



# Newsletter

Issue 13

July 2001

## SRMS Program for the Joint Statistical Meetings in Atlanta

by Jim Lepkowski, SRMS Program Chair

The ASA is advertising the Joint Statistical Meetings coming in August as “Hotlanta.” For those of us who enjoy hot weather, there will be time during the meetings to get away and enjoy the warm (very warm!) weather. For those who do not enjoy it, we have developed a program that should be able to keep you indoors and busy for all five days of the meetings.

The 2001 Joint Statistical Meetings are August 5-9, Sunday through midday Thursday. Papers on a wide range of survey topics will be presented across 13 time slots on those days, beginning at 2 PM on Sunday. After 2 PM and 4 PM sessions on Sunday, there are invited and contributed paper sessions at 8:30, 10:30, and 2:00 Monday, Tuesday,

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## Selected Moments in the Development of Probability Sampling: Theory & Practice

by Tommy Wright, U.S. Census Bureau

### *Population and Sample*

“All scientific observation, whether statistical or not, is based on sampling,” says Stephan (1948).<sup>(1)</sup> “The earliest examples of sampling procedures are to be found in certain very ordinary human activities. The common practice of taking a small part or portion for tasting or testing to determine the characteristics of the whole precedes recorded history and is one of the roots from which sampling methodology stems...”

The current approach to sampling assumes a given finite collection of units, called a *population*. When examination of each and every unit in the population to know a particular population characteristic is undesirable or impractical, a *sample*, i.e., a subset or portion of the population, may be selected to yield satisfactory information regarding the particular population characteristic. The population characteristic, called a *parameter*, is often a quantitative one. In such cases, a *statistic* is computed using information collected from the small and more manageable sample, and its value is used to *estimate* the unknown value of the parameter. Although we desire a sample that will provide a “good” estimate of the unknown value of the parameter, it is certainly conceivable that the sample information obtained could lead to a very poor estimate.

### *Probability Sampling*

*Probability sampling* makes use of the laws of probability in the selection of the sample and in the construction of efficient estimators. With *probability sampling*, every population unit has a known positive chance of being

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selected for the sample. Probability sampling provides a means of measuring how good one believes an estimate is relative to all the possible estimates from all of the possible samples.

### A Census or a Sample

When limited resources such as time and costs dictate that a complete census is not possible, sampling is an alternative. In certain cases, such as determining the accuracy of a missile, sampling is the only way! Historically, however, the application of sampling techniques has had its ups and downs, largely owing to common misconceptions about sampling.

As Kish (1979)<sup>(2)</sup> has pointed out, censuses, if done correctly, have the potential advantage of providing precise, detailed, and credible information on all population units. On the other hand, samples have the advantage of providing richer, more complex, accurate, inexpensive, and timely information about the entire population.

### Sampling: Its Development

Following are selected major moments in the theoretical and practical development of probability sampling methodology.

*1802: P.S. Laplace uses sampling to estimate the population of France as of September 22, 1802.* Laplace persuaded the French government to take a sample of the small administrative districts known as communes and to count the total population ( $y$ ) in the sample communes on September 22, 1802. From the known total number of registered births (birth registration was required) during the preceding year in these communes ( $x$ ) and in the whole country ( $X$ ), the ratio estimate  $X \frac{y}{x}$  of the population of

France could be calculated. Laplace also derived several theoretical properties of the estimator. Laplace (1786) demonstrated this method earlier in estimating the 1782 population of France.<sup>(3)</sup> Assuming a closed population (i.e., no births, deaths, nor movement across population boundaries during the preceding year), this ratio estimator is similar to the Petersen estimator (see later). A similar method had been used for estimating the population of England as early as 1662 by John Graunt.<sup>(4)</sup>

*19th Century: There is very limited use of sampling.* For government statistical agencies, the generally accepted method of coverage was a complete enumeration. Very limited sampling was done.<sup>(5)</sup>

*1890: Herman Hollerith applies his punch card machines to the “speedy” processing and tabulation of the 1890 U.S. Census.* This initial use of technology eventually spread to the use of computers and other technology, for the collection, processing, analysis, and dissemination of data from complex sample surveys and has assisted the development of further theory (Bellhouse, 2000).<sup>(6)</sup>

*1895: A.N. Kiaer calls for sampling based on the “representative method.”* At the Berne meeting of the International Statistical Institute (ISI), Kiaer (first Director of the Norwegian Central Bureau of Statistics) puts forward the idea that a partial investigation (i.e., a sample) could provide useful information based on what he called the “representative method.” His representative method aimed to produce a sample which was a miniature of the population and can be described as follows: (1) in social and economic surveys, one could begin by choosing districts, towns, parts of cities, streets, etc., to be followed by systematic, rather than probabilistic, choice of units (houses, families, individuals); (2) there should be substantial sample sizes at all levels of such a selection process; (3) the sample should be spread out in a variety of ways, primarily geographically, but in other ways as well. For example, if a sample had a deficiency of cattle farmers, he would add more of them.<sup>(5)</sup>

*1896: Petersen presents a sampling methodology for estimating the size of a finite population (of fish).* The Petersen estimator provides the basis for capture-recapture estimation, widely used in the estimation of a wildlife population size; and from humble beginnings, a very large capture-recapture scientific literature has developed.<sup>(7)</sup>

*1897: At a conference of Scandinavian statisticians held in Stockholm, a conference resolution gives guarded support for the representative method being promoted by A.N. Kiaer.*<sup>(5)</sup>

*1903: Randomization is proposed for use in sample selection.* Lucien March, a French statistician in the discussion to Kiaer's paper at the 1903 Berlin International Statistical Institute meeting, was the first to introduce (with caution) concepts related to the use of probability (i.e., randomization) in the selection of the sample.<sup>(5)</sup>

*1906: Bowley presents a central limit theorem for random sampling.* Arthur Lyon Bowley presents a paper which seeks to give an empirical verification to a type of *central limit theorem* for simple random sampling by observing that the distribution of 40 sample means was approximately bell-shaped (i.e., normal).<sup>(5)</sup>

*1912: Bowley uses a systematically chosen sample of houses to study poverty in Reading, England.* Bowley often checked the representativeness of his samples by comparing his sample results to known population counts of variables on which these counts were available. For two cases in which he found a discrepancy between his sample and the official statistics, on further checking he discovered that the official statistics were in error.<sup>(5)</sup>

*1925: Based on the work of a commission to study the application of the representative method, the International Statistical Institute's meeting in Rome adopts a resolution which gives acceptance to certain sampling methods both by random and purposive (nonrandom) selection.*<sup>(5)</sup>

*1926: Bowley provides a theoretical monograph on random and purposive selection.* As a major discussant of the resolution adopted on the representative method at the 1925 International Statistical Institute meeting, Bowley provided a theoretical monograph summarizing the known results in random and purposive selection. In addition to several other ideas, the monograph contains a development of stratified sampling with proportional allocation and a theoretical development of purposive selection through correlation between control variables and the variable of interest. This latter development included formulae for the measurement of the precision of the estimate under a purposive sampling design.<sup>(5)</sup>

*1928-1929: Purposive selection does not always work.* For example, Corrado Gini and Luigi Galvani describe the selection of a sample from the 1921 Italian Census where the sample was "balanced" on seven important variables and made a purposive selection of 29 out of 214 administrative units in Italy. The resulting sample showed wide discrepancies with the census counts on other variables.<sup>(5)</sup>

*1934: Jerzy Neyman's "landmark" paper is published and plays a paramount role in promoting theoretical research, methodological developments, and applications of what is now known as probability sampling.* In this paper, Neyman was able to provide cogent reasons, both theoretically and with practical examples, why randomization gave a much more reasonable solution than purposive selection to the problems that then confronted sampling statisticians. A second major achievement of Neyman's paper is that it provides a theory of point and (confidence) interval estimation under randomization that breaks out of an old train of thought and opens up new areas of research.<sup>(5),(8)</sup> The best known major achievement was the result on optimal allocation in stratified sampling, though this result was independently obtained earlier by Tschuprow (1923).<sup>(9)</sup>

*1937: W. Edwards Deming invites Neyman to come to Washington, DC to give a series of lectures on probability sampling at the Department of Agriculture Graduate School.*<sup>(5)</sup> The notes from these lectures were published and became a major way for Neyman's ideas to gain wide acceptance in the United States.

*1938: U.S. Census Bureau uses national sample to estimate unemployment.* In the mid-1930's, the United States was in the grip of the Great Depression, and there was urgent need for current information on the unemployed. But estimates of the number of employed varied by many millions of persons and the next decennial census would not occur until 1940. A *Census of Unemployment* was undertaken as a nationwide voluntary registration of the unemployed and partially unemployed. Lack of confidence in the ability to control the accuracy of the unemployment registration (through the post office) led to the idea of an enumerative check (sample). The *Enumerative Check (Sample)* involved an enumeration of a sample of the total population, including all households in a 2 percent sample of postal delivery routes... The national registration and the check survey were done in November 1937, preliminary reports began by January 1938, and the final published reports were completed in 1938. The *Enumerative Check (Sample)* achieved the recognition, in the Census Bureau and elsewhere, that large-scale sample surveys could make substantial contributions, and under appropriate design and control, could produce timely information that was more accurate than complete censuses or national registrations. Many point to this survey as an immediate consequence of Neyman's Washington lectures earlier in 1937 and as the step that gave the Census Bureau the confidence to use sampling in the 1940 Census. The *Enumerative Check (Sample)* led to the Sample Survey of Unemployment which was started in March 1940 as a monthly activity of the Work Projects Administration (WPA) to measure unemployment. In August 1942, responsibility for the Sample Survey of Unemployment was transferred to the Bureau of the Census, and the sample survey is known worldwide today as the Current Population Survey. Since July 1959, the Bureau of Labor Statistics has had shared responsibility for the Current Population Survey. A model source of labor market information as well as a wealth of other social and economic data, the Current Population Survey provides what many would consider the leading indicator of our society's well-being — in the monthly unemployment rate.<sup>(10),(11)</sup>

*1940: Morris Hansen leads the move for implementation of sampling in the 1940 Census of the United States.* In an effort to control and limit the extent of efforts to obtain needed information on every person captured in the 1940 Census, sampling was introduced. These changes partly

reflected the demand from government and the public for additional information for use in research and policy-making regarding unemployment, occupational shifts, migration, population growth, and so forth. In order to provide this data without requiring it of everyone, a sample of 1 out of 20 people nationwide was selected to answer supplementary questions. Although statistical estimates relating to the supplementary questions were made for the entire population, the population count was the result of summing the individuals captured on all of the collection forms nationwide (without the use of sampling).<sup>(5),(12)</sup>

*1940-1946: In a series of papers, Mahalanobis develops the method of interpenetrating samples whose main purpose was (and is) to control and reduce nonsampling errors.* One important consequence of the technique is its simplicity in the estimation of sampling variance regardless of the complexity of the form of the estimator.<sup>(13)</sup>

*1943: Hansen and Hurwitz provide theory for unequal probability selection of sample units.* Up to the 1940's, just about all theory and practice was about equal probability of each unit in the population being included in the sample. In their 1943 paper, Hansen and Hurwitz took an important step forward by extending the idea of sampling with unequal inclusion probabilities for units in different strata as put forward by Neyman to differing inclusion probabilities for all units within a stratum. This allowed the development of very complex multi-stage sampling designs that are the backbone of just about all large-scale sample surveys done today, especially those by governments. With these surveys, large samples with acceptable (not necessarily minimal) levels of variance could be conducted at a reasonable cost.<sup>(5),(14)</sup>

*1944: Completed construction of the Master Sample of Agriculture makes it possible to provide special reports from the 1945 Census of Agriculture and to meet national needs.* Meeting a critical national need and making extensive use of materials (aerial photos and highway maps), the Master Sample contained about 67,000 area segments in the roughly 3,070 U.S. counties; and the segments contained about 300,000 of the 6,000,000 U.S. farms at the time. Subsequently, the name Master Sample of Agriculture came to be applied to the frame which permitted the development of efficient methods of sampling individual farms in taking economic surveys of American agriculture for numerous applications. This valuable national resource was a joint effort of the U.S. Department of Agriculture, the Iowa State College (now University), and the U.S. Bureau of the Census (Fuller, 1984).<sup>(15)</sup>

*1949: United Nations Subcommission on Statistical Sampling strongly recommends use of “replicated or*

*interpenetrating samples.”* Citing Mahalanobis' technique of replicated or interpenetrating samples applied to jute and rice surveys in India, the United Nations Subcommission on Statistical Sampling strongly recommends use of the technique.

*1952: Horvitz and Thompson present a general theory of sampling with unequal probabilities.* This general theory was centered around what has come to be known as the *Horvitz-Thompson estimator* of a population total. In addition to being unbiased, there is no other estimator in a particular class of estimators, which has smaller sampling error than the Horvitz-Thompson estimator.<sup>(16)</sup> (Narain independently presented a similar general theory in his 1951 paper in J. Indian Soc. Agricultural Statistics, 3, 169-174.)

*1953: Two highly cited books (to this day) on probability sampling theory are published.* The books which continue to have tremendous influence on the field of probability sampling are:

Cochran, W.G. (1953). *Sampling Techniques*, New York: Wiley and Sons, Inc.

Hansen, M.H., Hurwitz, W.N., and Madow, W.G. (1953). *Sampling Survey Methods and Theory*, Vols. I and II, New York: Wiley and Sons, Inc.

*1955: Godambe proves that there does not exist a uniformly “best” estimator of the population mean under randomization.* In his 1955 paper, V.P. Godambe proved that there is no estimator of the finite population mean which has uniformly minimum variance, within a certain (reasonable) class of estimators. (A refinement of Godambe's result is given in Lanke (1975).<sup>(17)</sup>) Godambe's result caused a reexamination of the *foundations of probability sampling theory* and has led to a serious consideration of the use of models for choosing among probability sampling techniques. One important focus has been around work initiated by Royall in his 1970 paper.<sup>(18)</sup>

*1957: Kish<sup>(19)</sup> promotes the concept of the design effect which is a measure comparing the sampling variance of one design with the sampling variance of simple random sampling.* This helped encourage the computation of standard errors which were consistent with the sample design. Further work reflecting the sample design in analyses is given by Rao and Scott (1981) where they develop contingency table and goodness of fit analyses for complex surveys.<sup>(20)</sup>

*1968: Small Area Synthetic Estimation is first used based on a national survey.* Typically, estimates for a geographic area use only data gathered from the particular area. As the

demand for statistics on smaller geographic areas grows, a large enough sample to support precise estimates can become prohibitively expensive. Synthetic estimates, based on the assumption that differences among a population can be characterized mainly by age, race and sex, and not geographic areas, are employed to provide, for instance, estimates of disability at the state level. This estimation technique is still employed today, however many of the limitations have been determined and documented, in the ensuing decades. This continuous research has resulted in many improved small area estimation techniques, notably the “borrowed strength” estimators.<sup>(21),(22)</sup>

*1968: The University of North Carolina at Chapel Hill organizes a conference entitled New Developments in Survey Sampling.* With primary international attendance by statisticians who were specialists in survey sampling, there were also well-known statisticians with different specializations. Many consider this interaction of survey sampling with other areas of statistics a major turning point in the history of probability sampling.<sup>(23)</sup>

*1970: Under a model, Royall shows that the ratio estimator<sup>(4)</sup> is the “best” estimator of a population total for any sample (random or nonrandom), selected only according to the values of known correlated auxiliary data.* With his model, Richard Royall found that by purposively selecting the units associated with the largest values of known auxiliary data, the model sampling error of the ratio estimator was minimized. Though others (e.g., Cochran) had earlier used models and results had been obtained earlier by Brewer (1963)<sup>(24)</sup>, Royall’s work generated considerable research around *model-based inference in sampling* as well as the traditional *design-based inference in sampling*. Probability is used to assess the goodness of statistical methods. With models, the probability comes with the chosen model; with sampling designs, the probability comes with the randomization used for the sample selection. When models hold, model-based inference is hard to beat. However, randomization through design-based inference offers protection against model failure. Today, many researchers and practitioners make use of both.<sup>(25)</sup>

*1970: The 1970 Census of the United States adds 1.5 million people based on sampling.* The 1970 Census was the first census to be conducted in most areas by mail; it was also one that used two sampling efforts to contribute to the official census totals. The problems were (1) that the Census Bureau had found in pretests that occupied units incorrectly reported as vacant were a significant factor in the population undercounts and (2) that, from the 1960 Census, housing unit coverage in the South was considerably worse than in the rest of the United States. The

first sampling effort, called the National Vacancy Check, selected for visits and interviews a sample of 13,546 housing units from a list of units that had been classified as vacant. Based on the sample results, approximately 8.5 percent of all the units initially classified as vacant were reclassified as occupied, and an estimated 1,068,882 people — 0.5 percent of the total 1970 Census count — were added to the count. The second effort, the Postenumeration Post Office Check, was used in 16 southern states. In this check, the U.S. Post Office matched its list of addresses for certain areas (those counted by visits rather than mail) with the addresses from the census. From all addresses on the Post Office list but not on the census list, the Census Bureau selected a sample for visits. On the basis of the sample results, about 484,000 people were added, or 0.8 percent of the entire South and 0.2 percent of the total U.S. population.<sup>(26)</sup>

*1983: The National Health and Nutrition Examination Survey (NHANES) finds high levels of lead in Americans’ blood.* This national survey provided the first clear-cut evidence that Americans had too much lead in their blood. As a result, Congress, the Environmental Protection Agency, and others phased out the use of lead as a gasoline additive. This survey has been used to continuously monitor the dramatic decline in the blood-lead levels resulting from this action.<sup>(27)</sup>

*Acknowledgments:* This effort was initially undertaken to demonstrate to a wide audience that the area of probability sampling has a history of rigorous development as a tool for scientific inquiry. The inclusion of particular “moments” on the list reflects the author’s biases. The list is clearly not exhaustive as it does not reflect more recent activity on a number of topics including: resampling methods for variance estimation, imputation methods for nonresponse, probability proportional to size sampling methods, and the use of auxiliary data and Bayesian methods. The author is grateful to the following persons who agreed to review an earlier version for correctness when the possibility of sharing the list with the readers of this newsletter arose: D.R. Bellhouse, W. Fuller, V.P. Godambe, Z. Govindarajulu, C. Isaki, S.R. Jammalamadaka, G. Kalton, P. Kott, S. Lohr, D. Malec, J.N.K. Rao, S.R.S. Rao, R. Royall, F. Scheuren, J. Sedransk, M.G. Sirken, T.M.F. Smith, S.M. Stigler, S.K. Thompson, and K. Wolter. Any remaining errors are solely due to the author.

This paper reports the results of research and analysis undertaken by Census Bureau staff. It has undergone a Census Bureau review more limited in scope than that given to official Census Bureau publications. This paper is released to inform interested parties of ongoing research and to encourage discussion of work in progress.

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(Continued from page 1)

and Wednesday, and sessions at 8:30 and 10:30 on Thursday.

SRMS members are a very active group, contributing more papers to the meetings than members from any other section except Biometrics. We have approximately 230 papers that are currently scheduled to be given in six invited, 23 topic contributed, 14 regular contributed, and one poster session. As a result, there are at least four SRMS sponsored sessions during each of the time slots. There are also a number of sessions that we are co-sponsoring with other sections. The problem for SRMS members will be, as always, that there are too many choices of what sessions and what papers to attend at any given time!

The six SRMS invited sessions consist of two panels and four sessions of papers. Johnny Blair has organized an invited paper session in honor of Seymour Sudman ("Issues in Sample Design and Response Effects"). Two of the invited sessions will give Bureau of the Census staff an opportunity to discuss the 2000 Census and the American Community Survey (papers in "Census 2000 Population Coverage" and a panel on "American Community Survey Planning"). There is a second invited panel on "Generalized Processing Systems and Generalized Modules," and two other invited paper sessions on "Automated Model Building" and "Household Survey Nonresponse."

The remaining 37 (!) SRMS sponsored sessions contain contributed papers. Those papers in topic contributed sessions are 20 minutes long, while those in regular contributed sessions are 15 minutes in length. The topic contributed paper sessions cover a wide range of survey methods research issues, from census methodology to internet surveys to privacy and confidentiality. The papers in the regular contributed paper sessions also cover a wide range of survey methods issues. There are regular contributed sessions on variance estimation, small area estimation, weighting, nonresponse, sampling inference, data collection methods, and other topics.

While each of these 43 invited and contributed sessions may have interest for you, there is one session we are co-sponsoring that I wanted to highlight. This year the Social Statistics, Government Statistics, and Survey Research Methods Sections jointly sponsored a student paper competition. Alan Zaslavsky, Program Chair for Social Statistics, took the initiative, getting out an announcement about the competition last summer. A total of nine student papers were submitted. A small committee of Program Chairs and Program Chairs-Elect reviewed and ranked the papers and chose six students to receive travel and expense awards to attend the Atlanta meetings. Two of the awards

are sponsored by SRMS: Ji-Yeon Kim from Iowa State University, "Local Polynomial Regression Sampling in Multiphase Sampling" and Jennifer Czuprynski, Stetson University, "Balancing Survey Costs with Nonresponse Bias Using Callbacks in Telephone Surveys." One student award paper was already being given in an invited session, but the other five papers are being given in a Social/Gov/Survey co-sponsored topic contributed session on Thursday at 8:30 AM. If you are still in Atlanta at that time, consider dropping by this session to hear these student papers.

Don't forget to drop by the SRMS Annual Meeting, too. It'll be Wednesday night at 5:30 PM, with free food, lively conversation, lots of interesting business (yeah, sure), and more than a few light moments courtesy of the SRMS comedians in the audience. (While survey researchers may have a reputation of being pretty humorless, we manage to have an enjoyable time each year at the annual meeting!)

And if you can't get enough survey methods in all these sessions, don't forget lunch! Pat Cantwell, our Program Chair-Elect, has organized nine very interesting round tables on Monday, 12:30-2. The round tables are fee events, so you'll have to pay to get in. And do so early. There are a limited number of seats at each table.

There is one other noteworthy event for the 2001 JSM. This is the first year that the entire program is on the web. If you've submitted a paper, you probably encountered the new web system. Not unexpectedly, there have been a few problems, and some of you have found them. But largely the new system is working very well. And it is now the official program. While you'll be getting a printed version of the sessions (but not all the papers) in an upcoming issue of *AmStat News*, any changes that are made later will be made to the online program. Check it out at <http://www.amstat.org/meetings/jsm/2001/onlineprogram>.

Finally, a few words of thanks to those who have made my job as Program Chair this year a lot easier. Past Chairs, John Eltinge and Nat Schenker, were great mentors and put up with a lot of silly questions. Chair-Elect Pat Cantwell was always willing to help when I got a little overwhelmed sorting through 200+ papers and 40+ sessions. And Elaine Powell on the ASA staff has been a delight to work with, answering questions and making endless changes to the program. And last, but not least, thanks to all the members of SRMS! I can't say that this Program Chair role has always been fun, but working with SRMSers who submitted papers, organized sessions, agreed to be Chairs or discussants, or help in any one of a number of ways has always been a pleasure.%%

# Section News



## Election Results

### Chair-Elect

S. Lynne Stokes, University of Texas at Austin

### Program Chair-Elect

Howard R. Hogan, U.S. Census Bureau

### Secretary

Leyla K. Mohadjer, Westat

Congratulations to our new Executive Committee members!\*

## Next SRMS Business Meeting

Attend the next Business Meeting at the Joint Statistical Meetings on Wednesday, August 8, 2001, which begins with a social at 5:30pm in Atlanta.\*

## 2002 ENAR Invited Session

Barry Graubard has been appointed the SRMS representative to the 2002 ENAR Program Committee. He is submitting a proposal on behalf of SRMS for an Invited Session on Bayesian Methods for Small Area Estimation. Hopefully it will be accepted.\*

## SRMSNET

If you haven't signed on yet, join now. If you aren't on the list, you aren't in the know! SRMSNET offers people the chance to ask questions or submit announcements relating to survey methods to a group of users through the use of e-mail. To sign up, send a message to [listserv@umdd.umd.edu](mailto:listserv@umdd.umd.edu) and, in the body of the message, type subscribe SRMSNET your name. Users, please remember that if you just click on "reply," your answer will go out to everyone on the SRMSNET — be sure to direct personal replies to the sender's own e-mail address! To unsubscribe, in your message to [listserv@umdd.umd.edu](mailto:listserv@umdd.umd.edu), type in the body of the message unsubscribe SRMSNET.\*

## SRMS Web Site

by Sharon Lohr, Assistant Editor Amstat On-Line

The SRMS web site now resides on the ASA server (address: <http://www.amstat.org/sections/srms/>) so you will no longer need to update your links when the Assistant Editor changes. Please continue to submit your news, suggestions, and announcements to me ([sharon.lohr@asu.edu](mailto:sharon.lohr@asu.edu)) through December. My term as Assistant Editor ends in December 2001; please send nominations for the next Assistant Editor to Dan Kasprzyk ([Daniel.Kasprzyk@ed.gov](mailto:Daniel.Kasprzyk@ed.gov)) or Al Tupek ([atupek@bellatlantic.net](mailto:atupek@bellatlantic.net)).

One of the biggest draws on the web site is the set of "What is a Survey?" brochures. I have received several e-mail messages from students who have found the brochures very helpful. One student wrote that he had decided to go to graduate school in statistics and study survey research because the problems sound so exciting. Another, a graduate student "really struggling with stats" whose undergraduate statistics course had clearly not been a pleasant experience, was grateful for statistics information on the web site that "wasn't in Greek." Thanks again to Fritz Scheuren and the contributors to the brochures who have provided this important outreach.\*

## Executive Committee Reports

### Message From the Section Chair

by Dan Kasprzyk

The annual meeting will take place next month and once again the section has a large and varied program. Jim Lepkowski, our Program Chair, has organized 234 papers this year into 43 sessions, and Pat Cantwell, our Program Chair-Elect, has set up 9 luncheon roundtables. Since its earliest years, the Section on Survey Research Methods has always had a strong program of papers presented, and this year is no exception.

Congratulations to our newly elected officers — Lynne Stokes (Chair-Elect), Howard Hogan (Program Chair-Elect), and Leyla Mohadjer (Secretary). Thanks to all who agreed to run for elected office in the section.

You can read elsewhere in this newsletter the activities of the SRMS Executive Board. It is important to recognize that the section's financial condition is very good — and has been for several years, primarily because of the extraordinary success of the conferences the section has sponsored since the mid-1980's. With this success comes responsibility for the SRMS

Board to provide additional services to our members and the profession. Lars Lyberg (Chair-Elect), Sarah Nusser (Treasurer), and I plan to develop some ideas for the board. A few steps have been taken recently in this regard: providing support for student awards to the annual meetings (with the Social Statistics Section and the Government Statistics Section), providing funding to support student participation in the International Conference on Questionnaire Development, Evaluation, and Testing Methods, and providing support for student participation in the conference to honor our colleague, Wayne Fuller. These activities are extremely worthwhile, but the section can do more. Lars, Sarah, and I hope to stimulate discussion with the board on future activities in support of our members and profession.\*

## Treasurer's Report

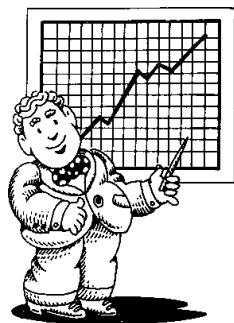
by Sarah Nusser

Thanks to Keith Rust's excellent work as Treasurer from 1999 to 2000 and to the success of recent conferences, the Section continues to have a sound balance, \$130,286.03 as of 12/31/00.

During the Spring 2001 SRMS Executive Committee meeting, we discussed several current and prospective initiatives that will make use of these funds.

As a Section, we have several commitments on the docket to support conferences and workshop activities. Seed money and travel funding for students and SRMS members have been obligated to the International Conference on Questionnaire Development, Evaluation and Testing (QDET), being held in the fall of 2002. In addition, two smaller conferences are being co-sponsored by the Section to pay tribute to sampling giants. In 2002, J. N. K. Rao will be honored with a conference on the occasion of his 65<sup>th</sup> birthday in Ottawa, Ontario. Wayne A. Fuller's 70<sup>th</sup> birthday was celebrated in Ames, Iowa in June 2001 (see article in Past Conferences).

The Executive Committee has also agreed to expand its commitment to sponsor at least two of the joint student paper awards given in the competition hosted by the Social Statistics, Government Statistics, and Survey Research Methods Sections.



We have received a number of other smaller requests for funding support and in many cases have needed additional information from the requestor to determine if the support is within the mission of the Section and if so, what level of support is appropriate.

At the August Executive Committee meeting, we will consider several options discussed in the spring for using the Section's funds. Many of these ideas focus on more proactively supporting students, isolated statisticians and other survey statisticians that require funds to attend professional meetings and continuing education activities. If you have ideas for recurring initiatives that you would like to share, please feel free to contact me at [nusser@iastate.edu](mailto:nusser@iastate.edu).\*

## Publications Officer's Report

by Al Tupek

My predecessor, Sharon Lohr, made my new role as publications officer easy. Thankfully, Leslie Wallace and Tom Krenzke continue to put out terrific newsletters, and Adam Kelley maintains the Section's listserv, SRMSNET. Sharon herself is continuing on as editor of the Section's web site. She has put up a lot of useful information on the site, including all of the recent Section newsletters and the "What is a Survey?" series. Check it out at [www.amstat.org/sections/srms](http://www.amstat.org/sections/srms). By now, you should have received a copy of the 2000 JSM Proceedings, if you ordered one. This will be the last printed proceedings. Future proceedings will be provided on CD-ROM.

I've been working with the other Section officers to see how we can better serve the membership through our publications. There are two areas that we hope to work on:

1. Providing electronic proceedings for previous JSM meetings. While we considered going it alone to scan in the documents, we decided to wait until after the 2001 JSM to see if the Council of Sections develops a plan for all sections.
2. Reaching out to the entire ASA membership with interesting articles about our Section and the activities of our members. We recently submitted an article to Amstat News and hope to continue to do so. If you have an article, or suggestions for articles, that would appeal to the broader ASA audience, please let me know. The best way to reach me is by email at [atupek@bellatlantic.net](mailto:atupek@bellatlantic.net).

## Report from the Council of Sections Representative

by Bill Kalsbeek

### ASA Proceedings On CD-ROM

There were many routine topics and actions taken at the Council of Sections meeting at the JSM last August in Indianapolis. Included among them: a decision to offer a free section membership upon joining the ASA starting in January 2001, a plea to have sections coordinate their appeals to donors during fund-raising campaigns, a request to provide information on professional ethics to new ASA members, and a solicitation for ASA strategic planning initiatives. The topic sparking the greatest interest by far was a proposal to completely discontinue publishing paper proceedings in favor of an electronic version, starting with the 2001 JSM. ASA staff had researched ways to accomplish this and concluded that it would be less expensive to produce for sale at \$20 a searchable CD-ROM containing papers for all sections combined than it would be to print and sell paper copies of separate section proceedings, as has been done for years.

With a strong endorsement of the Survey Research Methods Section and most other ASA sections, the proposal was given the green light to proceed. Although the sale price has since increased to \$25, publication of ASA proceedings in this format will allow the user to run topic/author searches and do jump links from a table of contents to the articles.

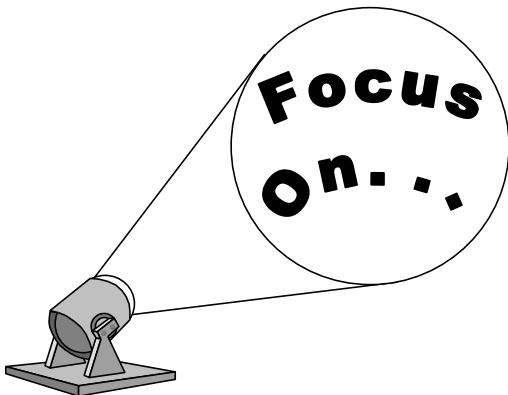
In a related development, the SRMS Executive Committee has decided to explore the possibility of converting past SRMS proceedings into a similar electronic format. This possibility was discussed at the Committee's May meeting and will be further considered in its August meeting at the JSM. Meanwhile, please feel free to contact me ([bill\\_kalsbeek @unc.edu](mailto:bill_kalsbeek@unc.edu)) or any other member of the Executive Committee if you wish to share your views or ideas on converting past SRMS proceedings in this way.\*

### Summary Notes from SRMS Executive Meeting

The following summarizes key decisions or discussion points from the April 2001 Executive Committee Meeting held at the ASA office in Alexandria, Virginia. For more information, contact the Chair, Dan Kasprzyk ([daniel.kasprzyk@ed.gov](mailto:daniel.kasprzyk@ed.gov)), or attend the next Business Meeting at the Joint Statistical Meetings (August 8, 2001 at 5:30pm in Atlanta).

- ◆ The International Conference on Questionnaire Development, Evaluation, and Testing Methods will be held in Charleston, S.C. November 14-17, 2002. The conference will be limited to 300 attendees. SRMS previously agreed to provide \$5,000 start-up money and \$10,000 additional support to help students and section members attend the conference, with at least half of the additional funding going to students. Abstracts for contributed papers are due September 1, 2001.
- ◆ The SRMS would like past proceedings to be electronically archived in the near future. The ASA Council of Sections has discussed this project for several years; there is a desire to archive proceedings for all sections. The SRMS Council of Sections Representative will follow up on this topic in August. The Committee is willing to pursue this for the section as a special project if the ASA does not have a schedule and plan to accomplish this.
- ◆ SRMS has one page available for section use in the Amstat News each month. The Committee agreed that we should make better use of this page. Al Tupek (the Publications Officer) is soliciting ideas for topics for the page.
- ◆ SRMS will sponsor a total of 43 sessions at the 2001 JSM in Atlanta. These include 6 invited sessions, a session honoring Seymour Sudman, and 234 papers. In addition, SRMS will sponsor nine roundtables.
- ◆ The Committee discussed what could be done to help the Program Chair with the large task of organizing the program each year. The Committee decided to have the Chair-Elect help the Program Chair, and to send both the Chair and the Chair-Elect to the Program Chair's meeting in February. This arrangement will not only help the Program Chair, but will familiarize the Chair-Elect with the process.
- ◆ Pat Cantwell has several ideas for invited sessions at the 2002 JSM in New York. More ideas are needed. The SRMS is planning a memorial session for Leslie Kish at the 2002 JSM.
- ◆ The Committee agreed to a proposal from the Government Statistics Section on how to structure the Student Award Committee in 2002 and beyond. The Chair of the award committee will come from one of the three sponsoring sections on a rotation basis. SRMS also agreed to sponsor two students each year and to consider additional requests for student awards if a large number of particularly good abstracts is received.

- ◆ For 2002, the section nearly doubled the available balance from the previous year's budget, bringing it to over \$130,000. As always, the Committee would like to use the funds to help its members and the profession. Several ideas for doing this were discussed, most of which were service-oriented activities for which little or no return on our investment is expected. The SRMS will continue to sponsor conferences of interest to the survey research community, but these tend to make money for the section.
- ◆ The SRMS needs an historian, whose primary duty would be to organize the section's historical documents and write the section's history from the late 1980's (Irene Hess has brought together considerable material from the first decade of the section's history). Ultimately, we would like the history to be posted on the section's web site.
- ◆ The SRMS webmaster, Sharon Lohr, is trying to make the section's web site more amenable to searches. Her term is up at the end of the year, so the section needs a new webmaster beginning in January 2002.
- ◆ The Committee considered several requests for funding. The Committee decided to financially support the International Conference on Recent Advances in Survey Sampling to be held from July 10-13, 2002 in honor of Jon Rao, and the conference held June 21-22, 2001 in honor of Wayne Fuller.\*



## Standing Committee Report

### ASA/SRM Working Group on Technical Aspects of SIPP

by Karen King, U.S. Census Bureau

The working group for the Survey of Income and Program Participation (SIPP) was formed in 1986. The working group

was formed based on a recommendation by the American Statistical Association's Census Advisory Committee (CAC). They felt that a separate working group was needed to properly deal with SIPP's numerous technical and methodological issues which were taking up a great deal of the CAC's time.

Initially the group was a joint venture between the ASA's Survey Research Methods (SRM) Section and the Social Science Research Council (SSRC) and was called the ASA/SSRC Working Group on the Technical Aspects of SIPP. The initial proposal suggested the working group would address these issues for two years. It was then to report back to the CAC with a recommendation for future meetings. The working group met several times over a two-year period and offered a great deal of valuable advice. In April 1989, the Census Bureau asked the Survey Research Methods Section to continue the working group indefinitely. The name of the working group was changed to its current form. The working group continues to meet and offer valuable advice for the SIPP and the related Survey of Program Dynamics (SPD). A meeting is planned for the fall of 2001.

Members of the working group usually serve 3 to 4 years. The size of the working group varies from 8 to 12 members. All members are from outside the Census Bureau and have come from other government agencies (Statistics Canada), private industry (Westat and Research Triangle Institute) and academia (University of Michigan, Stanford University, and Joint Program of Survey Methodology). Working group meetings generally occur annually. Occasionally a second meeting is called so that the working group can help address issues that need to be resolved in less than a year.

Topics discussed generally cover the current status of the survey products, progress on current research, potential impact of changes to the sample design, and potential improvements due to changes in procedures. Some specific concerns of the original working group were possible bias due to not interviewing the institutionalized population, alternative definitions of longitudinal households, the unbelievably high number of status changes occurring between SIPP interviews called the seam bias, and sample loss due to nonresponse. Specific concerns of more recent working groups included the new alternative measures of poverty, improvements in weighting and variance estimation, the seam bias, and sample loss due to nonresponse. As you can see, some issues never quite get solved or go away.

## SRMS Standing Committees

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Donna Brogan: 2001 - 2003  
Paul Lavrakas: 2001 - 2003  
Sarah Nusser: 2001 - 2004  
TBA: 2001 - 2002

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Don Dillman: 1998 - 2002  
Paul Biemer: 1998 - 2003  
Lynne Stokes: 1999 - 2001  
Clyde Tucker: 1999 - 2001  
Chris Skinner 2001 - 2003

### **Research Industry Coalition**

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## International Conference on Small Area Estimation and Related Topics

Potomac, Maryland, April 11-14, 2001

The conference organizer Stephen Woodruff reports that the conference went quite well. Consensus is that there was sufficient good new material presented to produce a proceedings later this year. Conference participants were spoiled with better than average facilities, receptions, and dinners. In particular, the Spirit of Washington dinner cruise on Friday was very enjoyable. For more information, please contact Steve at [swoodruf@email.usps.gov](mailto:swoodruf@email.usps.gov) or check out the conference web page at <http://galton.uchicago.edu/~larsen/sa2001>.

## Conference in Celebration of Wayne A. Fuller's 70th Birthday

Ames, Iowa, June 21-22, 2001

Sarah Nusser reports that over 150 colleagues and friends gathered on June 21-22, 2001 in Ames, IA to celebrate Wayne A. Fuller's 70<sup>th</sup> birthday. The conference program was designed to pay tribute to Professor Fuller's considerable impact on the statistical sciences and application domains, to his generous mentorship of students and professionals, and to his dedicated service to the discipline and to statistical organizations. Excellent talks were presented by 20 invited speakers on three topics related to Fuller's main research areas (time series, measurement error models, survey sampling) and on Fuller's influence on national statistical programs and subject matter areas such as dietary assessment, natural resource monitoring, and econometrics. Thirteen young researchers were invited to present posters on topics related to the conference themes, which were enjoyed by all during an evening reception. The conference closed with a banquet and roast. Many excellent and funny stories were shared by friends during the evening, including a rare showing of Carnac the Magnificent. The organizing

committee is indebted to the SRMS for its generous contribution. Other sponsoring organizations included the National Science Foundation, Symbiance, Census Bureau, Procter & Gamble, Eli Lilly, Westat, SAS, Bureau of Labor Statistics, and Iowa State University.



## International Conference on Recent Advances in Survey Sampling

Carleton University in Ottawa, Ontario, Canada, July 10-13, 2002

Sponsored by the Laboratory for Research in Statistics and Probability of Carleton University, and supported in part by a grant from the Survey Research Methods Section. The conference will honor the work of Professor J.N.K. Rao and will celebrate Professor Rao's 65th birthday, which falls on May 16 of 2002. It is intended that the conference will cover topics related to Professor Rao's wide-ranging research interests, particularly his interest in a broad spectrum of sampling topics. The sessions scheduled to date include sample surveys, biostatistics, time series, and statistical inference.

Professor Rao obtained his B.A. in Mathematics at the age of 17 from Andhra University and two years later obtained an M.A. in Statistics from the University of Bombay. In both cases he obtained a First Class. He then went to Iowa State University where he obtained his Ph.D. in 1961, obtaining the George W. Snedecor Award in Statistics for Outstanding Ph.D. Student of the Year. Since that time Professor Rao has been the recipient of several awards including Fellow of the Royal Society of Canada, Fellow of the American Association for the Advancement of Science, Fellow of the American Statistical Association and Fellow of the Institute of Mathematical Statistics. He has been given the Gold Medal from the Statistical Society of Canada and was invited to deliver the Eighth Annual Hansen Memorial Lecture in Washington, DC. His research career has, and continues to

be, outstanding. With over 120 publications in refereed journals, much of his work appears in the leading journals of the profession. He is much sought after for his editorial abilities, serving at various times as an associate editor for eleven different journals.

Professor Rao has long been a tireless supporter of the American Statistical Association and its Section on Survey Research Methods. Since 1978, Professor Rao has presented papers at the ASA meetings and subsequently published them in the "Proceedings of the Section on Survey Research Methods" on 14 different years. In many of those years, he was the co-author of more than one paper presented. He has also been invited on many occasions to give a paper or has been invited to be a discussant at these meetings. Last year he gave a one-day workshop on small area estimation sponsored by the Survey Research Methods Section. He served as an Associate Editor of the "Journal of the American Statistical Association" from 1992 to 1995. He has also served as Chair of the Committee on Fellows for the Section in 1995 - 96 and was a member of the E.C. Bryant Scholarship Committee in 1996.

For further information on the conference, please contact:

Mrs. Gillian Murray, Coordinator  
Laboratory for Research in Statistics and Probability  
Room 5230 Herzberg, Carleton University  
1125 Colonel By Drive  
Ottawa, ON K1S 5B6 CANADA

Tel: (613) 520-2167 Fax: (613) 520-3822  
E-mail: gmurray@math.carleton.ca.\*

International Conference on  
Questionnaire Development, Evaluation,  
and Testing Methods (QDET), Radisson  
Hotel Charleston, Charleston, South  
Carolina, November 14-17, 2002

The goals of the first international conference devoted to the methods used for questionnaire development, evaluation, and testing are to bring together researchers and survey practitioners working in this area, to stimulate research papers that contribute to the science of reducing measurement error through questionnaire evaluation, to provide documentation of the current practices, and to stimulate new ideas for future practices. Both invited and contributed sessions are planned. An integrated volume representing the theoretical, methodological, and statistical contributions to the field will be produced after the conference. Abstracts for contributed papers are due by September 1, 2001. This conference is

sponsored by ASA/SRM, AAPOR, IASS, CASRO, and CMOR. For more information please visit the conference web site at: [www.jpsm.umd.edu/qdet](http://www.jpsm.umd.edu/qdet) or contact Jennifer Rothgeb, Organizing Committee Chair, U.S. Census Bureau, FB4 - Room 3125, Washington, DC 20233; Email: jennifer.m.rothgeb@census.gov.\*

## Awards



### SSS/GSS/SRMS Student Paper Competition

Thanks to Alan Zaslavsky, ably assisted by Jim Lepkowski and Karen Woodrow-Lafield, the SSS/GSS/SRMS 2001 Student Paper Competition was a big success. As a result of the competition, six students will receive travel awards and will present their papers at the 2001 JSM in Atlanta. The 2001 winners are:

Kristin A. Blenk, Ohio State University  
Using Propensity Score to Control Coverage Bias in Telephone Surveys

LinChiat Chang, Ohio State University  
Improving Election Forecasting

Jennifer Czuprynski, Stetson University  
Balancing Survey Costs with Nonresponse Bias Using Callbacks in Telephone Surveys

Ji-Yeon Kim, Iowa State University  
Local Polynomial Regression Sampling in Multiphase Sampling

Stanislaw Kolenikov, University of North Carolina  
Modeling of Expenditure Distribution by Lognormal Mixture

Elizabeth Stuart, Harvard University  
Using Administrative Records to Predict Census Day Residency

Elizabeth Stuart will present her paper in an invited session (#167 on Tuesday from 10:30-12:20). The other five students have been organized into one topic-contributed session (#317 on Thursday morning from 8:30-10:20).

Students, it is not too early to begin thinking about the 2002 Student Paper Competition! Please use this announcement of our 2001 winners to begin seriously thinking about your submission. Speak with your advisor, chat with your fellow classmates, brainstorm a research idea you think would be

fun to develop! The summer is a perfect time to set your goals for next year! The deadline for submitting abstracts for the 2002 competition will be December 15, 2001, so start your planning now! If you have any questions or would like to speak to someone about the competition, feel free to contact the organizer of the 2002 competition: Robert Santos (2002 Program Chair, Social Statistics Section). Rob's email address is rsantos@nustats.com and his telephone number is 512 306-9065, extension 2235.\*

## Bryant Scholarship to be Awarded

Each year an outstanding graduate student in Survey Statistics is awarded the Edward C. Bryant Scholarship to help support the student's graduate education. Westat established the Edward C. Bryant Scholarship Trust Fund in 1995 to honor its co-founder and long-time leader. Under Dr. Bryant's leadership, Westat, an employee-owned statistical firm established in 1961, grew into what is now one of the world's leading statistical research firms with a full-time permanent staff of 1,200. Selection of the scholarship recipient is made by the ASA Bryant Scholarship Award Committee. The selection criteria includes potential to contribute to survey statistics, applied experience in survey statistics, and performance in graduate school. The award consists of a certificate and a \$1,500.00 cash prize.

The 2001 winner will be presented at the Presidential Address at the JSM in Atlanta. For more information about the 2002 scholarship including an application, see [www.amstat.org/awards/bryant.html](http://www.amstat.org/awards/bryant.html). An additional contact is Jean Opsomer, the 2001 Committee Chair at [jopsomer@iastate.edu](mailto:jopsomer@iastate.edu) or (515) 294-0212. Applications and letters of recommendation must be received by March 31, 2002 for consideration.\*

## The Waksberg Invited Paper Series in *Survey Methodology*

*Survey Methodology* has established an annual invited paper series in honor of Joseph Waksberg, who has made many important contributions to survey methodology. Each year, as part of the Waksberg Invited Paper Series, a prominent survey researcher will be chosen to author a paper that will review the development and current state of a significant topic within the field of survey methodology, and will reflect the mixture of theory and practice that characterizes Waksberg's work. The author receives a cash award made possible by a grant from Westat, in recognition of Joe Waksberg's contributions during his many years of

association with Westat. The grant is administered financially by the American Statistical Association. The author is selected by a four-person committee appointed by *Survey Methodology* and the American Statistical Association.

The author of the first paper in the series is Gad Nathan, Professor of Statistics at the Hebrew University of Jerusalem. His paper "Telesurvey Methodologies for Household Surveys — A Review and Some Thoughts for the Future" will appear in the June 2001 issue of *Survey Methodology*.

Paul Biemer has been appointed the ASA representative to the 2002 Waksberg Award Committee.\*



## Proceedings of the Second International Conference on Establishment Surveys

The ICES II proceedings, both in paper format as well as a CD-ROM were published earlier this year. Unfortunately, as with most undertakings, a few errors crept in. For this, I would like to sincerely apologize to all concerned, and to the affected authors in particular. The corrections can be found on the ICES II web site, under the Proceedings - Errata link:

<http://www.eia.doe.gov/ices2/#errata>

John Kovar, Chair, ICES II Organizing Committee\*

## Editors' Note

For an article detailing the sessions sponsored by SSS, GSS, or SRMS at JSM 2001, see the July Amstat News.\*

We welcome announcements from SRMS members that are of general interest to survey research professionals.

Contact the editors at [LeslieWallace@Westat.com](mailto:LeslieWallace@Westat.com) or [TomKrenzke@Westat.com](mailto:TomKrenzke@Westat.com).\*

# Significant Digits

by John Slanta, U.S. Census Bureau

*There once was a very smart midget  
Who built the very best widgets.  
His precision was small,  
so his orders grew tall,  
for he used more significant digits.*

My first encounter with significant digits was in high school chemistry class when the instructor was teaching us how to use the slide rule. My impression was that the concept of significant digits dealt with the accuracy of a number. If I multiply the two numbers 269 and 342 on my slide rule, then at best, I am able to read the result as approximately 92,000. The true result is 91,998. To determine how many significant digits there are in the approximation, first convert both numbers into floating-point notation, i.e.  $.92000 * 10^5$  and  $.91998 * 10^5$ . This eliminates all leading zeros. Then, assume an infinite number of trailing zeros on the end of the mantissa components. Between the approximate and true values, the maximum number of digits in the mantissa components that equal each other, when rounded, is the number of significant digits in the approximated value. In the above example, there are four significant digits. Both values round to  $.9200 * 10^5$ .

Unfortunately, most of the time we do not know the truth. Therefore, the number of significant digits in the approximated number is unknown and thus estimated. In the above example, I would have estimated the approximation to have only three significant digits because I knew that I was guaranteed at least that much accuracy with my slide rule. Therefore, the estimated number of significant digits of an approximation is based on the precision of the measuring tool used.

When determining the number of significant digits of a number from unknown origin, it has been common practice to treat all nonzero digits as significant. Zeros whose only assumed function is to keep track of the decimal place are



not significant. All other zeros are significant. This guess of the number of significant digits is only as good as the assumptions made. Note that good prior knowledge may lead one to a better guess. My favorite example is the temperature at which water freezes, i.e. zero degrees Celsius. This number has no nonzero digits and yet it has an infinite number of significant digits. With prior knowledge, one may also determine that some nonzero digits are not significant.

When doing a series of mathematical operations, one again has to estimate the number of significant digits in the final result. If the operations are multiplication or division, or one is using a function such as logarithmic or trigonometric, then it is customary to assume that the result has the same

number of significant digits as the input with the least number of significant digits. For addition or subtraction, one first needs to locate the marker. The marker is the highest place (... , hundreds, tens, units, tenths, hundredths, ...) of the last significant digit in each input. The number of significant digits is the number of digits to the left of the marker and including the marker that are not leading zeros. These estimates can be wrong, but generally, they are within one digit of the true

number of significant digits. There are paradoxes in the computer environment that exist where all the input values have a finite number of significant digits and the result is an infinite number of significant digits, and visa versa. I'll leave this for the reader to ponder.

I leave you with this final thought. When I learned to use the slide rule, I was working in base ten. Now, with the computer, I am really working in base 2, even though the display is base ten. That means numbers like 0.1 and 0.2 are never stored exactly in the computer. When working on the computer, we should consider significant digits in base 2, and then convert to base 10.

This paper reports the results of research and analysis undertaken by Census Bureau staff. It has undergone a more limited review by the Census Bureau than its official publications. This article is released to inform interested parties and to encourage discussion.\*

# Charter of the Section on Survey Research Methods (Revised 1991)

## Article I. NAME

The name of this organization is the Section on Survey Research Methods of the American Statistical Association (hereafter called the Association).

## Article II. SCOPE

The interests of the Section on Survey Research Methods include all those that employ survey methodology as a focus or as a prime tool of investigation. Some areas of special interest are:

1. Design and execution of sample surveys.
2. Analysis and presentation of survey data.
3. Statistical inference from survey data.
4. Publication of developments and findings in survey research.
5. Standards of design, estimation, and reporting of surveys.
6. Promotion of uniform survey terminology.
7. Consequences of survey research procedures and findings on public policy, including relations between public and private agencies in the design, conduct, and presentation of findings of surveys.
8. Ethics relating to the conduct of survey research and to respondents and potential respondents.

## Article III. FUNCTIONS

The primary function of the Section on Survey Research Methods is the encouragement of research and advancement of knowledge in survey research methodology, endeavoring:

1. To stimulate the preparation of articles and reports dealing with survey methodology under Association auspices.
2. To disseminate work on survey research methodology to a wider audience within the Association, in the scientific community, and among the public by fostering liaison with persons and organizations publishing papers and monographs on topics of interest in survey methodology.

3. To sponsor topic-oriented workshops, short courses, and conferences of interest to survey researchers.
4. To develop and publicize standards for the design, conduct, and reporting of surveys, and for the assessment and evaluation of survey practices.
5. To review outlets for publication on survey research methodology and to facilitate separate publications, when and where appropriate.

## Article III. MEMBERSHIP

Membership in the Section shall be open to all full members of the Association who indicate an interest in the activities of the Section by payment of Section dues.

The Section's membership year will coincide with that of the member's membership year in the Association.

## Article IV. DUES

Section dues will be determined by the Executive Committee of the Section.

## Article V. MEETINGS

The annual business meeting, open to all members and other interested parties, shall be held in connection with the annual meeting of the Association and shall be announced in advance in the printed program of the annual meeting.

## Article VI. OFFICERS AND TERMS OF OFFICE

The officers of the Section shall be elected by the membership and consist of the Chair, the Chair-Elect, the Past Chair, the Program Chair, the Program Chair-Elect, the Secretary, the Treasurer, the Publications Officers, and one or more Representatives to the Council of Sections.

The term of office for the Chair, Chair-Elect, Past Chair, Program Chair, and Program Chair-Elect shall be one year.

The term of office for the Secretary, Treasurer, and Publications Officer shall be two years.

The term of office for Representatives to the Council of Sections shall be as specified in the Charter of the Council of Sections.

The Chair-Elect, Chair, and Program Chair-Elect shall automatically succeed the Chair, Past Chair, and Program Chair, respectively, at the annual change of offices, which shall occur on January 1. No member shall be eligible for

immediate re-election to the same office except a Secretary, a Treasurer, or Publications Officer.

A Past Chair shall not be eligible for immediate re-election to the office of Chair-Elect, and a Program Chair shall not be eligible for immediate re-election to the office of Program Chair-Elect. A Representative to the Council of Sections whose first term was not a full term or whose term was shortened due to election to the Governing Board of the Council of Sections shall be eligible for immediate re-election.

#### **Article VII. EXECUTIVE COMMITTEE**

The Executive Committee of the Section shall consist of its officers. The Executive Committee shall manage the affairs of the Section. The Section Chair, with the advice and approval of the Executive Committee, may designate committees to carry out the functions of the Section.

#### **Article VIII. VACANCY IN OFFICE**

In the event of a vacancy in the office of Chair, the Chair-Elect shall become Chair for the balance of the vacated term in addition to the term for which the Chair-Elect was elected. In the event of a vacancy in the office of Program Chair, the Program Chair-Elect shall succeed for a similar term. If the office of Past Chair becomes vacant, it shall remain vacant until filled by the current Chair at the beginning of the following year. In the case of a vacancy in any one of the other elective offices, the Section Nominations Committee shall make a nomination(s). Appointments shall be by a majority vote of the Executive Committee. The person so chosen shall serve for the remainder of the vacated term.

#### **Article IX. NOMINATION AND ELECTION**

On or before the Association deadline each year, the Section's Committee on Nominations shall submit, to the

Secretary of the Association and the Section Chair, at least two nominations for each vacancy to be filled. All nominees are to be included in the Association's annual mail ballot for the election of Association and Section officers. All balloting procedures for Section officers shall conform to those used in balloting for Association officers.

#### **Article X. COMMITTEE ON NOMINATIONS**

Each year, the following year's Chair-Elect shall serve as Chair of the Committee on Nominations and shall appoint two other members of the Section to serve on the committee. No member of the committee, other than the Chair, shall be a member of the Executive Committee. The Committee on Nominations shall make the nominations for offices of the Section that will become vacant at the end of the following year.

In addition to the nominees of the committee, any Section member nominated by petition of 25 or more members of the Section shall also appear on the annual ballot. Such a petition must be presented by one of the petitioners to the Secretary of the Association and the Section Chair within 45 days after the mailing date of the publication announcing the names of the candidates submitted by the Committee on Nominations.

#### **Article XI. AMENDMENTS**

Amendments to this charter may be proposed by the Executive Committee of the Section or by a petition signed by at least 25 members of the Section and submitted to the Executive Committee. The proposed amendment shall be submitted to the members of the Section for mail vote at the time of the annual election of officers. If approved by a majority of the members of the Section voting, the Amendment is subject to approval of the Associations Council of Sections. If approved by the Council, the amendment shall be effective immediately.\*

# Executive Committee Members

<b>SECTION OFFICERS</b> <b>Survey Research Methods Section Executive Committee</b>		
<b>Past Chair</b> Brenda G. Cox Phone: (202) 484-4231 Fax: (202) 863-1763 E-mail: <a href="mailto:bcox@mathematica-mpr.com">bcox@mathematica-mpr.com</a>	<b>Program Chair</b> James M. Lepkowski Phone: (734) 936-0021 Fax: (734) 764-8263 E-mail: <a href="mailto:jimlep@umich.edu">jimlep@umich.edu</a>	<b>Publications Officer (2001-2002)</b> Alan R. Tupek Phone: (301) 457-4287 Fax: (301) 763-0345 E-mail: <a href="mailto:atupek@bellatlantic.net">atupek@bellatlantic.net</a>
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<b>Secretary (2000-2001)</b> Elizabeth Zell Phone: (404) 639-4710 Fax: (404) 639-2780 E-mail: <a href="mailto:ezrl@cdc.gov">ezrl@cdc.gov</a>	<b>ASA Staff Liaison</b> Mary Fleming Phone: (703) 684-1221, ext. 162 Fax: (703) 684-3422 E-mail: <a href="mailto:mary@amstat.org">mary@amstat.org</a>	<b>Assistant Editor AmStat Online (2001)</b> Sharon Lohr Phone: (480) 965-4440 Fax: (480) 965-8119 E-mail: <a href="mailto:sharon.lohr@asu.edu">sharon.lohr@asu.edu</a>

## Executive Committee Bios

*Pat Cantwell*, the SRMS Program Chair-Elect, is a supervisory mathematical statistician at the Bureau of the Census. At the Bureau he started in the Statistical Research Division working primarily on issues related to the household surveys, particularly the Current Population Survey. He then spent five years in the economic area in charge of sampling and estimation for surveys of retail and wholesale trade, transportation, trucking, and others. In recent years he has worked on the decennial census of population and housing, assuming responsibility for missing data procedures in the census coverage evaluation survey, and leading a branch in statistical communications. Prior to joining the Census Bureau, he received a Ph.D. in statistics from the University of Connecticut. His areas of interest include rotation sampling designs, composite estimation, coordinated sampling, and measuring transportation flows. He has published papers in the *Journal of Official Statistics (JOS)*, *Survey Methodology*, and the proceedings of various conferences. He serves as an associate editor of *JOS*, and was a member of the organizing

committee of the Second International Conference on Establishment Surveys, held in 2000.

*Jim Lepkowski* is Senior Research Scientist at the Institute for Social Research and Associate Professor in the Department of Biostatistics at the University of Michigan. He directs the Summer Institute in Survey Research Techniques at the Survey Research Center at Michigan, a program which has offered courses in survey research techniques each summer since 1948. Jim also is a member of the Joint Program in Survey Methodology at the University of Maryland, where he teaches courses jointly between Maryland and Michigan through a two-way interactive compressed video system. As a research scientist, Jim conducts investigations on survey methodology problems, such as the design of telephone samples for households in the U.S., the behavior of analytic statistics when the data are obtained from complex sample surveys, imputation methods to compensate for item missing data in surveys, weighting to compensate for unit nonresponse, and the interaction between interviewer and respondent in the survey interview. He currently directs the National Center for Health Statistics funded Michigan Center for Excellence in Health Statistics.\*



## Mission Statement

The mission of the Section on Survey Research Methods is to promote the improvement of survey practice and the understanding of survey methods by encouraging both theoretical and applied research on survey-related topics and by disseminating information on survey methods.

Areas of interest for the Section include all that employ survey methodology as a focus or as a prime tool of investigation. Of special interest are:

- ◆ Theoretical foundations of sampling;
- ◆ Sample design and estimation;
- ◆ Nonsampling errors and data collection methods;
- ◆ Analysis and presentation of survey data;
- ◆ Education of the public and students on the importance of scientific survey research;
- ◆ Publication and dissemination of survey research findings; and
- ◆ Ethics related to survey conduct and standards for survey practice.

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