TRAINING FOR THE FUTURE:

ADDRESSING TOMORROW'S SURVEY TASKS

A Report of the Subcommittee on
Survey and Statistical Training
in Federal Statistical Agencies

September 1998

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THE FEDERAL COMMITTEE ON STATISTICAL METHODOLOGY

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(September 1998)

MEMBERS

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Office of Management and Budget

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Consumer Product Safety Commission

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Bureau of the Census

Lynda Carlson
Energy Information Administration

Cynthia Z.F. Clark
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Zahava D. Doering
Smithsonian Institution

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Bureau of the Census

Gerald Gates
Bureau of the Census

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Bureau of the Census

David Pierce
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Alan R. Tupek
Bureau of the Census

Denton R. Vaughan
Social Security Administration

Robert Warren
Immigration and Naturalization Service

G. David Williamson
Centers for Disease Control and Prevention

Laura Zayatz
Bureau of the Census

EXPERT CONSULTANTS

Robert Groves
Joint Program in Survey Methodology

Graham Kalton
Joint Program in Survey Methodology

PREFACE

The Federal Committee on Statistical Methodology was organized by the Office of Management and Budget (OMB) in 1975 to investigate methodological issues in Federal statistics. Members of the committee, selected by OMB on the basis of their individual expertise and interest in statistical methods, serve in their personal capacity rather than as agency representatives. The committee conducts its work through subcommittees that are organized to study particular issues and that are open to any Federal employee who wishes to participate in the studies. Working papers are prepared by the subcommittee members and reflect only their individual and collective ideas.

Several members of the Federal Committee on Statistical Methodology proposed that a subcommittee be organized to investigate training programs for statisticians working in federal agencies. There was interest among committee members in different approaches used by the agencies, feeling that a study would provide insights and ideas for other organizations. Several members of the FCSM met to clarify the topic — conceived as "Training Received by Statisticians in Federal Agencies." They developed a charter for a subcommittee, identifying objectives, audiences, data needs, data collection strategies, qualifications for subcommittee members, and preliminary issues to be addressed. A subcommittee was convened, the membership of which included a combination of agency managers, practicing statisticians, agency training officers, and academic statisticians. The goal of the subcommittee was to clarify the issues, investigate the topic, and prepare a report for publication in the FCSM Working Paper Series.

After much initial discussion, the subcommittee re-named itself and focused its efforts on investigating training in survey methodology and statistics offered to employees of federal statistical agencies. This report provides the results of the study — information on courses currently funded by agencies, measures of employee satisfaction with their training opportunities, exceptional career development programs offered at some agencies, future needs, opportunities for collaboration, findings and recommendations.

The Subcommittee on Survey and Statistical Training in Federal Statistical Agencies was chaired by Cynthia Z.F. Clark of the Bureau of the Census, Department of Commerce.

MEMBERS OF THE SUBCOMMITTEE ON SURVEY AND STATISTICAL TRAINING IN FEDERAL STATISTICAL AGENCIES

Cynthia Z.F. Clark, Chair
Bureau of the Census
(Commerce)

Nancy A. Bates
Bureau of the Census
(Commerce)

Carol French
Energy Information Administration
(Energy)

Nancy Mathiowetz
Joint Program in Survey Methodology
University of Maryland

Renee Miller
Energy Information Administration
(Energy)

Romeo Munoz
Bureau of the Census
(Commerce)

Samuel Peng
National Center for Education Statistics
(Education)

Linda Raudenbush
National Agricultural Statistics Service
(Agriculture)

Jesus Salinas
Bureau of Labor Statistics
(Labor)

Monroe Sirken
National Center for Health Statistics
(Health and Human Services)

David Williamson
Centers for Disease Control and Prevention
(Health and Human Services)

ACKNOWLEDGMENTS

This study was suggested and championed by several members of the Federal Committee on Statistical Methodology — Maria Gonzalez, David Williamson, Monroe Sirken, and Daniel Kasprzyk. Three of the members of the FCSM — Cynthia Clark (Chair), Monroe Sirken, and David Williamson — were asked to serve on the subcommittee. The subcommittee first convened in November 1995.

This report is the result of the collective work and many meetings of the Subcommittee on Survey and Statistical Training in the Federal Statistical Agencies. All subcommittee members made significant contributions to the conception of the research and studies, to the implementation of the studies in their agencies, to the analysis of the data and information compiled, and to the preparation of the written report. Each agency representative prepared a case study of training at their agency. Several committee members took lead roles in preparing chapters of the report. Cynthia Clark (BoC) organized a session at the November 1996 COPAFS-sponsored conference on the Subcommittee's work. The paper she presented at the session introduced the work of the Subcommittee; it became the basis of Chapter One. Linda Raudenbush (NASS) prepared a description of Human Resources Management that set the context for the study in Chapter One. Nancy Mathiowetz (JPSM faculty) worked with Nancy Bates (BoC) to design the data collection, taking the lead in the analysis and presentation of the data. Nancy Bates served on the JPSM Practicum Survey Advisory Board and developed the presentation and analysis of the data on employee satisfaction with training. Carol French and Renee Miller (both EIA) edited the COPAFS seminar presentations on career development programs to prepare Chapter Four. All subcommittee members contributed to the report and to the findings and recommendations presented in Chapter Six. Linda Raudenbush provided overall critique and guidance for the entire report.

The subcommittee also thanks the following individuals — Denice Myers (NASS) for serving as secretary/coordinator of the subcommittee from November 1995 to June 1996 while serving as FCSM secretary; Jeremy Morton (NCHS JPSM Student) for annotating the bibliography under the direction of Nancy Mathiowetz; Theresa Hall-Marvin and Joan Hill (BoC JPSM students) for assisting with the collection, analysis, tabulation, and preparation of written documentation of the data collection under the direction of Nancy Mathiowetz; Mick Couper (JPSM faculty) for assistance in planning and tabulating employee training data from the JPSM 1996 Practicum Survey presented in Chapter Three; Fred Barrett (NASS), Charles P. Pautler, Jr. (BoC), and David Williamson (CDC) for developing the descriptions of the respective agency career development programs in Chapter Four; Robert Graham (NASS) and Angel Broadnax (BoC) for preparing Chapter Five on interviewer training under the direction of Linda Raudenbush and Nancy Bates; Susan Moberly (NCHS) and Elizabeth Lloyd (CDC) for assisting in preparation of agency case studies; William Arends, Virginia McBride, Lawrence Gambrell (NASS) for assisting in editing the entire report under the direction of Linda Raudenbush and Nancy Bates.

SUBCOMMITTEE CHARTER: TRAINING RECEIVED BY STATISTICIANS IN FEDERAL STATISTICAL AGENCIES

The objectives of the working paper are to:

- Describe and compare survey and statistical training programs of federal agencies.
- Assess the strengths and weaknesses of survey and statistical training received by the federal workforce.
- Provide guidelines for agency self-improvements of their survey and statistical training programs and for interagency coordination and collaboration in providing survey and statistical training.

The major stakeholders and audiences for the report are:

- The Office of Management and Budget's Office of Statistical Policy, the Federal Committee on Statistical Methodology (FCSM — chaired by OMB), and the Committee on National Statistics (CNSTAT) using summary information on the "state" of survey and statistical training in the Federal Statistical System as they review and assess such training for the federal workforce and develop strategies to meet current and emerging training needs.
- Federal agencies using cross-agency comparisons of survey and statistical training programs to help plan their training programs.
- The Joint Program in Survey Methodology (JPSM - a collaborative effort of the University of Maryland, the University of Michigan, and Westat), supported by the National Science Foundation and other academic institutions and professional societies using information about survey and statistical training providers to plan their curricula and programs.

The analysis requires three kinds of information about agency statistical training programs:

- Descriptions of agency training programs, including summary information about budgets, policies, special training initiatives, types of training provided, etc.
- Aggregate information on consumption of different types of survey and statistical training by the workforce of these agencies with demographic characteristics of that workforce.
- Opinions and perceptions of survey and statistical training including those of the management and workforce of these agencies regarding strengths, weaknesses, and quality of existing training courses, and unmet training needs.

Two methods are proposed for obtaining the required information:

- A survey to collect general information from all statistical agencies.

- Case studies to collect specialized information from specifically selected agencies.

The working group is to be composed of members exercising the following functions:

- Agency training officers to address the availability and accessibility of agency training information and to assist in making data collection arrangements.

- Agency statistical managers to provide experience from those proposing and approving training requests.

- JPSM and other university faculty to consult on all phases of the study and on the plan and preparation of the report.

Investigation of several issues is required prior to analysis and data collection, including:

- Clarification of "who are statisticians" and "what qualifies as survey or statistical training."

- Determination of what survey or statistical training information is available and accessible from federal agencies.

- Determination of the resource requirements needed to compile this information and the federal agency support forthcoming for this task.

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EXECUTIVE SUMMARY

The federal statistical agencies conduct many large and complex surveys to provide official statistics relevant to issues of public policy. These agencies require a highly technical staff to design and conduct these surveys and censuses and to produce information of high quality. Although the agencies have recruiting efforts to hire technically well-qualified individuals, many of the skills needed in statistical and survey methodology are not routinely taught in college and university programs. Thus, these agencies frequently find it necessary to provide on-the-job and other training to develop statistical and survey skills among their employees.

The Federal Committee on Statistical Methodology (FCSM) chartered a subcommittee to investigate the different agency approaches to providing training for their statisticians. The subcommittee determined early in its deliberations that the workforce under investigation should be more inclusive than mathematical statisticians, the primary constituency of the parent FCSM. The subcommittee also concluded that information focusing exclusively on survey and statistical training for this workforce would be uniquely relevant for agencies to use in their human resource development plans. The subcommittee thus chose to focus broadly on survey and statistical training for the technical workforce composed of mathematical statisticians, statisticians, statistical assistants, operations researchers, computer specialists, economists, and social science researchers (sociologists, psychologists, anthropologists) collectively referred to as the "statistical" workforce at the group of eighteen federal statistical agencies represented on the FCSM or on the Interagency Council on Statistical Policy (ICSP).

The subcommittee reviewed training and development at its six member agencies — Bureau of the Census, Bureau of Labor Statistics, Centers for Disease Control and Prevention, Energy Information Administration, National Agricultural Statistics Service, National Center for Education Statistics, and the National Center for Health Statistics. The information gleaned was thought to be relevant for a broader audience; it is provided, in Appendix A, in the form of case studies. To provide more comprehensive and consistent information on the topic of its investigation, the subcommittee conducted a survey of the eighteen federal statistical agencies referenced above from data maintained by them. Data items for the survey were suggested by the subcommittee's review of agency programs. The subcommittee developed a set of questions on the employee's perception of training at their agency for use in an organizational climate survey conducted at nine of the federal statistical agencies.

Three other work products emerged from subcommittee review and discussions. (1) A literature review on survey and statistical training was conducted, resulting in an annotated bibliography appended to this report. (2) A review of agency programs highlighted employee development programs at NASS, the Bureau of the Census, and the Centers for Disease Control and Prevention. These programs, documented in the report, provide models for employee development. (3) This review of agency programs took note of the fact that statistical agencies also provide training to individuals who are not their own employees (including interviewers, data users, data providers, and employees of international,

state, and local government organizations). A description of these training initiatives — thought to be informative to other statistical agencies — is included in the report also.

From its survey of eighteen federal statistical agencies, the subcommittee discovered that:

- The "statistical" workforce at the eighteen federal statistical agencies is composed of computer specialists (32%), statisticians (26%), economists (22%), mathematical statisticians (9%), and other related job categories (11%).

- The number, type, and length of survey and statistical courses taken by employees varied greatly by agency. The majority of courses involved statistical analysis and statistical computing. Many courses were common between the federal statistical agencies. Twenty-four percent of the courses were offered by JPSM, 31 percent by other universities, 19 percent by SAS Institute, and 26 percent by other institutions or organizations.

- Obtaining uniform data on statistical training proved to be difficult. Agencies measure and define statistical training differently and many agencies do not maintain a training database. Because of these inconsistencies, the subcommittee was not able to obtain good training cost estimates for the purposes of comparing and contrasting training expenditures across agencies.

- Employee satisfaction with their overall training opportunities varies among the agencies. The organizational climate survey of nine federal statistical agencies indicates that while the majority of employees believe they receive training necessary to do their jobs, there is some sentiment that training opportunities are unfairly allocated or given a low priority in individual agencies.

- An assessment of employee career development at three agencies revealed both similarities and differences in the approach to human resource development. The NASS utilizes Individual Development Plans (IDPs) as a means of planning and monitoring employee continued learning. The Census Bureau supports several programs that are voluntary and competitive — one for any individuals in the "statistical" workforce; the other exclusively for mathematical statisticians. The CDC recently implemented a quantitative career enhancement program that offers mathematical statisticians temporary reassignments as a way to acquire new analytical skills.

- The review of interviewer training highlighted the emerging needs for interviewer training on new technologies such as CATI, CAPI, CASI and its impact on training delivery and costs and interviewer skills.

The subcommittee concluded that improvement of survey and statistical training requires both (1) actions by individual federal statistical agencies and (2) enhanced collaboration between them. Its four recommendations are:

1. Elevate the priority given to training within the federal statistical agencies.

2. Assess training needs and opportunity within these agencies.

3. Create a formal approach to employee career development.

4. Enhance statistical literacy outreach to agency clientele.

CHAPTER ONE: INTRODUCTION

The federal statistical agencies conduct many large and complex surveys to provide official statistics relevant to issues of public policy. The agencies require a highly technical staff to design and conduct these surveys (including censuses) to produce information of high quality. Although agencies have recruiting efforts to hire technically well-qualified individuals, many of the skills needed in statistical and survey methodology are not routinely taught in college and university programs. Thus, agencies frequently find it necessary to provide on-the-job and other training to develop these skills among their employees. Approaches to this skill development vary among agencies.

1. Mission of the Subcommittee

The subcommittee was charged with documenting and comparing survey and statistical training programs of federal agencies. The subcommittee was asked to provide baseline measures of these programs and to assess the strengths and weaknesses of these programs. The group was directed to establish guidelines for agency self-improvement regarding these programs and for interagency coordination and collaboration in providing them. It was expected that the group would discover ideas that were worth sharing and identify areas of future need or improvement.

The subcommittee was asked to look toward the future by defining expected needs, resources to meet those needs, and potential for collaborations between agencies. It was also asked to identify areas where the Joint Program in Survey Methodology (JPSM)[1] might enhance its contributions to the federal statistical agencies. The group was directed to prepare a final report documenting its findings and making recommendations to improve survey and statistical training for statisticians.

This working paper provides information to executives of federal statistical agencies for planning individual agency programs and collaborating with sister agencies. It endeavors to stimulate critical thinking and provide for an increased exchange of ideas and information; the subcommittee desires that its report lead to increased collaboration and sharing of resources.

2. Methodology for the Subcommittee Study

[1]The Joint Program in Survey Methodology is a collaborative undertaking of the University of Maryland, the University of Michigan, and Westat in response to the Boskin initiative to improve economic statistics.

The first issue the subcommittee faced was to define its scope. The group was directed to address training received by statisticians employed by federal agencies. Several questions immediately arose. Who are statisticians? What training is relevant to statisticians? What federal agencies were interested in training received by statisticians?

The subcommittee undertook two initial review processes to address topics relating to its scope. Each agency representative gave a presentation discussing the agency's respective training program. These presentations at subcommittee meetings provided background for the subcommittee's future efforts. The subcommittee conducted a literature review to find relevant research and evaluation studies. Additionally the subcommittee applied concepts of the Human Resource Development model to its investigation. These initial reviews provided direction for the research described later in this chapter.

This section begins with a description of the Human Resources Development model that sets the context for an understanding of workforce training and presents an overview of relevant aspects — concepts, purposes, benefits, activities, and participants. This is followed by a brief summary of the training programs at the seven agencies represented on the subcommittee and a description of the literature review. The section concludes with a summary of initial findings from the agency and literature reviews.

Human Resources Development Model. "Workforce training" relates to the field of human resources management (HRM) — more specifically to human resources development (HRD). HRM is generally defined (*Robbins and Coulter*) as encompassing the areas of human resources utilization, development, and environment. The purposes of an organization's human resource development activities (*Nadler*) are to provide further information leading to:

1. Improved performance on the individual's present job.
2. Advanced preparation of an individual for an identified job in the future.
3. General growth not related to any specific job.

The three definitive purposes of HRD are achieved by distinct and separate sets of learning activity areas — training, education, and development. Each activity area has its own unique definition, focus, and time when the learning will likely be utilized. Table 1 describes and characterizes these activity areas. Although the primary focus of this study is on training, the report addresses some education and development programs. Due to the scarcity of academic programs preparing students for the range of survey and statistical skills needed in survey organizations, all three activity areas are particularly relevant.

An organization benefits when it conducts HRD activities through:

- Increased Productivity - by enhancing the job performance of competent employees.
- Reduced Turnover - by managing a career development process through which qualified employees progress in a planned and orderly movement to fill key functional roles.
- Enhanced Employee Satisfaction - by giving employees opportunities to develop their skills and knowledge; also, by providing the perks and rewards of certain off-site HRD programs.

- Attainment of Organizational Goals - by increasing employee understanding of the organization's strategic plan and the manner in which particular jobs contribute to achievement of its mission and resulting benefit to society.
- Enhancement of the Quality of Work Life - by enabling employees to adjust intellectually and psychologically to changes in the work environment.
- Sustained Employee Competitiveness - by maintaining a level of employee currency with technological changes.
- A Climate of Organizational Growth - by refreshing employees' learning skills with frequent developmental activities.

Table 1: Training, Education, and Development Model of HRD

HRD Activity Area/Definition	Focus / Purpose	Time Focus	Financial Resource	Fiscal Risk	Learners	Support System
Training **All learning related to the present job**	Present job - Acquire new competencies - Enhance present skills - Learn new technology - Solve specific learning-related job problem	Now (when the learner returns to the job)	Expense	Low	Learners are selected by supervisors and managers who are aware of the learning need or problem	- Learners, supervisors, managers and HRD staff all agree on specific learning goals. - Supervisors ensure that learning will soon be used on the job.
Education **Specific learning to prepare individual for a different but identified future job**	Future job - Learn about a different job in the same organization - Increase career development and enhancement opportunities - Get a promotion (upward mobility) - Enhance internal staff mobility (lateral mobility) - Reduce turnover	Soon (usually one week to one year)	Short term investment	Medium	Learners are those being considered for new or different jobs or promotions	- When the new job and supervisor are known, HRD staff can provide reinforcing processes and materials to transfer of learning. - When the new job and/or supervisor are unknown, HRD staff can provide some reinforcement to minimize learning loss.
Development **Learning for the growth of the individual; unrelated to specific present or future jobs; leads to greater organizational readiness for future changes.**	Individual/ Organization Individual growth opportunities through challenging learning Organizational climate of learning, growth, vitality, and readiness to create positive futures and manage change No sharp focus on need or subject matter	Sometime	Long term investment	High	More developmental opportunities are available for upper level employees and leaders. All employees should enjoy some development.	- Because there is no intention to support specific learning on present or future jobs, no support system is needed. - There should be a generally positive cultural value placed on learning, growth, and managing change.

Because providing HRD experiences requires financial resources, each activity area can be described as either an expense (with the expectation of immediate organizational benefit) or as an investment (with the hope of organizational benefit at some unspecified time). As with any financial transaction for goods or services, HRD activities have an inherent element of risk; i.e. what, when, and how much will the organization gain from paying for HRD activities? Federal statistical agencies will have to assess the most effective ways to obtain a workforce with the required skills for producing official statistics.

Review of Agency Programs. The HRD model sets the stage for investigation of the training programs of the seven agencies represented on the subcommittee. The presentations informed the committee of the full range of HRD activities occurring in the individual agencies that encompassed training, education, and career development. The presentations elicited many good ideas to which the subcommittee wanted to give broad visibility. This, because of their potential applicability to other organizations. Thus, case studies of these seven agency training programs are provided in Appendix A. Subcommittee knowledge of these agency training programs led to recommendations for agency collaboration presented in Chapter Six. Highlights of each agency review are given below. Staff numbers are from FY 1996.

Bureau of the Census (Department of Commerce). The Census Bureau has a staff of over 3,000 professionals — including statisticians (e.g., economic, demographic, survey), computer programmers, and individuals classified in other series. The Census Bureau supports academic training for staff on an individual course basis and for JPSM students on a half-time basis. It has also sponsored in-house statistical courses on topics such as variance estimation, time series and categorical data analysis, taught by Census Bureau staff experts in these topics. Four years ago a mathematical statistician career development program was initiated. In 1986, the Census Bureau developed a several day orientation program and a six week course entitled Professional Skills Development. All professional employees took the course during their first year of employment at the Census Bureau. During the course the employees designed and conducted a survey, giving them hands-on experience in all aspects of a survey. The orientation and Professional Skills Development courses have not been held in the past three years for lack of a sufficient number of entry-level employees. Plans are currently being made to revise the overview course.

Bureau of Labor Statistics (Department of Labor). The Bureau of Labor Statistics has a staff of 2,500, of whom 1,620 are in quantitative series — mathematical statisticians, statisticians, economists, computer specialists, statistical and computing assistants, and psychologists. BLS has a training plan for mathematical statisticians based on six technical items of "Knowledge, Skills, and Abilities" (KSAs). BLS identified three KSAs for supervisory positions and three more for management positions. For all of these KSAs, requisite training was also identified. BLS has set priorities for different levels of training. Training needed to perform the current job had first priority; training that was expected to have an impact on how the current job was done had second priority; training expected to have an impact on future jobs had third priority. Priorities are considered in determining training eligibility. BLS provides or supports both in-house (taught by employees or contractors) and academic training. BLS supports employees attendance in JPSM courses and degree programs as well as other academic course training.

Centers for Disease Control and Prevention (Department of Health and Human Services). CDC has approximately equal numbers of statisticians (52) and mathematical statisticians (67) and a large number of computer specialists (289). Its professional work force also includes sizable numbers of psychologists and sociologists. These staff numbers are exclusive of one of the CDC centers, the National Center for Health Statistics (described below). Apart from the Applied Statistics Institute managed by the NCHS, CDC offers courses specific to its program area (e.g. Introductory Biostatistics, Epidemiology for the Non-Epidemiologist, Introduction to Methods for Public Health Program Evaluation, Utilization of Data by the Public Health Manager, Marketing Information to Policymakers: How Statisticians can produce what Politicians Want). CDC also offers more standard survey and statistical courses (e.g. Basics of Survey Research, Introduction Small Area Analysis). CDC has recently developed a Quantitative Methods Career Enhancement Program to develop the capabilities of their mathematical statisticians.

Energy Information Administration (Department of Energy). The professional workforce at EIA includes industry specialists, operations research analysts, economists, survey statisticians, mathematical statisticians, computer specialists, and others. EIA participates in formal classroom training at universities (including JPSM) or from outside vendors. Special training courses, provided by the Statistics and Methods Group, addresses specific needs of individuals working in the energy industry (e.g. Determinants of Long-Run Energy Demand, Intermediate Econometrics, Commodity Pricing of Natural Gas), and needs of survey statisticians.

National Agricultural Statistics Service (Department of Agriculture). The professional staff at NASS are classified as agricultural statisticians, mathematical statisticians, or computer scientists. NASS has designed several career development programs and training programs for all its employees. All employees have Individual Development Plans (IDPs). IDPs are standardized for each professional series but allow for individualized training and development opportunities. The agency offers a formal week long orientation program and a series of agricultural survey and estimation training programs for all its statisticians. These courses cover specifics of agricultural survey design, data collection, and processing at several experience levels. NASS has long supported a program of full-time academic training at the graduate level in mathematical statistics, computer science, and survey methodology. An administrative record of the training provided by the agency is maintained in a training database (referred to as TRAI) at the USDA's National Finance Center, a computer processing facility.

National Center for Education Statistics (Department of Education). The workforce at NCES is primarily composed of educational statisticians and mathematical statisticians. NCES has a training program for staff to provide skills in statistical design, analysis, and project management. These courses are either taught by agency staff with a particular expertise or by outside experts. The agency also supports staff attendance at JPSM and WSS short courses. To promote effective and correct use of NCES data, NCES has developed a unique program of training for external data users. Data users often are also data providers; thus, the training also assists in improving data quality. Instructors are internal experts or known experts in a field.

National Center for Health Statistics (part of CDC in Department of Health and Human Services). The NCHS professional workforce includes health statisticians, computer specialists, and

mathematical statisticians. The Applied Statistics Training Institute sponsors short-term (2 1/2 day) training courses across the country focusing on data issues related to current public health concerns. NCHS supports academic programs for its staff, including participation in the JPSM courses and degree program. NCHS also conducts in-house training by bringing in vendors to teach technical courses. The agency has developed its own training database and has systematically collected information on training costs since 1995.

Literature Review. The literature review of workforce training of statisticians drew on resources available from members and from the Internet. It encompassed training within industry as well as training for government statisticians. Statistical agencies in other countries were contacted and their resources were received, e.g., the training and development handbook for methdologists developed by Statistics Canada. The subcommittee also learned that the Washington Area Alliance for Education in Survey Methods periodically prepares a consolidated List of Graduate Course Offerings at American University, George Mason University, Georgetown University, George Washington University, University of the District of Columbia, JPSM, and the USDA Graduate School. This report's annotated bibliography abstracts the papers and documents that were reviewed. References to these papers are given in the report. Several themes emerged from the literature review, including: a need for changes in the academic training programs that facilitate internships with government and industry; appropriate settings for both undergraduate and graduate programs; broad-based training in theoretical as well as applied statistical skills; and training in oral and written communication with non-statisticians. The authors suggest interdisciplinary training for statisticians that would include training in computer science, project direction, general management and supervision, and consulting.

Findings from Initial Reviews. The review of selected agency training programs led the subcommittee to conclude that the training relevant to its charter included both survey and statistical training for the collection, estimation, and publication of official statistics. The audience for survey and statistical training included quantitative agency employees in a broad set of professional classification series (henceforth referred to as "statisticians") and the statistical assistant series. The subcommittee's agency and literature review also identified needs for training "statisticians" in areas such as general computer software — word processing, spreadsheet, database; general office skills — writing, presentations, teamwork, project management; personal development; and management. Because these general categories of training would not differ intrinsically for "statisticians" from other members of the professional workforce, the subcommittee did not include these types of training within its purview. Training in statistical computing was deemed to be relevant for "statisticians" when the statistical content was an important factor in the course material.

The review indicated that the focus of the subcommittee's effort should be the primary federal statistical agencies. These were defined to include those agencies represented on either the OMB chaired Interagency Council on Statistical Policy (ICSP) or the Federal Committee on Statistical Methodology (FCSM). Table 2 provides a list of the federal statistical agencies referred to in this report, indicating their relationship to the ICSP, the FCSM, and the Subcommittee on Survey and Statistical Training for Federal Agencies. Information from the final report might also be relevant for other federal agencies with a smaller contingent of statisticians.

Several of the agency presentations described career development programs for statisticians, including two specifically designed for mathematical statisticians. These career development plans included aspects of all three HRD activities — training, education, and development. Because these programs have been effective at their respective agencies (and might well be adapted to other agencies), the subcommittee felt that other agencies might benefit from knowledge about these career development programs and their integration of HRD activities. A description of three specific programs is provided in Chapter Four.

Table 2: Federal Statistical Agency Representation

	Member, Interagency Council on Statistical Policy (ICSP)	Member, Federal Committee on Statistical Meth-odology (FCSM)	Representation, FCSM Subcommittee on Survey and Statistical Training
Agency for Health Care Policy & Research (AHCPR)		X	
Bureau of the Census (BoC)	X	X	X
Bureau of Economic Analysis (BEA)	X	X	
Bureau of Justice Statistics (BJS)	X		
Bureau of Labor Statistics (BLS)	X	X	X
Bureau of Transportation Statistics (BTS)	X	X	
Centers for Disease Control & Prevention (CDC)		X	X
Economic Research Service (ERS)	X		
Energy Information Administration (EIA)	X	X	X
Environmental Protection Agency (EPA)		X	
Federal Reserve Board (FRB)		X	
Immigration and Naturalization Service (INS)			
Internal Revenue Service Statistics of Income Division (IRS)	X		
National Agricultural Statistics Service (NASS)	X	X	X
National Center for Education Statistics (NCES)	X	X	X
National Center for Health Statistics (NCHS)	X	X	X
National Science Foundation Division of Science Resource Studies (NSF)	X	X	
Social Security Administration Office of Research and Statistics (SSA)	X	X	
Smithsonian Institution		X	

Subsequent review and discussion of the material presented by the agencies identified a need for a common data set to make comparisons between agencies. Subcommittee members compared their agency training databases, discovering that their ability to extract data varied widely. Nevertheless, the subcommittee felt that it would be desirable to attempt to collect as similar information as possible on the scope and cost of agency survey and statistical training for employees, and on the number of agency participants.

Information on agency survey and statistical training programs conducted for a broader audience -that of data collectors, data providers, and data users — was an initially unexpected aspect of the agency presentations. The recipients of this training were individuals who were at some agencies federal employees; at others, nonemployees. The audience was characterized as individuals who participated in the agency survey or statistical processes or received agency statistical products. They included interviewers (either employees or nonemployees), collaborators (clients), data providers, data users, researchers, employees of other government (local, state, federal, international) organizations. The subcommittee felt that more information on these training activities could be of interest to the federal statistical agencies in designing and developing their broad survey and statistical training curriculum.

3. Study Approach

The subcommittee recognized that it needed to know more about agency training databases to determine what information might be collected to compare agency programs. A subgroup next investigated agency training databases to determine what information was available. The NASS Training Information Database (TRAI), in particular, is quite extensive. It includes participant data elements: name, social security number, classification series, grade/level, position title, duty location and phone number, home address and phone number, organizational unit; and course data elements: title, course objective, course start/end dates, duty hours, non-duty hours, tuition cost (registration fees, books and materials, other), vendor (name, address), course address, training purpose code, training type code, training source code, training special interest code, payment method, indirect costs. Other agency training databases were less comprehensive. On the basis of the information thought to be available at most agencies, the group specified measures relevant for comparisons between agencies — average training costs and average number of training opportunities per employee; amounts and kinds of training provided and to whom; total cost and cost as percent of program budgets.

The group developed a survey questionnaire (Appendix B) to send to the previously identified list of federal statistical agencies to collect information on agency training. Each agency was requested to provide FY 96 data on training costs, survey and statistical course attendance, and numbers of attenders for "statistical" employees. "Statistical employees" were defined as:

- mathematical statisticians (GS-1529),
- statisticians (agricultural, economic, demographic, health, education — GS-1530),
- survey statisticians (survey methodologists — also GS-1530),
- quantitative social scientists (economists, sociologists, psychologists, anthropologists),

- operations researchers (GS-1515),
- computer specialists (GS-334),
- student assistants (GS-1599).
- statistical assistants (GS-1531).

Survey and statistical courses were grouped into six categories:

- statistical analysis (e.g. Analysis of Complex Survey Data),
- sampling (e.g. Applied Sampling),
- other statistical courses (e.g. Probability),
- statistical computing (e.g. Introduction to SAS),
- survey methods not otherwise classified (e.g. Questionnaire Design),
- other (e.g. Survey Management).

Information on course attendance was obtained and categorized by course type, participants' classification series, and grade.

The subcommittee recognized that the data in agency training databases would not provide information on employee satisfaction with training opportunities — for present work assignment, for keeping up with technology, and for career development — or employee's perception of the value of the training. Agency databases would only document what courses had been taken. An opportunity to collect information on employee perception arose in connection with the 1996-97 JPSM Practicum, Organizational Climate Survey of Federal Statistical Agencies, conducted at nine of the federal statistical agencies. Through an interagency process, the subcommittee proposed questions for this survey that would provide insight into employee satisfaction with training.

To highlight the subcommittee's initial findings, the subcommittee organized a session at the November 1996 conference jointly sponsored by the FCSM and the Council of Professional Associations on Federal Statistics (COPAFS). The session included a paper on the initial activities of the subcommittee, presentations on several agency career development programs, and a panel of senior agency executives discussing statistical training needs in the future. The documentation for this session was incorporated into the report.

As a follow-up to the panel presentation on statistical training needs in the future, the subcommittee sought additional agency executive insights on these needs. As a result of these two efforts, insights were obtained from BoC, BLS, NASS, and NSF from panel participation, and from EIA, NCES, and NCHS through response to an interview questionnaire.

Information was prepared on interviewer training. Federal agencies have different arrangements for securing an interviewer workforce. Some agencies directly employ their interviewers (BoC, BLS); some agencies contract for their interviewer workforce (NASS, other federal agencies). NASS has an arrangement with another organization, the State Departments of Agriculture, who supply NASS with interviewers. The information on interviewer training by three agencies — BoC, NASS, and BLS —

was included to provide information on statistical components of this training that were desirable in the conduct of surveys. This information would provide a model for agencies contracting for data collection with BoC, NASS, BLS, or a private organization.

Information was also requested on training of nonemployees. This information helped to provide a total picture of each agency's survey and statistical training programs. Additionally, it would provide insight on the outreach efforts of agencies in quantitative and survey literacy. Committee members thought that sharing of this information between agencies might provide ideas for more effective federal statistical system quantitative literacy. Agency survey and statistical training programs directed toward employees might thus be augmented.

While the study approach was multi-faceted, each facet had limitations that presented challenges. The survey questionnaire collecting information on agency training was self-administered, for example, and respondents had only limited opportunity to clarify the information request. Both training and training costs are defined differently across the agencies, leading to inconsistencies in the reported data. In addition, for nine of the nineteen agencies reporting on agency training, the information on employee perception of training (information obtained from the Organizational Climate Survey of Federal Statistical Agencies) covered all types of training for all employees, not just statistical training and training for statistical employees — the focus of this report. Details on the limitations are presented in these chapters.

4. Organization of Study

The major component of the report consists of the two formal survey data collection efforts — the survey conducted by the subcommittee discussed in Chapter Two and the analysis of the training questions contained in the JPSM Practicum Survey presented in Chapter Three. Chapter Two includes information on training for both agency employees and nonemployees. Chapter Three reports on agency employee perceptions about the training they currently receive (all training, not just statistical). Chapter Four presents information on three statistical career development programs. Chapter Five describes interviewer training at the Bureau of the Census, the National Agricultural Statistics Service, and the Bureau of Labor Statistics. Chapter Six highlights the recommendations and findings of the subcommittee, including potential uses of the survey results, recommendations to improve training opportunities, identification of areas of collaboration across the statistical system, and training to address future needs.

The report's annotated bibliography abstracts the material collected in the course of the agency literature review. Appendix A has case studies of seven federal statistical agency training programs. Agencies represented include: the National Agricultural Statistics Service (NASS), the Bureau of the Census (BoC), the National Center for Education Statistics (NCES), the Energy Information Administration (EIA), the National Center for Health Statistics (NCHS), the Center for Disease Control and Prevention (CDC), and the Bureau of Labor Statistics (BLS). Appendix B contains the Federal Statistical Agency Training Survey Questionnaire. Appendix C contains the training questions included on the 1996-97 JPSM Practicum Organizational Climate Survey of Federal Statistical Agencies. Appendix D provides the Questionnaire on Future Training at Federal Statistical Agencies used to solicit insights from Senior

Agency Officials at selected statistical agencies. This information was used in conjunction with comments made at the November 1996 COPAFS Seminar to profile future training needs.

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