

Position Classification Standard for Statistician Series, GS-1530

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SERIES DEFINITION

This series includes all classes of positions the duties of which are to administer or perform professional work, or to provide professional consultation in the application of statistical theories, techniques and methods to the gathering and/or interpretation of quantified information.

These standards supersede the standards for the Statistics Series, issued in June 1948 under the code P-1580-0, subsequently recoded to GS-1530. Also superseded is the fly sheet issued in August 1951.

GENERAL CHARACTERISTICS OF STATISTICS

The word *statistics* has two meanings. In the oldest meaning the word is used as the plural of statistic, and means a group of facts stated numerically. In its modern connotation, however, statistics means the body of theory and methods used in the collection, classification, and evaluation of quantitative facts as a basis for inference. It encompasses a body of techniques for acquiring valid knowledge, of measurable accuracy, from incomplete information, and represents a scientific system for the collection, compilation, description, organization, analysis, interpretation, and presentation of information in numerical form.

All of these processes are integrated into a coherent whole even though individual statisticians may specialize in various functions. The techniques of statistics are applicable to any subject-matter field in which facts may be validly expressed in or reduced to numerical form. In applied statistics these techniques are used in the solution of specific problems requiring quantitative data, or of the problems inherent in selection, collection, analysis, interpretation and presentation of such information.

As in other professional fields, judgment of a high order is commonly required in the adaptation or application of appropriate techniques and in the interpretation of results. Indeed, such judgment is required for determining in the first place whether a problem is amenable to statistical inquiry, and for the formulation and planning of the entire investigation.

One of the primary concerns of the statistician is the sources of data. He may use data derived from a sample, frequently a probability sample. Although the design of such a sample (that is the determination of the size and characteristics of a sample necessary to insure required reliability of data) is normally the function of a mathematical statistician, and may be incorporated into standard procedure manuals, the selection of specific units for the sample (e.g., the particular individuals to be interviewed) is the responsibility of the statistician on the project. In order to do it effectively he must have a firm understanding of sampling theory and of the specific principle upon which the particular sample design is based.

If primary data are to be collected the statistician, may provide advice or be directly involved in the collection processes. If data gathered by other agencies are to be used, the statistician will examine these tables and reports to understand their implications and limitations with regard to the problem under study. His next task is the organization of the data in such form that their significance, for the purpose at hand, may be appreciated, that comparison with masses of similar data may be facilitated, and that further analysis may be possible.

This arrangement takes different forms depending upon the problem under investigation. For example, observations at a moment in time might be arranged as a frequency distribution, and observations over a period of time, arranged chronologically. Each arrangement provides a different basis for analysis.

Examples of some of the various kinds of statistical techniques often used by statisticians include: *analysis of frequency distributions*, which provides averages and measures of variation of large masses of data from samples of censuses; time series analysis which permits the study of relationships between and among variables; *sampling*, which permits the estimation of characteristics of entire statistical populations and the testing of hypotheses concerning these characteristics from relatively small samples; and analysis of variance which is one of the methods for testing the significance of the differences between sets of data. Techniques for the *determination of confidence limits and the estimation of magnitudes* also offer examples of methods used by some statisticians.

STATISTICIAN SERIES DIFFERENTIATED FROM OTHER OCCUPATIONS

The statistician differs from the [Mathematical Statistician, GS-1529](#) in several fundamental ways. He is primarily the user rather than the designer of statistical tools. He normally uses standard techniques readily defined in the basic statistical text books or professional journals or incorporated in procedure manuals. Although he sometimes uses methods involving complex calculations, and must have a sound knowledge of the fundamental theories of statistics, his choice of statistical techniques is usually governed by the nature of his assignment. Finally, the statistician is more deeply involved with the subject matter of the statistical data; the mathematical statistician, with the statistical methodology. The statistician's research problem is ordinarily in a specific subject-matter field and his effectiveness as well as his prospects for professional development are dependent, not only on his understanding and ability to apply statistical methods, but also on his knowledge of the universes and information sources related to this subject-matter field.

The statistician differs from the subject-matter specialist (e.g., economist, physicist, etc.) in that his primary interest is in the investigation process rather than in the subject-matter conclusions. Statistical methods and techniques provide a means of coordinating and correlating a variety of observations, facts, or phenomena in the subject-matter field, and if he is to be effective, the statistician must acquire considerable knowledge not only about the detail but also about the theory of the subject under study. The grade controlling considerations for the statisticians' positions emphasize knowledge and use of statistical theory and technique and responsibility for

the selection, adoption and use of proper statistical methods of analysis and presentation. The subject-matter specialist, on the other hand, employs a variety of methods -- some statistical (and in this, his objective and method tend to coincide with the statistician's), some purely mathematical, some physical, and some intuitive. The use of statistical methods by subject-matter specialists may be only incidental and in any event is not grade controlling.

The statistician differs from employees in [the Statistical Clerical and Administrative Series, GS-1531](#) by his knowledge and use of basic statistical theory, methodology, and techniques. Specifically excluded from the Statistician Series, GS-1530 are those positions which include tasks related to the collection, analysis, and presentation of statistical data, but do not require professional knowledge of statistical theories, assumptions, or principles. For a full discussion of the distinctions between Statistician positions and positions in the Statistical Clerical and Administrative Series, GS-1531, see classification standards for this series issued in March, 1957.

On occasion, the statistician may use electronic digital computer equipment as an integral part of his work, or he may use the services of specialists whose positions are classified in the [Information Technology Management Series, GS-2210](#). In either case, however, his assignment requires professional knowledge and use of statistical methods, and the use of this equipment is ordinarily incidental to the purpose of his assignment. Electronic computer equipment is one of a variety of tools used in the statistician's work.

ORGANIZATION OF THE STANDARD

There are two basic types of statistician positions. The first of these, designated simply as "statistician," is divided into twelve subject-matter specializations. The second, identified as "survey statistician," is not further divided. The two basic types and the subject-matter specializations are discussed below. The grade-level criteria are applicable to all positions in this series regardless of specialization.

Statistician

These positions are concerned with the use of statistical techniques and methods to determine meaningful relationships in, or to measure the significance of quantified information usually relating to a particular subject-matter field.

The number and complexity of functions performed by statisticians vary extensively, but fully qualified statisticians typically are expected to be able to assume full responsibility for determining whether the problem is amenable to statistical inquiry, the kinds of data necessary and the sources of the information needed. They are expected to suggest new or improved methods for obtaining data, including cost estimates and evaluation of other limiting factors, and, when necessary, to plan forms and procedures-for collecting and tabulating data. They are responsible for analysis of findings including evaluation of the statistical limitations of available data and specification of the range of logically possible explanations of the findings, and are responsible, finally, for presenting findings in their most pertinent form. Such presentations may

include text, graphs, charts and tables based on original or derived data. These responsibilities require a knowledge of statistical theory, facility with statistical methods, and familiarity with the particular statistical techniques applicable to the subject matter involved. Usually an adequate working knowledge of the subject-matter field in which the work is conducted is also required. This last requirement may limit the movement of statisticians from one subject-matter field to another.

Since the subject-matter statistician may use primary as well as secondary data for his analyses, he may, on occasion, collect information by means of a survey. In such instances, however, his position differs from that of the survey statistician in that the survey is but one step in his full assignment. His emphasis is on analysis and interpretation rather than on the collection and presentation of data. Usually, surveys conducted by subject-matter statisticians will be small, infrequent, and non-repetitive. In some large statistical organizations which depend heavily on repetitive data collected from primary sources, the need for subject-matter statisticians rather than survey statisticians may occur in two circumstances: (1) assignments concerned with survey processes so well established and covered by procedure that professional level statistical work is confined almost exclusively to the analytical and interpretive processes after the data are tabulated; and (2) assignments which include responsibility for technical review of the collection system as part of the analysis, evaluation and explanation of findings.

Professional statisticians responsible for the application of statistical theory and methods to the solution of problems in a subject-matter field become familiar with both the general and the specific knowledge of the field. They understand, for example, the general magnitude and characteristics of the population under study, the various categories of data, and the technical language involved. They become familiar with the major controlling factors in the field and their general relationships, and with cycles, trends, sources, validity, limitations, and interrelationships of the data involved. They determine which facts may be validly expressed quantitatively, which are relevant and important, and which may be neglected for statistical purposes as extraneous or incidental. They are aware of the programs and objectives of the agency, and of the special and continuing problems involved.

Specializations

Specific subject-matter specializations are established in order to recognize the knowledge of the subject matter required, and the familiarity with the kinds and availability of data necessary in the various fields in which the statistician works. For purposes of titling, the subject-matter specialization will be shown in parenthesis following the title, "Statistician." These subject-matter specializations are based on a compromise between the formal subdivisions of the major scientific fields, the existence of large numbers of positions in certain subject-matter specializations, and the organization of the statistical activities in the Federal agencies. Inasmuch as the specializations provided are broad and encompass many restricted, unique, and highly specialized subject areas, selective certification may be necessary in filling positions involving narrow aspects of such fields. The use of the broad subject-matter title, however, is mandatory.

The following definitions of specializations include subjects which are typical of the statistics in each subject-matter field:

Agricultural. -- Crop production and crop acreage, livestock production and inventories, farm commodity prices and incomes, consumption of agricultural products, farm labor, farm property values and finance, marketing and transportation, and related agricultural topics.

Biology. -- Management and control of biotic forms and protection and control of the life processes of plants, animals, including such studies as animal and fish population inventories, and experiments in pest controls, etc.

Demography. -- Human populations and their characteristics, including distribution, migration, and growth; fertility, fecundity, mortality, marriage and divorce; and individual social and economic characteristics, such as age, education and occupation, attitudes, etc.

Economics. -- Production and prices, income, trade, money and credit, savings and investment, finance and taxation, labor and employment, transportation, and other topics not related to agriculture.

Education. -- The educational function including problems of the teaching and learning processes, and such topics as staff, students, income, property, organization, and curricula of educational institutions.

Engineering. -- Engineering activity and experimentation, including statistical quality control and acceptance-sampling procedures for raw materials and manufactured or processed products.

Health. -- The causes, incidence and cost of accidents, disease and disabling illness, including epidemiological research; and the administration of medical care, disability insurance, and public health programs.

Medicine. -- Studies which contribute to research and experimentation in the etiology, diagnosis, treatment, prevention and cure of human disease where such research is either laboratory or clinical in nature.

Operations and Administration. -- Studies on the problems of management and operations as related to jobs, people, material, equipment, methods, attitudes and working conditions, financial, management, program evaluation and control, statistical analysis of accounting systems, etc.

Social Science. -- Rural and urban sociology, criminology, racial problems, State and local government, social work, social insurance and welfare services, etc., but exclusive of the field of economics.

General. -- Any field which does not logically and clearly fall into one of the above subject-matter specializations.

Survey Statisticians

These positions are concerned with the application of statistical theory and technique to the planning, organization, and operation of programs for collecting, verifying, adjusting, processing, summarizing, and presenting information expressed numerically. A "survey" is a study in a given area, an ascertaining of facts of specific conditions, to provide pre-specified information. For purposes of this specialization the area under study and the specific information required may be internal to a particular agency or may involve obtaining data from outside sources.

Positions in this category usually will be found in statistical organizations of sufficient size to allow for such specialization. They are characterized by activities necessary to the collection of primary data as opposed to data selected or sampled from records, instruments or reports which were originally collected for other reasons, such as historical, administrative or control purposes. Although the decisions of the survey statistician must rest on a sound foundation of statistical principles, other and specialized knowledges, skills, and aptitudes are required.

He is responsible for defining measurements useful for specific purposes, and for determining the best and most efficient types of approach to the collection of the quantitative information most useful in the solution of the problem under study. He must determine the feasibility of reducing the problem to one in which objective measurements can be taken, and then he must plan, organize, and supervise the operation of the necessary survey.

He selects the most appropriate methods, within cost considerations, develops or reviews for structural soundness the questionnaires and schedules for obtaining the information, plans the development of related data for comparison, and establishes systems of classification and coding. He organizes the reporting of collection, summarization and presentation, and plans necessary checks and controls.

The survey statistician provides methods for the verification, adjustment and weighting of data, and establishes and applies established methods for evaluation of the accuracy of results, especially with respect to response errors, non-response and related problems. He formulates specifications and techniques for computer processing or for machine and hand tabulation including the design of punch cards, coding systems and summary sheets for calculation, subsequent analysis, and permanent records, and he may plan the presentation of resulting tabulations, charts and documentation.

The survey statistician is also responsible for the solution of the statistical problems occurring in the collection and summarization processes. He must reduce the process as far as possible to a routine which can be assumed by clerical personnel or process by machines, yet preserve the statistical validity of the data. He develops or reviews instructions to enumerators for the interviewing of respondents and the recording of information; he develops or reviews instructions to respondents for the completing of questionnaires, and instructions to nonprofessional personnel for the editing, classification, tabulation, and summarization of data including specific directions covering special cases which must be referred to a professional statistician and alternative solutions for common type problems.

This specialization includes all positions in which the primary concern is the overall planning or execution of complete surveys of any size, including initial negotiations or origination of the survey, and the establishment of general specifications and detailed time schedules governing the various steps involved in data collection, processing and publication.

In some situations the responsibility for the entire survey process may be incorporated into a single position. In large statistical organizations devoted to the collection of masses of data by mail or by personal interviews from people or from economic units such as business firms, institutions and similar organizations, good management may indicate specialization in the various survey functions. Thus, survey statisticians may be specialists in survey planning, data collection, data processing, or in problems related to the documentation and publication of survey findings.

Typical examples of assignments performed by survey statisticians specializing in the various survey functions are:

Survey Planning: Development and formulation of overall plans pertaining to the design of complete survey, considering general objectives and methods to be employed; development of overall procedures, forms design, cost estimates, time-table, specific plans for quality control and production control systems, staff requirements; and development of general data collection specifications, general data processing requirements and general survey documentation.

Data Collection: (1) Translation of general data collection specifications established by survey planners into detailed and practical plans for data collection systems; writing training manuals, procedural manuals, and similar related materials; designing standard forms and procedures governing all administrative and technical features of the data collection system; estimation and control of budgetary and financial, supply and space, personnel, public relations, and other general administrative management requirements of the data collection system.

or

(2) At field levels, the actual conducting of the data collection phase of the survey in accordance with all previous plans and procedures, the conducting of quality checks designed for the survey and troubleshooting all problems in the field. These assignments typically include also responsibility for the explanation, from firsthand observation, of unexpected data or trends, or apparently inconsistent survey findings and the providing of information on peculiarities of data.

Data Processing: Translation of the general processing specifications established by survey planners into detailed and practical plans for data processing systems; design of large scale systems to control incoming data collection materials; development of plans for production management including staffing plans, procedures, backlog scheduling and management, programming for any or all of the tabulation methods and the initial summarization of data. In all of these activities, the statistical validity intended in the original survey design must be

preserved, and, therefore, they require professional knowledge and understanding of the statistical principles and techniques involved.

Data Publication: Planning of statistical publications where knowledge of statistical presentation (i.e., tabulation, classification and charting techniques) is a paramount requirement; review, analysis, coordination, revision and/or consolidation of published or to-be-published statistical reports, volumes, and releases; performance of research and writing resulting in complete books such as statistical compendia (Statistical Abstract, Historical Statistics, etc.) The proper technical documentation of statistical methods used is an essential part of data publication and requires professional knowledge and understanding of the statistical principles upon which surveys were based.

/1/ Positions which typically require statistical studies of data contained in such records systems and which do not require performance of the functions listed in the following paragraphs should be classified as "Statistician (appropriate subject-matter specialization).

/2/ In agencies where the statistical data being collected relate primarily to a specific subject-matter field and where data analysis and interpretation are the end product of the survey, the duties and responsibilities listed here are usually undertaken by subject-matter specialists and/or subject-matter statisticians, as an integrated part of their basic assignments.

SUPERVISORY CLASSES

Supervisory classes have not been described in these standards although such positions are included in the series. When supervisory duties and responsibilities constitute a substantial, regular part of a statistician's position and are of such significance as to require supervisory qualifications, the position should be designated as supervisory by the addition of the prefix, "Supervisory" to the non-supervisory title, and is to be evaluated by the criteria in the [General Schedule Supervisory Guide](#). Supervisory statistician positions are to be evaluated relative to the criteria in that standard and in other related and appropriate standards. Neither the technical direction of small professional staffs nor program responsibility which does not include line supervision are considered indicative of a supervisory statistician position unless such responsibilities are of such consequence as to require specific supervisory qualifications.

METHOD FOR DETERMINING GRADE LEVELS

The value of statistician positions varies with relative differences in the complexity, the responsibility, and the qualifications required. These variations can be measured in positions involving the independent performance of professionally responsible statistical work by reference to the seven basic factors discussed below. The grade-level criteria for grades 9 through 15 are presented in terms of these factors.

Evaluation factors

1. *Nature of assignment.* -- Assignment patterns are described at each level. The difficulty of work performed varies with (a) the number of problems and the complexity of relationships involved, (b) the scope of the assigned work programs, and (c) the extent of initiation, planning, and development required in the statistical studies and investigations.
2. *Technical demands.* -- Variations in this factor are measured by (a) the required degree of proficiency with statistical techniques, (b) the extent to which development, modification, or adaptation of methods are necessary, and (c) the technical authority with which projections, estimates, forecasts, and interpretations are made.
3. *Responsibility.* -- Variations in responsibility are measured in two dimensions: (a) technical accountability both for the selection and application of statistical methodology and for the accuracy and adequacy of the statistical results obtained, and (b) administrative responsibility for the effective use of funds, staff, and equipment.
4. *Supervisory controls.* -- The kind and degree of supervision exercised over these positions is significant, since it conditions the difficulty of work performed and the amount of originality required as well as the responsibility for results and contracts.
5. *Guidelines.* -- The availability of established procedures and applicable precedents is especially significant in the lower levels. In the higher levels where guidelines are typically sketchy or nonexistent, greater recourse to personal knowledge and judgment is required.
6. *Contacts.* -- This factor deals with the frequency, nature, and level of the contacts, and the responsibility for agency representation and commitment.
7. *Qualifications.* -- The knowledge requirements cover both the professional techniques, methods, and purposes of statistical activity, and the knowledge of the agency program. The ability requirements relate to variations in the special qualities of mind and personality necessary at each level.

For professional statistician positions at developmental or training levels, some of these factors are relatively unimportant. For example, at the GS-7 level administrative responsibility and contacts have less significance in the evaluation of positions than at the GS-11 level. The grade-level criteria for grades 5 and 7 are, therefore, presented in more general terms which do not reflect the relative impact of each of the seven basic factors independently.

STATISTICIAN, GS-1530-05

Assignments cover miscellaneous duties related to problems assigned to higher-graded statisticians. These assignments provide training and experience in the methods and techniques of a particular, statistical or subject-matter specialization, as well as in the technical and administrative policy and regulations of the agency.

A typical on-job training situation is the most definitive characteristic of positions at this level. Techniques are usually spelled out in detail, methods are clearly indicated, and contracts are closely restricted. A higher-graded statistician exercises immediate supervision and gives specific work assignments, detailed instructions, advice, and guidance. He provides applicable literature and pertinent data, together with specific instructions for any adaptation or modification necessary; and reviews finished assignments in detail for compliance with instructions, accuracy in application of techniques, and soundness of conclusions.

Qualifications. -- The technical knowledge required includes understanding of fundamental statistical theories and knowledge of elementary statistical methods and of probability theory. Also necessary is the ability to acquire technical skills and knowledges pertinent to the agency program and relevant rules and regulations and the ability to prepare reports including both simple text and tabular and graphic presentations.

STATISTICIAN (APPROPRIATE SUBJECT-MATTER SPECIALIZATION), GS-1530-07

SURVEY STATISTICIAN, GS-1530-07

Assignments are typically small studies which have specific objectives and involve recurrent and predictable factors. They may be integrated segments of larger, more complex studies. They require the application of statistical techniques normally included in the basic education of professionally trained statisticians. These techniques, although standard statistical tools, are not necessarily routine, and their application to the peculiarities of the subject matter involved may require complex calculations.

Typically, technical responsibilities include the development of the details of the study according to established objectives and specifications, recognition of unexpected problems or variations in results, and the preparation of preliminary interpretations or tentative recommendations. Both planning and results are subject to thorough, detailed, technical review. Administrative responsibilities are confined to the occasional planning for the use of clerical employees or machine time.

Direct supervision is usually provided by a statistician of a higher grade, but technical direction may be given by a subject-matter specialist. The supervisor explains objective of assignment, indicates general method to be used, and suggests applicable techniques. Work is controlled by well-established procedures and readily available, clearly defined precedents, and the supervisor

is immediately available for guidance as the work progresses. Results are given careful technical review.

Contacts outside the agency are usually infrequent and are subject to prior supervisory review and approval. However, certain assignments, especially at field levels, may require regular contacts with the general public or with representatives of particular organizations, for purposes of collecting primary statistical data. Significant difficulties in securing cooperation, negotiations and commitments are not typical of contacts at this level.

Qualifications. -- Technical qualifications required include knowledge of the principles, theories, and techniques of statistics such as are covered in basic statistics courses which include probability theory; knowledge of the established precedents upon which assigned studies are based; and familiarity with sources of information related to the subject matter under study. Other requisite qualifications include the ability to plan and carry out work assignments effectively, to write simple technical reports, to plan and prepare graphic and tabular presentations of data, and to present technical documentation in a professional manner. The ability to meet and work effectively with a variety of people may also be required.

STATISTICIAN (APPROPRIATE SUBJECT-MATTER SPECIALIZATION), GS-1530-09

SURVEY STATISTICIAN, GS-1530-09

1. *Nature of assignments.* -- Assignments, which may either cover recurring or continuing studies or relate to special investigations, are characteristically clearly defined units or parts of major projects assigned higher-graded statisticians. They typically involve numerous or unpredictable factors and require the setting up and carrying out of integrated procedures. The work includes the selection and application of statistical techniques and the adjustment and adaptation of established statistical methods to the problem at hand.
2. *Technical demands.* -- Although the techniques and methods used represent standard statistical tools, they may be fairly complex and sophisticated. (For example, the application of various standard statistical formulae may require extremely long, involved or difficult computations.) The planning and execution of assignments sometimes include the design of general data-collection and analytical procedures where different from the established system, the determination of checks and necessary calculations, the analysis of results, and the drawing of conclusions. The most important technical demands at field levels usually are for great accuracy in following program guidelines and for great accuracy in following program guidelines and for perception in recognizing subtle distinctions in statistical results which demand departure from established rules and guidelines. Normally, reports are prepared after interpretations have been approved.
3. *Responsibility.* -- Statisticians at this level are accountable for the adequacy of the methods selected and the accuracy of the results obtained within the latitude allowed by the indicated

nature of the assignments, extent of technical demands, and degree of supervision. Administrative responsibility is confined to occasional planning of clerical or machine time.

4. *Supervisory controls.* -- A higher-graded statistician or subject-matter specialist provides general control and instructions indicating the scope and objectives of the assignment. The supervisor reviews and approves preliminary planning and is available for consultation and assistance throughout the study. Final reports are reviewed in detail, for clarity, completeness, and validity, and for the soundness of analysis and conclusions.
5. *Guidelines.* -- Considerable precedent in the form of similar studies is usually available for guidance in the selection and application of techniques and methods, the determination of sources and limitation of pertinent data, the anticipation and solution of problems, and the drawing of final conclusions.
6. *Contacts.* -- Contacts outside the agency are usually initiated by the supervisor, although special problems may require the development of continuing work relationships and the securing of cooperation from technical employees in closely allied organizational units in matters of mutual interest, such as the details of cooperative projects. Most contacts are characterized by the exchange of technical information, discussion of ideas, and the giving receiving of information on methodology. However, assignments at the field level may be similar to those indicated at GS-7 for field assignments with the addition of greater responsibility for overcoming difficulties in securing cooperation. Difficult negotiations and commitments are rarely involved without assistance from higher-graded statisticians.
7. *Qualifications.* -- Required technical qualifications include not only the knowledge of the principles, theories, techniques and methods of statistics, indicated at the next lower grade, but also knowledge of the application of statistics in a specialized area. For example, a subject-matter statistician must be familiar with the uses of statistics in a subject-matter field (e.g., economics, biology, etc.); a survey statistician, on the other hand, needs to understand the fundamental problems inherent in mass data collection. Also required is a knowledge of the regulations and objectives of the agency's program as they affect the assignment. Other qualifications necessary at this level include the ability to analyze factual information and recognize significant factors, relationships, and trends, and to write technical reports on specific assigned studies or to prepare preliminary drafts of more comprehensive reports. Ability to meet and work effectively with people is also usually required.

STATISTICIAN (APPROPRIATE SUBJECT-MATTER SPECIALIZATION), GS-1530-11

SURVEY STATISTICIAN, GS-1530-11

1. *Nature of assignments.* -- Assignments relate to the broad areas of agency activity in a variety of patterns. In agencies concerned with very large statistical processes, for example, statisticians at this level work on segments of the program. As an illustration, in a program involving nationwide data collection, they may be concerned with statistics covering specific crops or data on particular industries; or they may be confined to the techniques of a particular step in the entire nationwide program, such as the preparation of technical instruction manuals for field enumerators or the planning of quality control procedures. In other situations, where the agency program is not dependent on primary mass data, assignments may be integrated studies designed to provide statistical support for agency activities. For example, they may require the pulling together of several sets of data from secondary sources developed for quite different purposes and preparing an integrated analysis; or the collection, organization, analysis and interpretation of highly specialized data from restricted and readily available sources.

2. *Technical demands.* -- Whatever the pattern, however, assignments at this level may involve the initiation of investigations based on observations in related areas, and typically require extreme precision in carrying out program guidelines, plus the perception to recognize the variations in statistical findings which demand prompt action in adjusting or altering established procedures. Professional independence within assignment limitations, from the initial planning to the final report, is typical. Statisticians at this level, characteristically, develop or modify the methods they use; they select and apply a variety of techniques, frequently involving a number of variables. They specialize in either (a) the techniques of survey statistics, or (b) the statistics peculiar to a field (such as price statistics, crop estimates, medical case histories).

3. *Responsibility.* -- Technical responsibility is reflected in the degree of professional independence which is characteristic of statisticians at this level. These statisticians may be responsible for recognizing and recommending fruitful problems for investigation as well as providing technical assistance or advice on a particular statistical specialty or subject matter. In addition, statisticians at this level are responsible for planning the efficient use of available staff and equipment. Studies sometimes require extensive use of such facilities. One or more professional or nonprofessional assistants may be assigned, but supervisory responsibility is incidental to other responsibilities characteristic of this level.

4. *Supervisory controls.* -- A higher-graded statistician or subject-matter specialist provides administrative control. The scope and objectives of studies are determined in consultation with the supervisor who may offer assistance while work is in progress on administrative matters or on problems requiring unusual technical or subject-matter knowledge. Final reports are reviewed in detail by the supervisor, whether statistician or subject-matter specialist, for technical soundness, conformity to policy, and suitability for dissemination.

5. *Guidelines.* -- Guidelines on methods, techniques, formulas, and data directly pertinent to the study frequently require modification and may be unreliable or conflicting. Considerable technical judgment is required to assess, select, and make optimum use of such tools.

6. *Contacts.* -- Contacts are characterized by the exchange of information and opinion at a high technical level. Statisticians at this level provide extensive methodological or subject-matter interpretation and advice. Coordination with and the securing of cooperation from outside groups may also be involved. Continuing liaison or new work relationships with other Government or private groups are subject to supervisory approval. This is the lowest level at which the significant public relations responsibility is evident. Responsibility for agency representation or commitments is greatest in technical matters clearly within the scope of the assignment.

7. *Qualifications.* -- Knowledge of statistical theory and technique at a comprehensive professional level is basic to these positions. Requisite qualifications also include knowledge of statutory provisions, content, and objectives of relevant aspects of the agency program, and a specialized knowledge of the principles and characteristics of survey statistics or of the statistics in a subject-matter field. Other qualifications required include the ability to recognize and evaluate the importance of critical factors relative to the assignment, such as limitations of available guides and precedents, to solve problems when pertinent guides are not available, to draw rational inferences based on assigned investigations, and to prepare technical reports on findings and methods. The ability to work cooperatively and effectively with others is also required.

STATISTICIAN (APPROPRIATE SUBJECT-MATTER SPECIALIZATION), GS-1530-12

SURVEY STATISTICIAN, GS-1530-12

1. *Nature of assignments.* -- Assignments are in the same variety of organizational patterns indicated at the GS--11 grade level. However, the work is characterized by the multiple nature of assignments which typically include several related studies or several segments of a mass data-collection project to be coordinated and kept in progress simultaneously. Work typically includes the full scope of the investigative process from initiation of the study and planning of methods, through the execution of the plans, to the final interpretations and reports, and is characterized by the need for independence and professional authority.

2. *Technical demands.* -- Statistical projects assigned characteristically require the modification and adaptation of a variety of methods or the development of new systems or procedures. Interpretations, forecasts, and recommendations based on statistical findings are typical. A statistician at this level usually is a recognized specialist in a particular statistical function or in the statistics pertaining to a specific subject-matter field.

3. *Responsibility.* -- The statistical validity of results is a basic responsibility at this level whether these results be reports of findings, estimates, forecasts, or recommendations based on investigations. Such responsibility is inherent at each step of the statistical process: initiation,

planning, execution, analysis, interpretation, and final presentation. Statisticians at this level are responsible for providing expert advice and consultation on their particular statistical specializations. Statisticians at this level are responsible for the effective use of assigned funds so that maximum statistical service and information are provided within monetary limits. Responsibility for recommendations relative to research budgets may also be represented. Professional and nonprofessional staff assistants may be assigned these statisticians, requiring the coordination, direction, and review of their work, but such supervisory responsibilities are incidental to other responsibilities characteristic of this level.

4. *Supervisory control.* -- Supervision of a very general nature is provided by higher-graded statisticians or subject-matter specialists who discuss and approve the initiation, development, or revision of projects or studies which fall within the framework or established agency programming and policy. The supervisor may be consulted on the preliminary planning and execution of the most difficult phases of the work. Progress is reported in occasional conferences or in formal summary reports. Decisions on matters of policy are reserved for the supervisor. Most work is not reviewed in detail and completed studies are examined for overall concepts, technical results and apparent validity and for policy conformance.

5. *Guidelines.* -- Guidelines applicable to the most difficult technical problems may be almost completely lacking. Familiarity with the advanced literature of the field, a broad comprehension of related fields, and originality and resourcefulness usually are required in arriving at sound technical judgments.

6. *Contacts.* -- The statistician at this level frequently provides professional leadership within the agency and secures cooperation, coordinates studies, and exchanges information with outside groups. He makes authoritative recommendations and provides advice as an agency representative acting as a consultant and specialist in a particular statistical function or on the statistics of a subject-matter field. Commitments based on interpretations of agency policy may be involved. Contacts typically involve the exchange of complex technical information and opinion, and discussion of difficult technical problems. The initiation and maintenance of outside contacts and work relationships characteristic of this level involve responsibility for agency public relations.

7. *Qualifications.* -- In addition to a comprehensive knowledge of statistical theory and technique, positions at this level require a thorough knowledge of the methods, principles, and characteristics of a particular statistical specialty or of the statistical resources, methods and procedures of a subject-matter field. Also required is a comprehensive understanding of the broad aspects of the agency program. Statisticians at this level must have the ability to analyze factual information, to recognize and evaluate significant and critical factors in investigations to solve complex problems (or advise others on the solution of such problems), to draw rational inferences based on statistical data, and to prepare comprehensive and publishable reports. Demonstrated ability to work cooperatively and to obtain cooperation of representatives of outside groups is also necessary.

STATISTICIAN (APPROPRIATE SUBJECT-MATTER SPECIALIZATION), GS-1530-13

SURVEY STATISTICIAN, GS-1530-13

1. *Assignment pattern.* -- Assignments involve the initiation, formulation, and planning, as well as the execution and control of major statistical studies or continuing projects. Such studies or projects usually represent an important segment of the agency's primary research program or statistical projects. For example, in an agency which provides broad nationwide statistics, statisticians at this level may be responsible for regional data or for a segment of the national ; or in an office responsible for the statistical controls for agency wide operations, they may be responsible for the statistical controls covering a segment of the agency wide operations. Statisticians at this level also serve, either on a continuing or special assignment basis, as consultants and advisors to top-level subject-matter specialists or agency officials responsible for broad research, administrative, or operational programs. The individual assignment typically is a general problems area related to a specific subject-matter or statistical function, and is characterized by a high degree of latitude, independence, and professional authority.

2. *Technical demands.* -- Assignments require the evaluation and the resultant selection, adaptation, or development of necessary statistical methods. Such methods may be highly varied and broad in scope of the subject-matter field or they may be intensely specialized in a particular statistical function. Statisticians at this level are frequently recognized specialists in their fields, and exercise technical authority through assignments having important program, operational, or research significance.

3. *Responsibility.* -- Technical responsibility for the statistical validity of results and the soundness of value judgments is reflected in recommendations for the initiation or modification of technical or administrative policy, the preliminary analysis and evaluation of proposed projects and studies, and the establishment of technical regulations and instructions for the conduct of statistical work. Statisticians at this level are responsible not only for the effective use of assigned budgets but for the review and evaluation of proposed research budgets and the resultant recommendations. Although they are usually assisted by small staffs of statisticians, subject-matter specialists, and nonprofessional employees who must be given professional, technical leadership, the grade level of their positions is dependent upon the high level of research and consultation performed rather than upon supervisory responsibilities.

4. *Supervisory control.* -- General direction typically is provided by the head of a major organizational segment, who may be either a statistician or a subject-matter specialist. The supervisor gives general instructions covering scope of assignment, indicates broad objectives to be achieved and major or important problems to be expected; he may be consulted for advice on unusual technical problems or for policy interpretation. Completed work is reviewed for technical results and policy compliance.

5. *Guidelines.* -- Applicable guidelines are frequently lacking, Familiarity with advanced and obscure literature and theory in the field, a broad generalized knowledge of the guides in related

statistical or subject-matter fields, originality and resourcefulness are required in arriving at sound technical judgments.

6. *Contacts.* -- A variety of person-to-person work relationship involved technical recommendations and decisions of high order. The statistical consultant at this level provides authoritative advice and central coordination on advanced statistical problems. He represents his agency as an expert consultant or advisor on a statistical specialty or the statistics of a particular subject matter. The initiation of contacts and work relationships necessary to the program and the negotiation of agency participation in cooperative projects with outside groups add to the responsibility and difficult of contacts.

7. *Qualifications.* -- In addition to the knowledge of theory and techniques of applied statistical methods at a comprehensive professional level, statisticians at this level must have either extensive knowledge of the statistical methodology relative to a specific subject matter or intensive knowledge of the specialized techniques of statistical surveys. They must also have a thorough understanding of the agency program, a comprehensive knowledge of statistical research being done by others in related fields, and the ability to advise and consult on a variety of problems involving the theory or application of statistical methods. They must have the ability to originate new statistical methods for projects of a broad and comprehensive nature, as well as the demonstrated ability to plan, direct, and coordinate a variety of specialized and complex statistical research projects.

STATISTICIAN (APPROPRIATE SUBJECT-MATTER SPECIALIZATION), GS-1530-14

SURVEY STATISTICIAN, GS-1530-14

1. *Nature of assignments.* -- Assignments involve the development and execution of statistical research programs or major statistical projects which involve nationwide data collection, provide essential and continuing information for important segments of the general public (such as national economic trend data or nationwide crop forecasts), serve as controls for important administrative or operational activities of a major department or agency of the Federal government, or have objectives of equal urgency and importance. Programs and studies typical of assignments at this level may represent major segments of broad statistical research programs. As recognized authorities in their particular statistical specialties, statisticians at this level often serve as consultants and advisors to other technicians in similar or related fields, both within the Federal government and in private research or professional groups.

2. *Technical demands.* -- Technical demands are represented in the appraisal of the problem area, the planning of the statistical approach, the integration of a variety of methods valid statistical whole, and the solving of difficult and unique problems which may require imaginative or novel approaches. These demands may be characterized by their variety and breadth involving the full scope of a subject-matter field, or they may be typified by their depth and intensity in a narrowly specialized statistical activity. In either case, statisticians at this level

are usually authoritative specialists in their fields and provide expert advice and consultation on the statistics or statistical methods at their command.

3. *Responsibility.* -- Responsibility for statistical validity and sound technical judgments is reflected in the formulation of plans for statistical support of an agency's program, in the execution of such plans, in the interpretation of findings, and in the resultant recommendations. Statisticians at this level are typically responsible for the development of budget recommendations for statistical support of the agency's program. They may have responsibility for planning and coordinating the work of a small staff of assistants. However, this aspect of their work is considered as professional leadership rather than as an administrative responsibility.

4. *Supervisory control.* -- General direction typically is provided by the head of a major organizational segment who is in charge of the overall agency program and usually exercises only administrative control over statistical methodology and programming. Instructions cover only very broad and general directions as to scope and objectives of assignment; completed work is reviewed for adequacy in meeting objectives and for policy compliance; supervisor is available for difficult policy decisions and for assistance with any difficult negotiations with top officials in other agencies or outside organizations.

5. *Guidelines.* -- Precedents and pertinent literature are often almost completely absent. Statisticians at this level are almost entirely dependent on their personal professional knowledge, originality, and imagination for the solutions to unique technical problems.

6. *Contacts.* -- Typically, statisticians at this level maintain continuing liaison with other organizations, both within the Federal government and with State or private research organizations, for the development of cooperative efforts and for the exchange of ideas, information, and data. Such contacts may require difficult or delicate negotiations and considerable responsibility for the public relations of the agency. The recommendations, advice, or opinions of statisticians at this level may affect agency programming and policy.

7. *Qualifications.* -- These positions require a broad comprehension of the principles and theories of applied statistical methods related to a specific subject-matter field or a particular statistical function. They also require authoritative knowledge of the resources, precedents, practices, and available data within their area of specialization and related areas, and a comprehensive knowledge of the extent of the need and demand for statistics and statistical research in their field. Statisticians at this level must be able to act independently in the planning and execution of a variety of projects and to make authoritative and final decisions requiring considerable technical and administrative judgment. They also must be able to evaluate the effectiveness of statistical programs to interpret a variety of statistical data involving complex and subtle interrelationships, and to provide sophisticated advice and recommendations on statistical and statistical methodology.

STATISTICIAN (APPROPRIATE SUBJECT-MATTER SPECIALIZATION), GS-1530-15

SURVEY STATISTICIAN, GS-1530-15

1. *Assignment pattern.* -- Assignments involve the planning, developing and technical direction of statistical research programs where the investigations are of such major importance and scope as to involve extremely large nationwide data collection problems, to have a bearing on national legislation, to affect the administrative or operational policies of a major department or agency of the Federal government, or to have implications of similar gravity and impact. Statisticians at this level frequently serve as chief consultants on the statistical aspects of a subject-matter field or on the technical aspects of a specialized statistical activity, and as such, provide authoritative counsel to high-ranking government officials.
2. *Technical demands.* -- Technical demands are measured less by the required degree of proficiency with statistical techniques (which is assumed to be equal to that specified at lower levels) than with the necessary originality and creativity required to visualize statistical methodology in relationship with the broad research, investigative or philosophic problem involved. Statisticians at this level recognize and advise on the optimum use of statistical technology and the possible expected contribution of statistics, as well as the limitations of statistical methods, in the solution of the basic problems involved.
3. *Responsibility.* -- Interpretations, findings, and judgments are accepted as authoritative within the agency and form the basis for indicated official action or policy. Responsibilities may include final budget recommendations for statistical activities in support of agency program. Responsibility for assigned staff is similar to that indicated at the GS-14 grade level.
4. *Supervisory control.* -- Supervision is confined to broad administrative direction which may be limited to budgetary approval and broad agency policy and program compliance. Statisticians at this level are expected to examine the overall agency program to locate and explore possibilities for statistical support to the agency's objectives. Results are judged on a basis of the effectiveness of the support to the agency activity of the statistical program.
5. *Guidelines.* -- Guidelines, as such, are lacking, and statisticians at this level are expected to apply a very high degree of technical knowledge, imagination, and creativity in the solution of statistical problems of critical importance.
6. *Contacts.* -- Statisticians at this level develop and maintain wide, continuing relationships with ranking statistical executives, both within and outside the Federal government, on broad statistical programs to avoid overlap of objectives and to insure integration of coordinated statistical programming. Commitment authority for decisions relating to agency statistical resources characterizes this level. Authoritative recommendations on technical statistical matters of great scope and importance are typical. Statisticians at this level may be consulted as experts in their fields by high-ranking government officials or top leaders in other organizations.

7. Qualifications. -- These positions require (a) an authoritative knowledge of principles and theories of applied statistical methods, represented by either an extremely extensive knowledge within a specific subject-matter area or an extremely intensive knowledge of a particular statistical function, and (b) a comprehensive knowledge of the laws, policies, and regulations governing the agency program. The statisticians at this level must have outstanding and demonstrated ability to plan, initiate, and coordinate a variety of statistical projects, and to recommend or establish policy relating to complex statistical and administrative problems.