Editorial

**Preface to the Special Issue in Memory of Fred Smith and Chris Skinner**

Two giants of the survey sampling world, Fred Smith and Chris Skinner passed away close together in December 2019 and February 2020. Both spent a large part of their working lives at the University of Southampton, but also spent time studying and working at the London School of Economics and Political Science (LSE). Therefore, in July 2021 the University of Southampton and LSE hosted a conference in their memory, as an International Association of Survey Statisticians-sponsored satellite meeting of the World Statistics Congress (WSC). Although we had aspirations to meet physically, there proved to be too much uncertainty over whether travel would be possible as the COVID-19 pandemic continued, so both the satellite meeting and the WSC itself were held on-line. This special issue contains a selection of papers from the conference, some invited from those who had worked closely with Fred and Chris, some contributed following an open call.

**Fred Smith and Chris Skinner**

Fred Smith studied statistics at LSE, and on completing his BSc moved on to a postgraduate studentship, then quickly to an assistant lectureship. He never completed a research degree – so he became a Professor without a PhD – but was still an outstanding researcher in the fields of time series and survey sampling. In 1968 he moved to the University of Southampton, where he encountered several other eminent survey statisticians – particularly Tim Holt with whom he started a programme of research on the analysis of complex survey data. Fred ‘officially’ retired in 1999, but was still regularly to be seen around the University attending seminars late into the 2010s.

Chris Skinner was an undergraduate at Cambridge, but then followed a similar path to Fred, gaining an MSc from LSE and working there as a research assistant before moving to Southampton in 1978 where he completed a PhD under Tim Holt, working on analysis of complex survey data. This continuing programme of work led to many outputs, two books and several conferences, as Southampton became a key place for research on survey methods. This also led to strong connections with official statistics, and ‘market testing’ led to an opportunity for work with the Office for National Statistics which continues today. Chris moved back to LSE in 2011, where he remained until his untimely passing.

Both Fred and Chris were unfailingly generous with their time. Fred was often happiest in debate over some aspect of statistical methodology at the blackboard, and both were very welcoming of students and visitors. More details of Fred’s life can be found in Chambers & Skinner (2003) and Holt (2020), and of Chris’s life in Haziza & Smith (2019) and Chambers et al. (2020a, b).

**Introduction to the Special Issue papers**

The first two papers include reviews of the work of Fred Smith and Chris Skinner respectively. Pfeffermann’s paper on the time series analysis of repeated survey data summarises the contributions of Fred Smith and Alastair Scott, who worked closely together on several papers, before bringing the field up to date with some of the latest developments in this topic. Chambers *et al*. review some of Chris Skinner’s contributions to the modification of inverse probability weights to improve inference, draw some parallels with causal inference and then extend the approach further, with an application to data from a rainfall experiment in Oman.

The remaining papers are set out in approximately the order of the survey process, as in the Generic Statistical Business Process Model (UNECE 2019). Clark & Steel consider how samples can be designed to make them efficient inputs to modelling, particularly considering the estimation of regression coefficients in generalised linear models. Zhang & Haraldsen turn their attention to a neglected corner of privacy – National Statistical Offices are often concerned with ensuring outputs are not disclosive, but here a model for how data inputs can be protected from disclosure during collection of detailed datasets from data providers is the focus.

Fuller considers poststratification based on sample quantiles, which provides protection against defining empty poststrata. Poststratification was a topic that Tim Holt and Fred Smith worked on in the late 1970s, and Fuller’s article includes a review of this work.

Several papers consider aspects of modelling of survey data. Van den Brakel *et al*. and Gonçalves *et al*. both consider state space modelling of repeated survey data from Labour Force Surveys, a topic which Fred Smith worked on extensively. The former paper shows how the state space model which provides the official labour force outputs in the Netherlands had to be adapted to deal with the effects of COVID-19 on both data collection and the levels of employment states. The latter demonstrates the production of single-month estimates from a state space model for a Labour Force Survey design with a quarterly rotation pattern in Brazil. Essentially the same design is in use in several countries, including the Netherlands, Brazil and the UK, and Chris Skinner advised on the introduction of this design in the UK in the early 1990s.

Kim *et al*. consider the fitting of two-level models to two-stage sample designs, following on from one of Alastair Scott and Fred Smith’s collaborations, and introduce a new approach for analysing two-level models taking account of the design weights. Silva & Moura also consider multilevel models, this time based on informative samples, and extend the existing approaches to work with multivariate responses.

Würz *et al*. consider small area estimation under transformations to deal with a skewed distribution of the data. Usually, auxiliary data for the whole population are required to make a bias adjustment in the back transformation, but here Würz *et al*. make adjustments with only some aggregate statistics (including covariances, which would have to be provided by a data custodian). This is therefore an approach related to disclosure control since less data would need to be released.

The last two papers are more explicitly about statistical disclosure control, an area where Chris Skinner was very active. Indeed he appears as an author in this memorial issue by virtue of some research completed after his death. Shlomo & Skinner review some of Chris Skinner’s work on the quantification of re-identification disclosure risk in sample data, and then extend the approaches to the case of a subpopulation which is not representative of the general population. Finally, Jackson *et al*. tackle the problem of synthetic data, in the particular case of large, categorical datasets, using an approach based on saturated count models which works in reasonable timescales.

**Appreciation**

Fred Smith and Chris Skinner both inspired a generation of statisticians working in survey sampling and related areas. The range of topics represented here, most directly related to their research topics, is wide, and demonstrates how they were able to inspire others to follow and to help to generate a community of survey sampling methodologists. We are grateful to all the participants at the Conference in memory of Fred Smith & Chris Skinner, and to those who have helped bring about this special tribute in the Journal of the Royal Statistical Society, a society with which both Fred and Chris were heavily involved.

**References**

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Paul A. Smith

Peter W.F. Smith

University of Southampton

August 2022