

NEW METHODS FOR SMALL GROUP ANALYSIS FROM SAMPLE SURVEYS

Ray Chambers and David Steel are chief investigators on this linkage project which commenced in January 2008. The industry partners are Australian Bureau of Statistics, Australian Bureau of Agricultural and Resource Economics, NSW Department of Health Centre for Epidemiology and Research, and NZ Ministry of Health.

Total funding \$601,000.

The aims of this project are:

- To create and evaluate cost-effective methods to produce data for small groups using statistical modeling to combine survey data with information from other sources.
- To develop methods for small sample inference from sample surveys based on unit level models with correlated group effects.
- To develop a theory of robust inference for group effects applicable to small samples, where group definitions are flexible and can depend on the variable of interest.
- To determine the implications of the need to produce data for small groups for sample design, particularly in multistage surveys and repeated surveys.
- To provide high quality research training in applied statistics for research students in an area where there is strong demand in industry.
- To provide the opportunity for a postdoctoral researcher to establish international research credentials and industry relevant expertise.
- To establish ongoing research collaborations with four major organizations that conduct surveys and analyse the resulting data for small groups.

The research consists of five separate but related strands:

1. Efficient sample design and weighting with spatially correlated group effects.
2. Rotating panel designs for measuring change.
3. M-quantile models for spatially correlated data and categorical variables.
4. Outlier robust inference for small domains and small areas.
5. Statistical modeling and inference under informative grouping.
6. The following projects are currently underway as part of the overall research project.

Personnel employed as part of the project:

- GEORGE SOFRONOV, Post-doctorate, Efficient small area estimation with spatially correlated data

- DIANE HINDMARSH, PhD, Small area estimation and analysis: theory and application to health surveys
- ANANG KURNIA, PhD, Small area inference with long tailed distributions

Other people associated with the project include Hukum Chandra from the Indian Agricultural Statistics Research Institute, New Delhi, Nikos Tzavidis from the University of Manchester, and Nicola Salvati and Monica Pratesi from the University of Pisa who are working on research related to strands C and D of the project in association with Ray Chambers.

Other students in the School of Mathematics and Applied Statistics at the University of Wollongong who are working on related topics include: Mohammad Namazi Rad: 'Topics in Survey Design and Analysis' under the supervision of David Steel and Ray Chambers, and Wilford Molefe: 'Multilevel Models and Sample Design for Small-Area Estimation' under the supervision of Robert Clark.

This project will lead to advances in statistical theory relating to small sample inference from national and sub-national surveys. These advances will have a substantial impact on the information provision and analytic capacities of each of the four partner organizations.

Links to outcomes such as talks, papers and papers in progress will be posted on this website as they become available.

For further information, contact [Professor Ray Chambers](#).