PROFESSIONAL STANDARDS OF STATISTICIANS IN STATE AND LOCAL GOVERNMENTS

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INTRODUCTION

The use and the importance of statistics in our society are growing. Its impact is increasingly apparent in all aspects of our lives, in the private sector, in our great institutions of learning, in our technologies, in political forums, and in the machinery of government. In government, its influence is felt at all levels--the federal, the state, and local sectors. As greater reliance is placed on quantitative evidence as a basis for both understanding and for decision-making in an increasingly complex society, the burden on and the responsibility of the statistician--as producer, as custodian, and as interpreter--of this important social tool will continue to grow.

Viewing the statistician and his products in the long historical context of mankind's development enables one to better appreciate the factors that have enhanced his role and today increasingly draw him into the public forum. As Jean Gibbons wrote so eloquently a few years ago, the enhanced role of statistics in our lives today is associated with civilization's long effort to cultivate increasing rationality in human decision-making (18).

Society's growing reliance on statistical information requires that we continuously strive to effect a better fit between public needs and the skills that we as statisticians possess. This calls for constant professional self-scrutiny, in terms of education and training, in terms of communication with the public, and in terms of generating high levels of expectation for ourselves. These aspects of self-scrutiny are all subsumed under the broad rubric of "professional standards," an area to which the American Statistical Association has directed its attention for over 25 years.

STANDARDS FOR STATISTICIANS

For over 25 years the American Statistical Association has addressed issues related to statistical standards through a variety of organized activities. As early as 1952, an Ad Hoc Committee on Statistical Standards recommended to ASA President William Cochran that the Association should work toward developing an agreed upon set of statistical standards, both technical and ethical, which could provide guidance to individual statisticians, in terms of standards to which published statistical results should conform, and procedures to assure valid statistical results (3).

However, interest in these "standards" questions has waxed and waned over time. Appraisals of the feasibility of establishing professional standards for statisticians have differed widely, depending upon the appraisers, their approach to the problems, and the historic context of their inquiry.

In the years since statisticians in the United States mobilized organized efforts to address "standards"questions, we have come to appreciate the wide range of issues involved, some of which come to the fore, then recede, then reemerge--all reflecting social and other forces impinging on the profession.

Standards for Practitioners or for Products?

Discussions about statistical standards often distinguish between standards applied to statistical products--such as timeliness, validity, reliability, accuracy--and those applied to statisticians, that is, to their competence levels and to their professional behavior. While this distinction is useful, particularly with respect to strategies for improving the quality of the statistical enterprise, these aspects of statistical standards are integrally related to one another. High competence standards for statisticians, and commensurate training levels, are likely to yield professionals who will bring to their work more sophisticated tools and higher performance expectations than those with less training. On the other hand, strategically speaking, the technical demands and performance standards associated with the statistical system itself--including the incentives and resources provided for realizing them--may be essential ingredients for stimulating high quality statistical work and for instilling a sense of professionalism among practicing statisticians. Indeed, essential demand may be a necessary condition for eliciting an appropriate supply response.

Albert Mindlin has stressed that one way the Federal government can help elevate local statistical standards is to insist on a certain level of sophistication in its work. Mindlin recently expressed particular concern when the Federal government asked local areas to assume less rather than more responsibility for producing local population estimates, suggesting that this approach was "deleterious to professionalism of state and local statisticians" (10).

Standards of Competence

A further distinction that bears on professional standards for statisticians is that between standards related to competence and standards related to professional behavior and practice. The competence question subsumes the many issues associated with statistical training and education, to which the American Statistical Association has devoted much attention. Competence standards are also central to consideration of individual certification and institutional certification and institutional accreditation--questions that come up from time to time in connection with broad inquiries into professional standards These questions arose, for example, in the

deliberations of the ASA Task Force on Professional Standards in 1970 and 1971. Standards for professional behavior, in comparison, are directly related to consideration of ethical conduct and performance.

With respect to certification, the Task Force on Professional Standards made some inquiries into this area, but took no definitive position on it (9a). Much earlier, in the 1950's the ASA Ad Hoc Committee on Statistical Standards under the Chairmanship of the psychologist and statistician Rensis Likert considered development of professional standards as essential and as a "necessary step before any certification procedure for statisticians can be established". The issue of certification for statisticians was raised again in 1973 by J. Boen and H. Smith who recommended that ASA give consideration to "imposing a structure on the statistics profession by certifying some statisticians as qualified to do applied work" (11).

When the question of certification was also raised among mathematicians in the early 1970's, the Board of Governors of the American Mathematical Association received a report which, in its general discussion of salient issues, seems relevant to certification for statisticians. J. G. Harvey and M. W. Pownall, authors of the AMA report, discussed both the accreditation of institutions and the related question of individual certification (19). They noted that among the traditional fields of liberal education, chemistry is one of the few fields with an accreditation system. Virtually all the others with special accreditation systems are professionally-oriented. According to Harvey and Pownall, chemists assess that minimum institutional standards have raised the quality of education in chemistry. But the authors caution that such standards, by being prescriptive, may threaten smaller institutions, discourage educational experimentation, and may rigidify curricula. They suggest that certification of mathematicians, might be accepted as evidence of qualification, but they question whether a system of certification by examination could really be designed to give a reliable evaluation of the qualities that it would purport to measure.

Those who considered these matters in Lester Frankel's ASA Task Force on Statistical Standards recognized some of these pros and cons as well. Herbert Alfasso, for example, spoke out in favor of certification for statisticians, but he recognized concerns that a program of testing for statisticians in connection with certification could be educationally stifling by restricting curricula, especially in a rapidly growing field like statistics.

In commenting on the implications of certification for state and local statisticians, Kenneth Rainey recently observed that much of the strength of statistics as a profession derives from its auxiliary role in support of other fields such as planning, public administration, engineering, and the regular professions. He sees a need for professional statisticians whose speciality is related to statistical analysis in support of government activities: but he is concerned that these professionals not be allowed to become a "priest-craft" (7b).

There seems little likelihood that pressures for the certification of statisticians will be great in the immediate future, since these pressures appear to most often arise from conditions of excess supply. Harvey and Pownall noted that certification and accreditation can be used to limit both the number of supplying institutions, as well as the number of professionals. The field of statistics does not appear in imminent danger of reaching such a condition in the near future.

Ethical Standards

When the Ad Hod Committee on Statistical Standards met in the early 1950's, many other professional associations were also addressing questions of ethical issues. For example, the American Psychological Association had formulated a code of ethical conduct for the profession. In her description of ASA activities in this area, Jean Gibbons notes that interest was high in the early 1950's under Rensis Likert's leadership, but after a survey assessment of membership interest, these issues were dropped 1956 by the Association as a formal matter (18).

In her description of statisticians' concern with this area, Gibbons calls attention to a number of related papers that have appeared in British and American journals. But her own work perhaps is one of the most cogent arguments for the importance of these issues, at a time when statistics and statisticians assume an increasingly important role in our society.

More recently in testifying before the Congressional Hearings on Statistical Coordination, James Knowles stressed the importance of ethical standards for statisticians in the organization and the operation of the Federal statistical system. He noted that foremost among the requirements for a quality statistical system is public confidence in its ethical integrity. "That confidence will not flourish unless the system enjoys the respect and confidence of professional workers activitely using the data coming out of the system..." (32).

State and Local Standards

Another organized effort of the American Statistical Association concerns itself with professional standards of statisticians in state and local governments. While many of the issues of statistical standards are basically the same as those discussed earlier without reference to the specific governmental context, there are two factors that make a focus on state and local governments particularly challenging.

The first is that the dramatic expansion of the state and local sectors during the past 20 years has given them a "frontier" character, in terms of opportunities for innovation and improvement, relative to the Federal sector. The second consideration is that a focus on state and local governments provides an opportunity to deal explicitly with an important set of factors that influence public statistical activities at all levels of government, namely, intergovernmental statistical issues. These issues speak of how the quality of our statisticians and the quality of our statistical products are influenced by the

relationships that exist among the Federal, state, and local levels of government.

A focus on state and local government by the American Statistical Association represents recognition of the importance of these governmental sectors in terms of their unique attributes and problems.

A FOCUS ON STATE AND LOCAL GOVERNMENT

In 1960, state and local governments employed about six million persons, or 2.5 times as many as the Federal government; by 1974, state and local government employed 12 million persons, or four times as many as the federal government. While the state and local sectors have continued to expand in terms of employment since 1970, the size of the Federally-employed labor force had not grown at all during 1970-74 (31). Rapid growth of the state and local sectors since the mid-1960's reflects a set of principles articulated by the Federal government in the late 1960's which stressed a greater role and responsibility for state and local government in the treatment of national problems (17,33,37). A reflection of this was the growth in Federal outlays to states, which Ullman showed expanded to $30 billion in 1971, four times the amount in 1960 (29).

Expansion of these governmental sectors has been accompanied by a certain amount of stress and strain. The accretion of new roles and the creation of new intergovernmental structures has required entirely different sets of relations both within and between governments. Strains have also arisen because the shift in responsibilities to states and local areas from the Federal government has been imposed on many areas which did not heretofore possess either the infra-structure or the personnel capable of discharging them effectively.

New responsibilities in many cases have been added to structures that were already rather complex, since the states and local areas had preexisting responsibilities to their constituents. Because states and local areas have sensed that the complexity of their governments has not been fully appreciated by the Federal government, there have been a number of efforts in recent years to elucidate and enunciate governmental processes, particularly those of states directed mainly at a Federal-level audience. Recent reports sponsored by the Council of State Governments (14, 15) describe the diversity and complexity of state governments, particularly with respect to their unique central "planning" functions and processes, which have no apparent structural or administrative counterparts at the federal level.

One theme that runs through these reports is an appeal to the Federal government to ease the burden imposed on the states by the "confusing, contradictory, duplicative, and overlapping mass of requirements and definitions in planning and program guidelines". The reports note, further, how Congress and the Executive Branch depend on state and local governments for program design and management in many areas; but that a major burden results from lack of coordination in program activities at the federal level: "Each federal program makes its unique and often conflicting demands on state government in its prescriptions for eligibility, planning, organization, fund matching, and procedures, imposing enormous burdens in terms of management functions and coordination at the state and local levels (15).

The rapid growth of the state and local sectors, the burgeoning programmatic responsibilities, and the absence of adequate program coordination at the Federal level have had consequences for management and administration at the other levels of government. These are reflected in intergovernmental statistical relations, and in the characteristics of statistical activities in states and local areas. They are reflected most insistently in the repeated plea, from municipalities and states, in 1967 and in 1977 for "better statistical coordination" (1, 25, 28).

Cooperative Statistical Programs

For statistical activities, the increased emphasis on state and local roles has built on preexisting structures and principles on intergovernmental cooperation know generically as the "Federal-State-local cooperative statistical programs". The first two programs of this type were initiated in 1917, and are now know respectively as the Cooperative Employment, Hours, and Earnings System of the U.S. Department of Agriculture. The Statistical Policy Division of the U.S. Office of Management and Budget describes these cooperative systems of data collection as "federally-initiated or sponsored statistical programs in which State agencies participate in the collection, processing, or utilization of nationally standardized statistics. The cooperative systems are undertaken for the mutual benefit of the participants, involve multiple states, and contain data of a recurrent nature which is intended to have broad applicability" (33).

The cooperative systems are built on an early federal recognition of an important and legitimate role for states in a national statistical system which was articulated as early as 1934 (17), and recently in the 1971 Report of the President's Commission on Federal Statistics. In the 1971 Report, Morris Ullman noted some of the advantages of these systems for reducing reporting burden, eliminating duplication, effecting economies through joint operations, and implementing principles of comparability (29).

In several respects, cooperative statistical programs have significance for state and local statistical activities. Just in terms of resources and manpower, some of these programs account for an important proportion of statistical support at the state and local levels. The two oldest programs--that of the Department of Labor and that of the Department of Agriculture currently fund, fully or in part, over 400 field positions in each state. The DOL budget for these field positions is about $3 million per year; the Agriculture budget for field staff is several times that. Another dozen or so programs in such areas as health, education, and law enforcement are neither as well-established nor as well-endowed in terms of resources as the DOL and

Agriculture programs (12, 17).

In addition to providing funds to states and local areas, the cooperative programs have been important means for improving the quality of statistical activities at these levels as government, as Morris Ullman noted (29). Katherine Wallman, in her discussion of these programs, indicates that statistical standards are integral to the cooperative statistical activities. "In each of the Federal-State Cooperative Systems of Data Collection, some attempt has been made to prescribe the definitional, quality, and timeliness standards which should be followed in the reproduction of the required data by the participating State" (33).

Training and Education. A significant contribution of the cooperative programs to enhancing statistical quality and professional standards of statisticians at the state and local has been through their related training and educational activities. Again, these are most developed in the older, better-established programs, where, for example, field staff are systematically exposed to training through seminars, meetings, and conferences, and in which staff are encouraged to take advantage of in-service training opportunities.

The potential for Federal leadership in promoting state and local statistical standards through education and training was recognized early in the evolution of the cooperative statistical programs. It was emphasized by both Herbert Alfasso and Morris Ullman in the Report of the President's Commission on Federal Statistics, where a particular training program of the Federal government was singled out as a model. This is the Applied Statistics Training Institute (ASTI) of the National Center for Health Statistics, established in the mid-1960's to provide training and educational opportunities for those working in the health area. Because of the high quality of ASTI's program, it has since become an educational resource serving many of the cooperative programs, as well as other statisticians at all levels of government. In the President's Report, Alfasso and Ullman, drawing on the example of ASTI, call upon the Federal government to take the lead in establishing a basic training program "for state and local statistical personnel covering both data gathering and data use". They recommend that costs be shared by the Federal government and the states (1,29).

In the area of training and education for statisticians, the Federal government has yet to develop a coherent and comprehensive model that could speak to the in-service and the career development needs of statisticians at all levels, from that of apprentice to that of high-level statistical administrator. Such a program could serve as a useful paradigm, if developed, for state and local governments. A recent study by the Statistical Policy Division of the U.S. Office of Management and Budget described various elements of such a program, which elements have been implemented by different agencies at different times, but never in a really coordinated manner (35). Such a program for career development, along with a comprehensive training institute oriented to the in-service training needs of all levels of government, could be useful paradigms and resources for improving professional standards of statisticians in state and local government.

Opportunities for Improvement. If the cooperative statistical programs have been successful in upgrading the quality of statistics and statisticians in state and local governments, through standard setting, resource transfer, training, and information exchange, they still present opportunities for improvement. Katherine Wallman has noted that across programs, there are still wide differences in the specification of statistical standards, in enforcement of adherence, and in resources provided to state and local areas to participate in these cooperative programs. Most troublesome, Wallman notes, is the lack of coordination of standards and guidelines among the statistical programs of the many sponsoring agencies, at the Federal level. In the absence of needed information exchange and coordination at the Federal level, the Federal statistical system, insofar as it affects states and local areas, falls far short of its potential (33).

Statistical Coordination

Among the factors frequently cited as having a bearing on quality of statistics at the state level is that of "coordination". In the National Conferences on Comparative Statistics sponsored by the National Governors' Conference in 1966 and 1967, the need for the improved statistical coordination at the state level was emphasized. Herbert Alfasso described these efforts in the Report of the President's Commission on Federal Statistics, where he identified as the most significant recommendation to come out of those conferences, that "each state develop an agency to coordinate statistical activities within the state and to serve as a channel to the federal government and to other states" (1). A similar theme was echoed by Jay Tepper in his presentation on "Intergovernmental Data Issues" at the 1977 meeting on data co-sponsored by the National Governors' Conference and the Council of State Planning Agencies (25,28). A related recommendation was made in a recent paper by Katherine Wallman which calls for establishing a "focal point" in each state to "coordinate State-level input to the Federal level on cooperative system" (37).

Despite repeated calls for improved statistical coordination at the state level, and certainly at the Federal level (32), there are some who have questioned whether the benefits of central coordinating units will meet expectations and who have asked if there might not be important costs in terms of effective communication between state and counterpart Federal statistical agencies. Rita Zemach sees the theoretical attractiveness of a central statistical coordinating agency at the state level, but does not feel that such units are practical in large states.

Progress toward establishing central coordinating units at the state level since the 1966 National Governors' Conferences recommended them has been limited. Herbert Alfasso reported that about 13 states had established such offices as of 1968, but by 1977 there was not much evidence that earlier momentum had been sustained;

indeed, some of these offices have since been disbanded. Alfasso stressed that statistical coordination at the state level requires Federal leadership through "providing recognition, technical guidance, and other assistance" (1).

Central Statistical Services

The concept of a focal point for statistical coordination at the state level is sometimes confused with that of central statistical services. While the two concepts are related to statistical standards, broadly defined, they are quite different from one another. Coordination need not imply central services, nor the reverse.

Albert Mindlin is a leading proponent of central statistical services, particularly at the municipal level (10). Mindlin emphasizes that the scale of governmental operations and the supporting resources in many states, and at the local level, are often insufficient to justify hiring highly trained statistical specialists in any one program, which simply could not "afford" them; but a central statistical office could hire professional statisticians who could, he asserts, design and carry out authoritative sample surveys; conduct skillful statistical analyses; apply specialized and highly efficient mathematical techniques such as statistical quality control to the improvement of government operations; and provide technical advice and consultation on the design, conduct, and evaluation of innumerable management improvements.

From the point of view of elevating professional standard and the quality of statistical work in state and local government, the concept of central statistical services is a plausible and an appealing one. However, given the imperatives of government organization, which is built around functional and line programs, it is often difficult to sustain interest in and support for central services, in the absence of strong outside incentives. As in the case of establishing focal points for the coordination of state statistical activities, it would seem that strong Federal incentives and leadership would be necessary to induce states and local areas to adopt a model of central statistical services for which Mindlin has made such a cogent case.

RECENT ASA ACTIVITIES RELATED TO STATE AND LOCAL PROFESSIONAL STANDARDS

ASA interest in statistical standards as they related to state and local government was initially stimulated by the work of the Social Science Research Council (SSRC) ASA Committee on Statistical Training about ten years ago. Recognizing the role of the state and local governments in an expanding range of program activities, and recognizing further that those assigned to statistical tasks at these levels of government often had little background in the field, the SSRC Committee, chaired by Conrad Taueber, suggested that concerted efforts be undertaken to "develop standards for statisticians in governmental service, with special reference to the needs of State and Municipal Services" (27).

ASA Committee

As a result of the ASA Board recommendation, the Ad Hoc Committee on Professional Standards of State and Local Government Statistics was organized on July 1, 1973, under the chairmanship of Anders S. Lunde. During the following year, the Ad Hoc Committee prepared a comprehensive set of recommendations for a long-range plan, as well as two reports.

Recommendations

In its recommendations to the ASA Board of Directors, the Committee of Professional Standards of Statisticians in State and Local Governments distinguished between those actions that would be focussed directly at state and local government statistical activities and those that could take advantage of Federal sponsorship of some of those programs.

ASA and the Federal Government. Recognizing the manifest accomplishments as well as the potential of Federal-state cooperative statistical programs for enhancing the quality of statistical work and for improving the professional stature of statisticians at all levels of government, the ASA would work with the Federal government, through the Statistical Policy Division and through the individual sponsoring agencies of major cooperative statistical programs, to:

1. Encourage development of uniform professional standards,
2. Review the structure and activites of the cooperative statistical programs, with a view to enhancing their statistical standards,
3. Encourage the development of training institutes for statisticians at all levels of government along the lines of Applied Statistics Training Institute, of the National Center for Health Statistics, and the Management Science Training Program of Training, of the U.S. Civil Service Commission.

ASA and State and Local Government. Working closely with representatives of state and local government, the ASA Committee would:

1. Explore state and local experience with Offices of Statistical Coordination and central Offices of Statistical Services,
2. Encourage and support the development of training programs for statisticians, including in-service training, on-the-job training, career and continuing education, and academic training, available to statisticians at all levels of government,
3. Encourage exchange programs for statisticians with universities and, through the Intergovernmental Personnel Act (IPA), among levels of government.

ASA and Members of the Profession. The ASA Committee on Professional Standards of Statisticians in State and Local Government recognizes that the extent to which statisticians are effectively used at all levels of government depends upon a clear understanding and appreciation of their

capabilities to inform the government process with their skills. This is very much a matter of education directed to those managers and administrators in state government with whom statisticians interact on the job. To facilitate the educational process, the ASA Committee would take responsibility for:

1. Developing general guidelines for job descriptions of statisticians, based on knowledge of existing position descriptions at the state and local levels, as well as on understanding the processes by which job descriptions are developed and modified in response to changing technological conditions and changing roles of statisticians in government,
2. Develop publications aimed at acquainting government program managers and administrators with the contributions that statistical reasoning and applications can make to government programs. Such brochures could be aimed at specific functional areas of state and local government responsibility,
3. Establishing panels of statisticians available to assist state and local areas in auditing the functions and jobs of statisticians, with a view to bringing these into closer alignment with the recommended general guidelines for these job descriptions. The panels could also be available to comment on other aspects of state and local statistical operations, including organization, administration, and implementation of statistical programs.
4. Organize a number of conferences and seminars under ASA auspices at the national, regional, and state levels that would serve as forums for promulgating and discussing general guidelines for statistical job descriptions; for discussing other issues of general concern to statisticians working in state and local government; for information exchange about intergovernmental and intragovernmental statistical issues; and for enhancing the understanding of statisticians' roles and capabilities by program managers and administrators.

CONCLUDING OBSERVATIONS

For over a quarter of a century, the American Statistical Association has actively addressed many of the issues associated with professional standards of statisticians. The changing foci of ASA activities are a response to shifting membership concerns which, in turn, are dictated by the social, economic, governmental, and technological context in which we live. During this period, we have all been witness to extraordinary changes that have affected the roles and responsibilities of statisticians.

Technological developments in data processing and computing capabilities have been truly revolutionary. They have facilitated date manipulation to an extend previously unimaginable. In addition, they have added to the cadre of persons working with quantitative data an entirely new group whose skills are closely aligned with the new technology.

Accompanying the technological revolution and amplifying it has been a dramatic increase in educational achievement throughout the population, resulting in a more informed public and one far more appreciate of the uses of statistical information. An emphasis on high level statistical skills now informs virtually every graduate program; and the emphasis is percolating down through the educational system, making important inroads today at the secondary school level.

In government, the use of statistical methods has proliferated, supporting such areas as planning management, budgeting, program evaluation, and many aspects of administration. As statisticians' skills are increasingly sought in the public and private sector, so too are statisticians drawn increasingly close to environments in which advocay dominates--in politics and in litigation--subjecting statisticians to public pressures as never before.

With new demands and pressures, with enhanced visibility and stature, statisticians are forced into exercises of self-scrutiny, in which they must ask themselves about their adaptation to constantly changing circumstances. We have attempted to review some of the issues that statisticians have addressed over the past 25 years in this continuing self-scrutiny, emphasizing certain issues associated with new intergovernmental circumstances.

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