

Position Classification Standard for Medical Technologist Series, GS-0644

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SERIES DEFINITION

This series includes positions which require professional knowledge and competence in the field of medical technology. Medical technology involves performing, advising on, or supervising clinical laboratory testing of human blood, urine, and other body fluids or tissues, using manual or automated techniques; confirming test results and developing data which may be used by physicians in determining the presence and extent of disease or in support of medical research; modifying or designing laboratory procedures; establishing and monitoring quality control systems and measures; and providing instruction in the basic theory, technical skills, and application of laboratory test procedures. Medical technology includes work in such areas as hematology, bacteriology, mycology, virology, parasitology, immunology, serology, immunohematology (blood banking), clinical chemistry (including endocrinology and toxicology), and urinalysis as they relate to clinical laboratory practice.

This standard supersedes the classification standard for the Medical Technologist Series, GS-0644, published in February 1968.

SERIES COVERAGE

Medical technologist positions are found in Federal hospital and outpatient-clinic laboratories; regional and reference laboratories which serve other hospitals, clinics, ships at sea, or foreign stations; research and development organizations; and regulatory and control agencies. Most medical technologists produce test results for use by physicians in the diagnosis and management of disease. Some do research, develop laboratory techniques, teach, or perform administrative or management duties. A few provide consultative and advisory services to State and local health departments, develop standards and regulations controlling laboratories engaged in interstate commerce and/or receiving reimbursement under Medicare, or perform other similar activities.

Although positions classified in this series generally involve testing body fluids or tissues from humans, other duties may sometimes apply. In hospitals where the infection control/environmental surveillance program is supported by the clinical laboratory, medical technologists may test environmental as well as biologic specimens. Where there is no organized nuclear medicine service, they may perform limited nuclear medicine procedures (e.g., in vitro radioimmunoassay tests) in addition to other procedures. In unique situations they may test samples from animals rather than humans (as in setting up and performing quality-controlled hematologic, biochemical, and immunologic laboratory procedures/tests to support pharmacologic studies in laboratory animals).

EXCLUSIONS

Excluded from this series are the following kinds of positions:

1. Positions that primarily involve technical support work in medical technology are classified in the [Medical Technician Series, GS-0645](#).
2. Positions for which the paramount requirement is professional knowledge and competence in a single clinical discipline such as microbiology or chemistry are classified in the appropriate professional series, e.g., [Microbiology Series, GS-0403](#); [Chemistry Series, GS-1320](#).
3. Positions that primarily involve technical support work in an anatomic pathology (cytopathology, histopathology) laboratory are classified in the [Pathology Technician Series, GS-0646](#). (See [Digest 13](#) for additional guidance.)
4. Positions that primarily involve technical support work in nuclear medicine technology (using unsealed radio nuclides for diagnostic, therapeutic, and investigative purposes) are classified in the [Nuclear Medicine Technician Series, GS-0642](#).
5. Positions that primarily involve technical support work concerned with operating medical machines or instruments as part of the examination or treatment of patients (e.g., X-ray, cardiovascular function testing) are classified in the appropriate technical series, e.g., [Diagnostic Radiologic Technologist Series, GS-0647](#); [Medical Instrument Technician Series, GS-0649](#).
6. Positions, other than those of medical technologists, that primarily require the application of professional knowledge and skill in an allied health field and are not more appropriately classifiable in any other existing series are classified in the [General Health Science Series, GS-0601](#). (See [Digest 13](#) for cyto- and histotechnology position series assignments.)
7. Positions involving responsibility for information technology systems and services used in the automated acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, assurance, or reception of information. Such positions are classified in the [Job Family Position Classification Standard for Administrative Work in Information Technology, GS-2200](#).
8. Positions for which the paramount requirement is administrative management knowledge and skill are classified in the [Administrative Officer Series, GS-0341](#).
9. Positions for which the paramount requirement is knowledge and competence in the installation, maintenance, overhaul, and repair of laboratory equipment and instruments are covered by the Job Grading Standard for [Medical Equipment Repairer, WG-4805](#).

AUTHORIZED TITLES

Medical Technologist is the basic title for all positions in this series. *Supervisory Medical Technologist* is to be used for positions that meet the minimum requirements for application of the [General Schedule Supervisory Guide](#).

GLOSSARY OF TERMS

Accreditation is the approval or recognition of a laboratory as conforming with a standard. Most Federal clinical laboratories or components thereof (e.g., blood banks, transfusion services, education programs) are accredited, certified, and/or licensed by one or more agencies such as the Joint Commission on Accreditation of Hospitals (JCAH), the College of American Pathologists (CAP), the American Association of Blood Banks (AABB), the Committee on Allied Health Education and Accreditation (CAHEA), the Centers for Disease Control (CDC), the Health Care Financing Administration (HCFA), and the Food and Drug Administration (FDA), all of which promulgate standard criteria of performance.

Proficiency testing is a quality control procedure for evaluating performance of a laboratory as a whole, not of individual workers. Many laboratories participate in external proficiency testing and quality assurance programs such as those administered by CAP and CDC.

Reference values (or "normal" values) are the limits of the range of results within which data is normally found for comparable individuals under similar conditions. At present, there are no universally accepted reference values transferable from one laboratory to another and from one age group to another. The commonly accepted reference range in use today is obtained by statistical methods.

Routine tests are repetitive (high-volume/frequency) procedures, available on routine request, which are carried out using regular, unvarying methods.

Specialized tests are procedures that require a complex network of steps and variables; the methodology chosen depends on results obtained in earlier stages of testing and factors associated with particular patient conditions. Routine tests may become specialized depending on the patient -- for example, although the test for calcium level normally is simple, a patient with pancreatitis has a fatty suspension in the serum which makes determining calcium level very difficult and requires the use of special procedures and instruments.

Standard tests are well-established, well-accepted (routine or specialized) procedures of proven diagnostic value. Since there may be many different protocols for a particular examination, accrediting agencies require that laboratories have written standard procedures for the tests they perform.

Standard reference materials are basic materials (e.g., calcium, cholesterol, creatinine), certified as to purity, used to calibrate instruments, test procedures, and relate analytical results to a common base.

Standard reference methods are laboratory methods of proven and demonstrated accuracy which are used to check the accuracy of analytical results obtained by different methods and for the evaluation of new techniques.

Some abbreviations used in this standard are: ABO -- the major human blood group/type system; CBC -- complete blood count; RBC -- red blood (cell) count; Rh (Rhesus factor) -- antigens present on the surface of red blood cells (associated with the Rh blood group system); WBC -- white blood (cell) count.

NOTE: It is the responsibility of qualified physicians to diagnose and treat disease based on the interpretation of test results in the light of patient history and physical findings. In this standard, references to the correlation and interpretation of test data are intended to describe those functions that are not uniquely within the purview of a physician.

OCCUPATIONAL INFORMATION

Medical technology as an applied science is made up of a number of established academic disciplines (microbiology, chemistry, etc.) that are universally defined, recognized, and accepted as professions by academic institutions, industry, and government. Despite a trend toward specialization, medical technology is essentially an integrated or "generalist" profession. Medical technologists must have a knowledge of the whole field, i.e., all four major disciplines of laboratory practice (microbiology, clinical chemistry, hematology, and immunohematology), whether they specialize or not. Medical technologists who choose to specialize may concentrate in one or more clinical disciplines or subdisciplines (specialty areas) and/or in one or more of the following functional areas:

Administration. Medical technologists play a central role in clinical laboratory management. They carry out a wide range of administrative functions (e.g., scheduling laboratory personnel; reviewing/evaluating procedures and instituting remedial action for detected deficiencies/defects; reviewing and approving new test methodologies; selecting equipment to purchase; maintaining quality assurance, preventive maintenance and safety, and other laboratory programs; developing automatic data processing applications; preparing budget and staffing estimates and technical reports; designing technical manuals and forms; developing laboratory guidelines and/or regulations).

Research. Medical technologists participate in medical research and development activities directed at expanding scientific knowledge or developing new or improved methods and techniques (e.g., planning and carrying out studies on the effect of chemicals on erythrocyte sickling or the stability of red cell antigens in experimental anticoagulants for prolonged liquid

storage). Working as independent investigators, members of research teams, or research assistants, they may author or coauthor technical reports and articles for scientific journals.

Education. Medical technologists are involved in designing, conducting, and evaluating education programs. (All clinical laboratories are expected to provide continuing/in-service education programs, and some sponsor an accredited medical technology program and/or other recognized education or training programs.) Most medical technologist assignments include some teaching responsibilities; these may involve classroom teaching and/or on-the-job demonstration and laboratory practice. The instruction may be given to medical technologist students, medical technicians, physician residents and/or others. Typically, these duties are in integral part of the basic assignment and do not affect the grade level or the qualifications required for the position. Some medical technologists have education or training work as a primary responsibility (e.g., coordinating the laboratory rotation of students from colleges or universities with which the hospital/laboratory is affiliated, or teaching full time in an accredited program). A few are responsible for directing/administering, under the direction of the pathologist in charge of the laboratory, a structured education program or school where both didactic and clinical training are provided and the school is responsible for admission, curriculum, and academic credit and receives accreditation.

RELATED POSITIONS

In some instances, it may be difficult to distinguish between medical technologist positions and other closely related laboratory positions. Sometimes the distinction can be made on the basis of the kind of work. When that is not possible, the distinction must be based on the background knowledge required to do the work, the reasons for the position's existence, or the sources of recruitment or lines of progression where the position is located.

Distinguishing Between Medical Technologist and Medical Technician Positions

Positions are classified in this series when, and only when, performance of the work requires the application of professional knowledge and skill as distinguished from the desirability of, or preference for, such qualifications. It is sometimes difficult to determine whether a position requires the services of a professional medical technologist or a technician -- either because of the similarity of functions, objectives, and work products, or because areas of work which do not require the application of professional knowledge have traditionally been performed by technologists.

Medical technologist positions require professional knowledge of medical technology. Professional knowledge of medical technology is defined as (1) as thorough knowledge of the principles, theories, and accepted practices of the clinical laboratory sciences as they relate to the conduct of tests on human blood, urine, and other body fluids and tissues; (2) a broad knowledge of laboratory testing methodologies and quality assurance procedures; (3) specialized knowledge of clinical correlation which relates laboratory test data to human physiology; (4) knowledge of disease states and the clinical significance/application of various tests as aids in diagnosing the

causes of disease; and (5) an understanding of related disciplines such as microbiology, chemistry, pharmacology, anatomic pathology, and nuclear medicine and their relationships to medical technology.

The requirement for the application of professional knowledge and skill may be based on such duties and responsibilities as:

- Solving testing problems of an advanced or novel nature;
- Developing new solutions to testing problems;
- Performing the newer/more complex tests and examinations;
- Installing/adapting new tests for production use;
- Insuring the adequacy of the scientific knowledges applied in the performance of required tests;
- Recognizing and defining testing problems and evaluating methods for their solution;
- Evaluating guides or possible alternative approaches to standards methods;
- Improving the efficiency and quality of a testing program;
- Establishing and monitoring quality control/record keeping systems and measures to assure the accuracy and validity of test results;
- Developing instructions for converting from manual to automated testing systems;
- Planning and conducting training programs for medical technicians and medical technologist students;
- Establishing standards and writing instructions for calibrating or standardizing instruments and equipment;
- Recommending the addition of new tests to the laboratory's service;
- Training to assume a full professional position.

Generally speaking, medical technologists at the full performance level and above perform laboratory tests which, because they have a high level of difficulty and/or are infrequently performed, require a special sensitivity to possible problems. They recognize unexpected test reactions, errors, and discrepancies; identify technical, instrumental, or physiologic causes of problems (e.g., test conditions, chemical reactions, instrument function, patient variables, interfering drugs); determine solutions based on the theory of reactions on which the procedures

are based and other clinical data; suggest additional assays that could clarify or amplify the physician's diagnosis; and design, evaluate, and implement new methods.

Medical technologists apply professional knowledge of scientific principles and theory to determine the causes or possible significance of abnormalities and departures from the norm when test results do not conform to expectations; to alter procedures and techniques to correct problems; and to correlate and interpret test results (within the framework of the discipline) based on an understanding of the underlying physiologic phenomena and relationships among tests.

In comparison with technologists, *medical technicians* typically perform the routine tests in the clinical laboratory. They refer abnormal or unusual results to a supervisor or higher-grade technologist according to protocol; identify direct causes (technical or instrumental) of problems and make corrections by using prescribed criteria which specify alternatives from which decisions may be made; check the validity of results using preset interrelations of tests; and use and monitor quality control procedures within predetermined parameters.

Medical technician positions do not require the application of professional knowledge and skill in that the work assigned can be performed by (1) application and adaptation of established testing and examination procedures as outlined in test manuals and (2) use of practical judgment with only an elementary grasp of basic scientific principles. While medical technicians must recognize unanticipated reactions and deviations from the norm when test results do not conform to expectations, they are not expected to analyze the results to determine the causes or possible significance of such reactions or to alter the procedures and techniques based on an understanding of the theory and principles involved. They are not expected to confirm and verify results on the basis of theoretical considerations. Such responsibilities require the application of professional skill and knowledge.

There are work situations, however, where, through extensive experience, a medical technician can function at a level comparable with professionals in a narrow aspect of medical technology while not having professional competence to move into other areas of the field. (In the absence of significant differences in work assignments, the fact that the knowledge and skills required for technician work are different in kind from those required for technologist work is no basis for assuming a difference in the grade level of a position.) Technicians can and do perform similarly difficult work requiring the exercise of initiative and practical judgment in the application and adaptation of standardized techniques and methods. This is particularly true in laboratories where most of the testing work requires limited reference to basic scientific considerations, i.e., where most of the problems have been repeatedly encountered, solutions established, and formulas and guides developed.

Distinguishing Between Medical Technologist and Other Professional Positions

Medical technologists may perform diagnostic testing in one or more of the disciplines or subdisciplines of laboratory practice. When a technologist assignment is confined to intensive work in one discipline such as microbiology or chemistry, it can be difficult to distinguish that position from those of other professional biologic or physical science positions.

Many of the professional positions specializing in intensive work in one "section" of the laboratory are interdisciplinary in nature. For example, a position in the microbiology section of the laboratory might be filled by either a microbiologist or a medical technologist. Any question as to which series such a position should be classified in usually can be resolved by considering (1) the qualifications required, to the extent that they influence and affect the assigned duties and responsibilities; (2) the professional training and experience of the candidates; (3) the approach to the work (e.g., from the point of view of a microbiologist or a medical technologist); and (4) the overall purpose of the work and how it is to be done as determined by laboratory management officials.

GRADING POSITIONS

The grade-level criteria in this standard are to be used to classify nonsupervisory medical technologist positions for which there is no applicable grade-evaluation guide. This standard does not provide grade-level criteria for all types of medical technologist positions; it may be helpful to refer to standards for related series such as the Computer Specialist Series, GS-0334, covered in the [Job Family Position Classification Standard for Administrative Work in Information Technology, GS-2200](#), the [Microbiology Series, GS-0403](#), the [Chemistry Series, GS-1320](#), the [Education Group, GS-1700](#), and the [Quality Assurance Series, GS-1910](#), for additional information. The following are some of the standards to be used in place of or to supplement this standard:

1. The [General Schedule Supervisory Guide](#) is to be used to evaluate supervisory positions. Positions that involve supervision of one-grade interval work and also entail the personal performance of technologist duties which are different in kind or level from the work supervised should be treated as mixed positions; Part I of the Supervisory Grade-Evaluation Guide should be used to classify the supervisory responsibilities, while this standard should be used to evaluate the professional technologist work.
2. The [Research Grade-Evaluation Guide](#) is to be used to evaluate positions engaged in basic or applied research. Positions that involve limited elements of research work in support of physicians or other research scientists (e.g., carrying out research protocols, running specific tests, adapting test procedures to provide optimal results) are not considered to involve the personal performance of basic or applied research and should be classified by means of this standard.

3. The [Grade Level Guide for Instructional Work](#) is to be used in conjunction with this standard to evaluate positions that involve substantial instruction work.
4. The [Grade Level Guide for Instructional Work](#) is to be used in conjunction with this standard to evaluate positions primarily concerned with education and training work.
5. The standard for the [Medical Technician Series, GS-0645](#), may be used in conjunction with this standard to evaluate full performance level technologist positions below GS-9 provided appropriate consideration is given to all factors.

EVALUATION NOTES

Positions should be evaluated on a factor by factor basis, using one or more Office of Personnel Management benchmarks and/or factor-level descriptions for the Medical Technologist Series. Only the designated point values may be used. Additional instructions for evaluating positions are contained in the [Introduction to the Position Classification Standards](#). It should be noted that the absence of benchmarks for positions at any particular grade level does not preclude evaluation of positions at that grade. Should the work being evaluated exceed the highest level for a factor described in this standard, the [Primary Standard](#) and/or another related FES standard may be used to evaluate the position in conjunction with, and as an extension of, the criteria contained in this standard.

The descriptive material found in a particular factor, benchmark, or factor-level description expresses the nature or quality of that factor or level; all the material that bears on the position being evaluated must be considered and given appropriate weight. It does not however prescribe the universe of characteristics which may justify matching to a particular factor or factor level. There are numerous work situations and position characteristics that are found in the medical technologist profession that may not be specifically or definitively identified. It therefore follows that good classification judgment must be used in deciding whether a particular position element fully meets the intent of a particular factor level. The following additional points should be born in mind in evaluating medical technologist positions:

The impact of mechanization and automation on laboratory work. At the present time, the state of automation in most laboratories ranges from that in clinical chemistry, which is highly automated, to that in microbiology, which presents special difficulties that have hindered the development of automation. No division of the clinical laboratory has yet been completely automated, and this goal is considered to be some distance in the future. Experience has shown that the introduction of automated devices into a clinical laboratory increases the number of tests performed without reducing the level of skills required of laboratory personnel. Because the detecting systems incorporated into such instruments are usually based on the same chemical and physical principles as those used in the conventional nonautomated tests, and because the instruments can drift out of control or otherwise malfunction, equivalent and sometimes additional knowledge and skill are needed to insure the production of reliable data in all but a few instances where the rate of test output is low and operation is simple (assuming that the

technologist calibrates the equipment, performs check-out procedures, recognizes malfunctions and discrepancies, etc.).

Some laboratories use an automated laboratory information system to process test requests, produce reports of test results, and provide interpretive information. While the technologist may enter laboratory data into the computer system, identify errors, correct problems, etc., computer skills normally are secondary to the scientific knowledge required for the work.

The effect of restraints imposed by authorities. Accrediting agencies generally require that medical laboratory services be directed by pathologists or other physicians, or, under certain circumstances, by scientists who specialize in clinical chemistry, microbiology, or other biologic sciences. The responsibilities (establishing procedures, providing consultation services to the medical staff, preparing test interpretations, etc.) vested in the pathologist or other medical officer who heads the laboratory may proscribe the higher-level duties that can be performed by medical technologists. However, if these or similar functions are substantially and regularly performed by the technologist, full value may be assigned to the factor or factors that reflect that situation.

The trend toward specialization. As tests have proliferated and become more sophisticated, many laboratories have become more compartmentalized. Medical technologists in small laboratories usually perform many types of tests. In large laboratories, however, technologists often specialize in one (or more) of the fields in which the laboratory offers services (bacteriology, biochemistry, serology, hematology, immunohematology, etc.). Generalists may be concerned with a wider variety of problems, specialists with more substantial depth of analysis. Both types of positions may operate at any of the levels described. Moreover, it cannot be assumed that one discipline is more difficult, per se, than another discipline, or that work in a research and development environment is more difficult, per se, than work in a clinical environment. The duties, responsibilities, and qualifications required must be evaluated in terms of the common factors.

The impact of constraints and judgmental demands placed upon medical technologists in the laboratory. Clinical laboratories are expected to have written instructions for all test procedures, including control and calibration procedures and pertinent literature references. These quality control systems and measures are designed to assure medical reliability of laboratory data in situations where error may produce harm to the patient, misdiagnosis, or incorrect treatment or medication. While these controls obviously affect certain decision-making opportunities, medical technologists are expected to exercise independent judgment to monitor, control, and assess test conditions, specimen quality, chemical/biologic reactions, and instrument function; identify atypical organisms; solve unexpected problems, as when standards or control samples do not give acceptable values; correlate quantitative, biochemical, physiologic, and morphologic data to verify results; evaluate and implement new procedures; and perform other similar duties.

The scope of laboratory services. The technical complexity of most laboratory assignments (as distinguished from the administrative problems and non-test performance tasks encountered) largely depends on the variety and difficulty of the test procedures performed. The test procedures a clinical laboratory offers depend to a great extent on the needs of the medical staff

it serves -- the staff usually require more complicated and diverse laboratory services in facilities that provide service in a large number of medical and surgical specialties and subspecialties, that are equipped to care for the most complex and unusual patient conditions, that have special diagnostic and treatment programs such as renal transplant or alcohol and drug dependence treatments units, that are affiliated with medical schools, or that have a substantial amount of medical research.

Many laboratories do not regularly perform certain tests because physicians rarely order them or the patient population does not require them. Others send the more complex tests to other agency or commercial laboratories. Particular care must be taken in evaluating positions where the laboratory provides limited services. There may be little work that justifies the exercise of professional knowledge and skill -- in laboratories where most of the test orders fall in routine categories, for example, one would expect that most of the tests would be performed by medical technicians. The professional work that does exist may be performed by a supervisor or lone technologist; and/or it may warrant a lower grade than it would if the full range of specialized tests were being performed.

GRADE CONVERSION TABLE

Total points on all evaluation factors are converted to GS grades as follows:

GS Grade	Point Range
5	855-1100
6	1105-1350
7	1355-1600
8	1605-1850
9	1855-2100
10	2105-2350
11	2355-2750
12	2755-3150
13	3155-3600

FACTOR LEVEL DESCRIPTIONS

FACTOR 1, KNOWLEDGE REQUIRED BY THE POSITION

This factor measures the nature and extent of information or facts which medical technologists must understand to do acceptable work (e. g., steps, procedures, practices, rules, policies, theories, principles, and concepts) and the nature and extent of the skills needed to apply those knowledges. To be used as a basis for selecting a level under this factor, a knowledge must be required and applied.

Level 1-5 -- 750 Points

Professional knowledge (such as would be acquired through a baccalaureate program in medical technology or equivalent education and experience) of the basic principles, concepts, and methods of medical technology, including a knowledge of laboratory mathematics and statistics, and skill in applying this knowledge in carrying out a limited variety of specialized tests for which there are highly standardized methods and techniques in one or more areas of the clinical laboratory (microbiology, clinical chemistry, hematology, immunohematology).

or

Equivalent knowledge and skill.

Level 1-6 -- 950 Points

In addition to the knowledge described at Level 1-5, professional knowledge (such as would be acquired through relevant graduate study or clinical experience) of the established principles, concepts, and methods of medical technology, and skill in applying this knowledge in performing/monitoring the full range of specialized tests and nonroutine procedures for which there are standard methods and techniques (i.e., methods and techniques that are well established, that apply to most situations encountered, and that can be carried out with minor modification or adaptation) in one or more areas of the clinical laboratory. Knowledge of laboratory mathematics and statistics sufficient to establish quality controls, troubleshoot procedures and equipment, calculate and correlate test results, and set up and implement new procedures.

Knowledge of related disciplines (e.g., histology, cytology, pharmacology, pharmacokinetics, anatomy, physiology, epidemiology, genetics) and of the significance of certain clinical and physiologic conditions (e.g., conditions affecting hormone secretion) sufficient to use such knowledge in assessing and correlating data, verifying results, etc. (e.g., evaluating certain stains prepared in histology, recognizing interfering drugs or infectious diseases that can cause abnormal results, assuring proper collection and preservation of specimens, performing therapeutic drug monitoring).

Knowledge and understanding of recognized reference standards, medicolegal requirements, regulatory and accrediting agency requirements, and pertinent statutes sufficient to use such knowledge in performing/monitoring diagnostic tests (e.g., maintaining chain of custody when a specimen is submitted for medicolegal reasons so as not to affect the legality of the result, using and storing controlled substances in an appropriate manner, assuring that blood and blood products meet prescribed specifications, reporting notifiable diseases to proper authorities).

Some positions require knowledge of instructing techniques and practices sufficient to use such knowledge in instructing students and others in the basic principles and specialized methods of one or more areas of medical technology (classroom or bench teaching).

or

Equivalent knowledge and skill.

Illustrations:

- Professional knowledge and skill sufficient to perform/monitor the full range of special tests and nonroutine procedures in the chemistry section of a clinical laboratory. Assignments require knowledge of medical technology and clinical chemistry principles and methods to perform such procedures as blood gases and pH, toxicology studies, atomic absorption spectrophotometry, and discrete sample analysis; correlate abnormal results with corresponding pathology; troubleshoot problems (chemical, mechanical, electrical, electronic) and take corrective action; accept and resolve referrals of abnormal or unusual results and observations from lower-grade personnel; set up and monitor record keeping and quality control procedures; and instruct technical staff and medical technology students in laboratory theory and practice.
- Knowledge and skill sufficient to carry out the unusual and more difficult procedures in the blood bank/transfusion service of a general medical and surgical hospital. Assignments require knowledge of medical technology and blood bank procedures and techniques to perform procedures such as atypical typing and crosshatching and elution/absorption of antibodies; solve complex antibody problems; investigate autoimmune hemolytic disease/hemolytic disease of the newborn; investigate transfusion reactions; and monitor the quality of routine work performed in the section.
- Knowledge and skill sufficient to establish and monitor quality controls in the microbiology section (general and special bacteriology, anaerobic bacteriology, mycobacteriology, mycology, parasitology, immunoserology, and infection control, surveillance, and sanitation) of a clinical laboratory and to coordinate/integrate the program with the laboratory's quality assessment and control activities. Assignments require knowledge of medical technology/microbiology principles, techniques, and instruments to determine quality control measures needed; select control samples appropriate to monitor assays (tube dilution tests, direct smears, synergism studies, dark field microscopy, identification of anaerobes, mycobacteria, fungus, parasites, and atypical organisms, etc.); conduct quality control procedures on equipment, reagents, and products; respond to external proficiency testing programs; establish and maintain record keeping systems; and evaluate results of quality control procedures and implement corrective actions when indicated.

Level 1-7 -- 1250 Points

Professional knowledge of medical technology applicable to a wide range of duties in one or more specialty areas or functions, and a high level of skill in applying this knowledge in solving very complex problems involving diverse aspects of clinical laboratory practice (e. g., conducting a variety of specialized tests of greater than average difficulty, as in the more esoteric laboratory areas of virology, histocompatibility, tissue typing, or cytogenetics or in a discipline that is undergoing significant development, where procedures require frequent modification and change in order to incorporate revise theories and techniques); modifying or adapting established methods and procedures or making significant departures from previous approaches to solve similar problems; revising standard methods to improve or extend test systems; and evaluating, modifying, or adapting new methods to meet the requirements of particular testing situations.

Knowledge of regulatory, licensing, and accrediting agency requirements, medicolegal responsibilities, and statutes governing clinical laboratory operations sufficient to use in planning, implementing, or monitoring laboratory programs/services (e.g., determining needs, assuring compliance with standards).

Management, administrative, or coordinative knowledge and skill sufficient to provide advisory, reviewing, inspecting, education and training, or problem-solving services (as a "troubleshooter," specialist, or coordinator) on specific problems, projects, programs, or functions (e.g., developing, reviewing, and evaluating the implementation of work plans, including estimates of personnel, equipment, and supplies, and the detailed instructions necessary to carry out the plans for complex long-term projects such as designing a clinical laboratory information management system that provides reports of results, interpretive information, and special reports).

or

Equivalent knowledge and skill.

Illustrations:

- Knowledge and skill sufficient to organize and conduct a wide variety of unusually difficult tests in the endocrinology area of a reference laboratory which provides supplemental service to other agency laboratories. Assignments require a thorough knowledge of advanced biologic, chemical, and immunologic techniques and instrumentation; the clinical significance of test results; and the physiologic, pathologic, and other factors and conditions that affect test results. Such knowledge is required to establish, implement, and monitor systems and procedures for controlling and verifying the performance of polypeptide, thyroid, steroid, and adrenal medullary hormone tests and miscellaneous endocrinologic tests; perform modified procedures (e.g., modification of published techniques) or special studies to suit specific clinical situations; suggest additional tests that could clarify or amplify diagnoses; and investigate and recommend new assays and improved methods to enhance the sensitivity, specificity, and reliability of

particular procedures or resolve production tests with which the laboratory is experiencing problems.

- Knowledge and skill sufficient to perform highly specialized immunohematologic studies in the blood bank/transfusion service of a large, multidisciplinary medical center (which includes an open heart surgery center) and to provide advisory/reference services for other military and civilian hospitals.

Assignments require advanced knowledge of the theories and principles specific to immunohematology, immunopathology, histocompatibility, transplant immunology, and genetics to obtain diagnostic results in presumptive Rh genotyping, anti-human globulin testing, and definitive studies for blood group systems such as MNSs, P, I, Kell, Duffy, Lewis, Vel, and Kidd; furnish technical guidance and advice to the laboratory's staff and to personnel at other military and civilian blood bank facilities on resolving difficult compatibility and antibody testing problems; evaluate new procedures, equipment, and reagents for possible use in the laboratory; review and recommend revision of the hospital's blood bank regulations and standards; and plan and conduct approved training programs in immunohematology and blood bank technology for resident pathologists and military laboratory officer interns and technicians.

- Knowledge and skill sufficient to plan and carry out the testing program in the mycology/mycobacteriology unit of a national medical center laboratory, provide regional and reference services to other hospitals, and test complex technical equipment and diagnostic reagents proposed for military use. (The laboratory is a user testing site.) Assignments require in-depth knowledge of microbiologic, serologic, biochemical, and drug therapy techniques to establish protocols for isolating and identifying mycologic/mycobacteriologic agents and special bacteriologic agents such as Legionella; maintain reference cultures for use in the unit and regional laboratories; evaluate and introduce new procedures and techniques; review and update standard operating procedures manuals; evaluate equipment and reagents proposed for military use; perform referencing for CAP survey programs and insure the laboratory's referee status is maintained; advise staff on the uses and limitations of various tests/procedures; and train (present lectures, provide bench instruction, review and update curriculum and training aids, grade students, etc.) medical technologist and medical technician students (in approved schools), dermatology residents (weekly review of recently isolated dermatophytes), Medical Service Corps officers, and personnel from other commands in mycology/mycobacteriology.

- Knowledge and skill sufficient to plan and administer an autonomous education program (a school of medical technology which includes didactic and clinical training of twelve months' duration taught at the senior-year level of university study) to meet accreditation standards. Assignments require a comprehensive knowledge of medical technology principles and methods as well as a thorough knowledge of educational theory and techniques to develop or update curriculum;

develop course guidelines, materials, and educational tools such as computer-assisted instruction, interpretive report forms, self-teaching aids, and newsletters; supervise instructional personnel; establish laboratory rotation schedules; evaluate and advise on student progress; conduct and document periodic self-assessments of the program to assure compliance with applicable laws and regulations and maintain accreditation; and maintain liaison with cooperating or affiliated universities and/or colleges, resource organizations, and State offices to coordinate program goals, objectives, and policies.

- Knowledge and skill sufficient to design and implement technical and administrative programs for a large, multidisciplinary laboratory in a hospital which receives many critically ill patients who need constant monitoring plus many specialized laboratory procedures requiring a variety of sophisticated instruments. Assignments require in-depth knowledge of technical and administrative principles and techniques to coordinate the activities and services of the various laboratory components; implement hospital and regulatory agency policies and rules; assist and advise section supervisors on the preparation, maintenance, review, and revision of procedural manuals; organize new employee education and in-service education programs; plan and carry out special studies in problem areas (e.g., equipment, methods, workflow, reporting procedures) and recommend changes based on findings; establish/maintain preventive maintenance and laboratory safety programs; select and authorize expendable supplies and reagent purchases; review and recommend new methods and equipment; maintain liaison with other hospital departments to obtain necessary support of laboratory activities and represent the laboratory on institutional committees; prepare budget requests, reports, and position papers; and develop the laboratory portions of hospital guidelines.

Level 1-8 -- 1550 Points

Mastery of medical technology principles, concepts, and methods to apply new scientific/technological developments and theories to major problems not susceptible to treatment by accepted methods and/or take actions or make recommendations which have significant impact on existing agency/national policies and programs. Typically the medical technologist is recognized as a technical authority in a particular discipline or function.

or

Equivalent knowledge and skill.

Illustrations:

- Knowledge and skill sufficient to evaluate and approve clinical laboratories for Medicare reimbursement purposes throughout a multistate region. Assignments require expert knowledge of all aspects of laboratory practice as well as statutory requirements and published rules and regulations to plan and conduct the surveys

of laboratories; assure compliance by Medicare participants with standards; develop and recommend regulations, criteria, and standards for laboratory certification; monitor the effectiveness of the survey and enforcement activities of States; provide technical assistance to States, professional organizations, and others in developing laboratory/surveyor improvement programs, providing training, modifying guidelines/procedures to make them compatible with Federal requirements, etc.; provide leadership and guidance in correcting problems and resolving jurisdictional disputes; provide authoritative advice and consultation on the interpretation and application of Medicare/Medicaid standards for medical laboratory services and other medical technology related issues; and collaborate with other regions and programs of the agency in developing national guideline materials.

- Knowledge and skill sufficient to discharge a key role (in an agency headquarters office) in the overall planning, administration, and evaluation of agency laboratories, many of which have shortages of personnel and other resources, performance deficiencies of long standing which are difficult to overcome, or similar management problems. (Many are in hospitals, outpatient clinics, or satellite stations in remote, rural areas of the country.) Assignments require comprehensive and detailed knowledge of clinical laboratory practices, laboratory management techniques (including new developments in laboratory information management and the use of computer data base systems), Federal and State laws and regulations, and state-of-the-art technology and equipment. Such knowledge is needed to conduct continuing studies and analyses of laboratory activities and recommend actions and policy changes to correct deficiencies and/or improve laboratory programs; develop and maintain an agency wide laboratory information system; develop agency guidelines governing laboratory operations; analyze major health care programs and proposed legislation with respect to the agency's laboratory program goals and objectives; and advise agency officials and laboratory personnel at all organizational levels on various aspects of diagnostic laboratory testing and laboratory management.

FACTOR 2, SUPERVISORY CONTROLS

This factor covers the nature and extent of direct or indirect controls exercised by the supervisor, the medical technologist's responsibility, and the review of completed work. Controls are exercised by the supervisor in the way assignments are made, instructions are given to the medical technologist, priorities and deadlines are set, and objectives and boundaries are defined. Responsibility of the medical technologist depends upon the extent to which the medical technologist is expected to develop the sequence and timing of various aspects of the work, to modify or recommend modification of instructions, and to participate in establishing priorities and defining objectives. The degree of review of work depends upon the nature and extent of the review, e.g., close and detailed review of each phase of the assignment, detailed review of the

finished assignment, spot check of finished work for accuracy, or review only for adherence to policy.

NOTE: Technical supervision may be provided by a higher-grade medical technologist as well as by the supervisor. Bench technologists at all levels may periodically be required to analyze a previously tested specimen as an unknown to verify their ability to reproduce test results; such testing is designed to validate laboratory reproducibility and does not imply any particular level of supervision.

Level 2-1 -- 25 Points

The supervisor assigns work by providing clear, detailed, and specific instructions which cover the individual steps to be followed.

The medical technologist, typically inexperienced (e.g., the entry-level technologist with no previous clinical training), works as instructed and consults with the supervisor on matters not specifically covered in the original instructions or guidelines.

The work is closely controlled. The supervisor reviews the work in progress and on completion for accuracy, adequacy, and adherence to instructions and established procedures.

Level 2-2 -- 125 Points

The supervisor makes continuing or individual assignments by indicating generally what is to be done, problems to be anticipated, quality and quantity of work expected, deadlines, and priority of assignments, and suggests ways of handling and solving problems. Additional, specific instructions are provided for new, difficult, or unusual assignments.

The medical technologist, who typically has had limited experience (such as would be acquired through an educational program which included a substantial clinical training component, or through a period of on-the-job training), independently plans the sequence of tasks necessary to carry out recurring assignments, but refers deviations from approved procedures, unanticipated problems, and unfamiliar situations not covered by instructions to the supervisor for decision or help. Subject to preset decision criteria the technologist uses judgment and initiative in choosing the best specimen; observing if instruments are functioning properly; selecting procedures (e.g., determining aspiration technique for quantity of specimen, diluting specimen/repeating count if WBC is high); checking control values against expected results; and evaluating test results in terms of color, gas/liquid/solid formations, etc.

The supervisor assures that finished work and methods used are technically accurate and in compliance with instructions or established procedures. Review of the work increases with more difficult assignments if the technologist has not previously performed such assignments.

Level 2-3 -- 275 Points

The supervisor makes assignments by defining objectives, priorities, and deadlines, and assists the medical technologist with unusual situations which do not have clear precedents.

The medical technologist plans and carries out the successive steps and handles problems and deviations in the work assignment in accordance with established protocols, previous training, or accepted laboratory practices. Judgment and initiatives employed by the technologist include selecting and implementing testing methods appropriate to the source and characteristics of the specimen; monitoring, controlling, and assessing the events of reactivity (e.g., test conditions, chemical and physical events, instrument performance); recognizing conditions which cause erroneous results (e.g., blood typing from heparinized blood, superficial contamination of specimens collected from body sites containing indigenous or colonizing bacteria); troubleshooting complex instruments; and correlating test results with patient data (history, physical findings, medications, and other laboratory data) to verify results. When there is a need to deviate from or modify procedures to correct a problem, the technologist makes a literature search or consults with medical staff or technical authorities and implements corrective action provided it is consistent with accepted professional methodology -- for example, to perform a Fibrin Degradation Product Test for a patient who is on heparin, which prevents clotting, the technologist consults with the pathologist, who suggest using protamine sulfate to neutralize heparin to promote clotting.

Completed work is evaluated for technical soundness, appropriateness, and conformity to policy and requirements. The methods used in arriving at the results are not usually reviewed in detail. If the technologist is alone (night shift, on call), the supervisor may review reports after the fact.

Level 2-4 -- 450 Points

The supervisor sets the overall objectives and resources available. The medical technologist and supervisor, in consultation, develop the deadlines, projects, and work to be done.

The medical technologist, having developed expertise in a particular specialty or application area (e.g., laboratory information management, quality assurance), is usually assigned continuing responsibility for independently planning and carrying out a major laboratory program; resolving most of the conflicts which arise; coordinating the work with others as necessary; and interpreting policy in terms of established objectives. In some assignments, the medical technologist also determines the approach to be taken and the methodology to be used. The medical technologist keeps the supervisor informed of progress, potentially controversial matters, or far-reaching implications.

Completed work is reviewed only from an overall standpoint in terms of feasibility, compatibility with other work, and effectiveness in meeting requirements or expected results.

FACTOR 3, GUIDELINES

This factor covers the nature of guidelines and the judgment needed to apply them. Guides used in the field of medical technology include, for example: laboratory manuals and operating procedures, manufacturers' protocols, medical orders, standard textbooks, professional journals and literature, accepted professional standards, agency policies and directives, accreditation standards, and Federal and State laws and regulations.

Individual jobs vary in the specificity, applicability, and availability of guidelines for performance of assignments. Consequently, the constraints and judgmental demands placed upon medical technologists also vary. For example, the existence of specific instructions, procedures, and policies may limit the opportunity of the technologist to make or recommend decisions or actions. However, in the absence of procedures or under broadly stated objectives, medical technologists may use considerable judgment in researching literature and developing new methods.

Guidelines should not be confused with the knowledges described under Factor 1, Knowledge Required by the Position. Guidelines either provide reference data or impose certain constraints on the use of knowledge. For example, for a particular diagnosis there may be three or four tests set forth in a technical manual. A medical technologist is expected to know these tests. However, in a given laboratory the policy may be to use only one of the tests; or the policy may state specifically under what conditions one or the other of these tests may be used.

Level 3-1 -- 25 Points

Specific, detailed oral and/or written guidelines covering all important aspects of the assignment are provided to the medical technologist.

The medical technologist works in strict adherence to the guidelines; deviations must be authorized by the supervisor.

Level 3-2 -- 125 Points

Procedures for doing the work are established and a number of specific guidelines are available, including written descriptions of test, control, and calibration procedures and decision criteria, and explicit instructions for such procedures as collecting, preserving, transporting, and receiving specimens; preparing, labeling, storing, dispensing, and evaluating reagents; and maintaining equipment.

The number and similarity of guidelines and work situations require the medical technologist to use judgment in locating and selecting the most appropriate guidelines, references, and procedures for application (e.g., using appropriate materials to calibrate or standardize instruments); making minor deviations to adapt the guidelines in specific cases (e.g., manipulating or modifying a specimen to meet the requirements of the analysis or isolate the

components necessary for the procedure); determining which of several established alternatives to use to verify and correct a problem (e.g., checking out equipment malfunctions, determining when to use back-up methods); and recognizing the need for timely reporting of laboratory data and/or shipment of products and specimens. Situations to which the existing guidelines cannot be applied or significant deviations from the guidelines are referred to the supervisor.

Level 3-3 -- 275 Points

Guidelines are available, including established and/or experimental protocols, technical manuals and journals, and agency/hospital regulations, but are not completely applicable to the work or have gaps in specificity. Decision criteria do not cover every situation (e.g., confirming unusual test results; adapting one company's reagents that are cheaper or more readily available to another company's equipment; using an altered technique, as in using a prewarmed crossmatch to find compatible donor units for a patient to be transfused; performing analyses when known reference materials or media are unavailable; assessing and correcting unexpected reactions and errors).

The medical technologist uses judgment in interpreting and adapting guidelines and precedents for application to specific cases or problems in accordance with established policies and accepted theory; in setting up and adapting new tests for local use; and in recommending changes to procedures to improve the reliability of data, enhance services, correct deficiencies, etc.

Level 3-4 -- 450 Points

Administrative policies and precedents, laws, regional or area directives, agency regulations, accreditation requirements, and scientific references are usually applicable, but are stated in general terms. Guidelines for performing the work are often scarce or of limited use, as, for example, when there is insufficient information about the accuracy, precision, reliability, and utility of new or controversial instruments or techniques; when professional journals and other literature have conflicting views on accuracy and reliability; or when proven/valid methods of testing are lacking or incomplete.

The medical technologist uses initiative and resourcefulness in deviating from or extending traditional methods and practices, or in developing and recommending new or substantially modified methods, criteria, or policies.

FACTOR 4, COMPLEXITY

This factor covers the nature, number, variety, and intricacy of tasks, steps, processes, or methods in the work performed; the difficulty in identifying what needs to be done; and the difficulty and originality involved in performing the work.

Level 4-2 -- 75 Points

The work consists of duties that involve specific, well-defined tasks (e.g., typing and crosshatching for transfusions; performing peripheral blood examinations; culturing anaerobes, fungi, and mycobacteria; using and monitoring quality control procedures within predetermined parameters) which are designed to provide the medical technologist with experience in the clinical application of scientific principles and theories in diagnostic testing and quality control and to enable the technologist to acquire a variety of advanced skills and techniques. The assignments generally consist of individualized tasks or limited phases of broader assignments for which higher-grade technologists have overall responsibility.

Decisions regarding what needs to be done involve various choices requiring the medical technologist to recognize the existence of and differences among a few easily recognizable, specified alternatives. The work includes such tasks as analyzing and discriminating between signals (colors, patterns, etc.); making morphologic distinctions; recognizing factors which directly affect procedures and results (e.g., environmental conditions, time lapse, media or reagent deterioration or contamination); and identifying technical and/or instrumental causes of problems. Tests may have to be performed on an emergency or "stat" basis (under close supervision).

The medical technologist corrects technical or instrumental errors by use of prescribed strategies and performs additional tests (using preset interrelations of tests) to check validity of results. Careful planning and timing is required to run more than one procedure (each one with time-dependent steps) at a time. At this level, the duties may be similar to those performed by technical support employees, but such assignments are performed for a shorter period of time, are assigned primarily for training and development of the professional medical technologist, and are designed to supplement previous training in the fundamentals of the clinical laboratory sciences.

Level 4-3 -- 150 Points

The work includes a variety of duties involving different processes and methods (e.g., collecting and preparing specimens, preparing and controlling reagents, calibrating or standardizing and maintaining instruments, and performing complex analyses; conducting quality control procedures on equipment, reagents, and products; setting up, standardizing, and implementing new procedures).

Decisions regarding what needs to be done depend upon the analysis and evaluation of collection techniques and conditions, specimen characteristics, adequacy of reagents, instrument performance, acceptability of control samples, results of quality control procedures, and other variables such as physical or drug-related factors (e.g., factors which influence body drug levels, such as liver metabolism, renal function, protein binding, body weight, body surface area, age, sex, time course of therapy, effect of other drugs on metabolism and distribution, and rate of conversion to active/inactive metabolites) involved in each assignment. The chosen course of action may have to be selected from many alternatives, as, for example, when standards or control samples do not give acceptable values.

The work typically requires analyzing and interpreting a variety of conditions and elements (e.g., quantitative, biochemical, physiologic, pathophysiologic, and morphologic data, patient history, physical findings, medications, and other variables) to verify or clarify results. The medical technologist assesses such factors as the conformity of reference values and test results to the established protocols, the relationship of test data to other laboratory data, and the validity of data in relation to the test system. Judgment is required to apply a range of established approaches and solutions to malfunctions (e.g., instrument function, reaction system).

Level 4-4 -- 225 Points

The work typically involves full responsibility for the technical aspects of a discipline or functional area of the laboratory and includes a wide variety of duties involving diverse and complex technical or administrative problems and considerations (e.g., evaluating, refining, and implementing new methods and procedures for laboratory systems/programs such as specimen collection and processing, reagent preparation and control, blood donation and storage, and quality assurance; developing procedural manuals to ensure proper performance of tests; establishing standards of acceptable performance meeting internal and external requirements and regulations).

Assignments involve such complicating factors as practical economic or operating problems (e.g., outdated equipment, changing technology, inadequate control systems or validation methods, unacceptable proficiency testing); inadequate or discrepant information about the use and capabilities of new instruments or methodologies (e.g., new methodologies for which standardized procedures have not yet been developed and for which only a minimum of guidance is available through regulatory agencies); or requests for modified procedures, test alternatives, or special studies to meet specific clinical situations or research requirements.

The work typically requires determining ways to extend standard test systems; modifying conventional methods to produce acceptable results; developing new or revised procedures and protocols using standard techniques; creating or revising logic schema (within state-of-the-art) to determine corrective action for problems; or refining existing criteria for administering or evaluating programs.

Level 4-5 -- 325 Points

The work includes planning and coordinating activities covering a broad range of programs involving a number of laboratories, or intensive analysis and problem solving (as a technical expert) in a discipline or functional area.

The work involves solving very complex problems concerned with unique or controversial aspects of medical technology or laboratory management, new or unconventional methods, program changes, or conflicts between scientific/technological requirements and regulatory or program (e.g., cost effectiveness, responsiveness) requirements.

The work requires devising new or improved methods to produce effective results or implement advances in such areas as quality assurance, cost containment, in-service education, or test

development; establishing criteria for administering or evaluating laboratory programs; or originating policy guidance and procedural material for use by operating personnel.

FACTOR 5, SCOPE AND EFFECT

Scope and effect covers the relationship between the nature of the work, i.e., the purpose, breadth, and depth of the assignment, and the effect of work products or services both within and outside the organization.

Effect measures such things as whether the work output facilitates the work of others, provides timely services of a personal nature, or impacts on the adequacy of research or clinical conclusions. The concept of effect alone does not provide sufficient information to properly understand and evaluate the impact of the position. The scope of the work completes the picture, allowing consistent evaluations. Only the effect of properly performed work is to be considered.

Level 5-1 -- 25 Points

The work involves the performance of specific procedures for the purpose of gaining practical experience in the application of academic theory and basic principles of medical technology.

The work is closely supervised and facilitates the work of coworkers within the immediate organizational unit by relieving them of routine tasks.

Level 5-2 -- 75 Points

The work involves the performance of specific procedures and typically comprises well-defined, individualized tasks or a segment of an assignment of broader scope (e.g., performing set-up procedures such as preparing bone marrow specimens, inoculating blood and tissue cultures, and staining direct smears).

The work contributes to the accuracy and reliability, as well as the timeliness, of procedures performed by higher-grade coworkers.

Level 5-3 -- 150 Points

The work involves performing/monitoring the full range of specialized and nonroutine tests according to established methods; reviewing and analyzing conventional testing problems and recommending or implementing solutions to overcome them; and setting up and developing protocols for new procedures.

The work affects the adequacy of clinical laboratory services or research conclusions (and hence the correct diagnosis and treatment of patients), the efficient operation of laboratory system and programs, and the effective management of laboratory resources.

Level 5-4 -- 225 Points

The work involves devising new or improved techniques or solutions to complex technical problems in one or more disciplines or functional areas; assessing the effectiveness of various laboratory programs; providing advisory, planning, or surveillance services to clinicians, laboratory directors, and supervisors on specific functions, programs, or problems that are particularly difficult, widespread, or persistent; or developing procedural manuals or guidelines for major agency activities (e.g., developing and administering a proficiency testing program for all laboratories testing for lead intoxication under the national occupational exposure to lead standard; designing and conducting training courses on the availability of newer and more reliable diagnostic and quality control techniques in the field of bacteriology for a national program to improve the bacteriology laboratory services of State health departments; developing endocrinologic reference method which can be used for standardization of analytical methods by clinical laboratories). Assignments typically involve problems that occur at a number of laboratories within a broad geographic area or at a reference laboratory that provides unique supplemental services to other laboratories in a geographic area, or problems that are systemic in nature involving major testing or quality assurance systems and processes.

The work directly influences the effectiveness and acceptability of total laboratory systems/programs, the operations of many laboratories in different localities or in other Federal or State agencies, or the activities of nongovernment laboratories.

Level 5-5 -- 325 Points

The work involves determining the soundness of agencywide laboratory programs and plans; developing and establishing new approaches and methods for use of operating personnel; resolving problems that are critical to accomplishment of the agency's mission; providing authoritative advice and technical assistance to Federal, State, and local public health laboratories; or developing or revising regulations which affect a large segment of the clinical laboratory industry.

The work affects the development of major segments of an agency's laboratory programs and policies; the work of State and local officials, top-level managers of the agency/department, private laboratory directors, educators, accrediting and regulatory agency administrators/surveyors, or other scientific or administrative experts; important national goals and programs (e.g., a national program for clinical laboratory licensure and certification); or the wellbeing of substantial numbers of people (e.g., all users of blood products).

FACTOR 6, PERSONAL CONTACTS

This factor includes face-to-face and telephone contacts with persons not in the supervisory chain. (*NOTE:* Personal contacts with supervisors are covered under Factor 2, Supervisory Controls.) Levels described under this factor are based on what is required to make the initial contact, the difficulty of communicating with those contacted, and the setting in which the contact takes place (e.g., the degree to which the employee and those contacted recognize their relative roles and authorities).

Above the lowest level, points should be credited under this factor only for contacts which are essential for successful performance of the work and which have a demonstrable impact on the difficulty and responsibility of the work performed.

The relationship of Factors 6 and 7 presumes that the same contacts will be evaluated for both factors. Therefore, use the personal contacts which serve as the basis for the level selected for Factor 7 as the basis for selecting a level for Factor 6.

Level 6-1 -- 10 Points

The personal contacts are with higher-grade/experienced technologists and technicians within the immediate work unit and in related or support units within the laboratory, and with patients in very highly structured situations (e.g., in the presence of a higher-grade medical technologist).

Level 6-2 -- 25 Points

Personal contacts are with employees in the same agency, but outside the laboratory (employees who generally are engaged in different functions, missions, and kinds of work, e.g., representatives from various levels within the agency, such as headquarters, regional, district, or field offices, or from other departments/services of the hospital or center) or with individuals or groups from outside the employing agency in a moderately structured setting (e.g., where the contacts are generally established on a routine basis, the purpose of the contact may need to be made clear, and the role and authority of one or more of the parties may have to be identified). Typical of contacts at this level are those with patients, their families, physicians, nurses, administrative personnel, sales/product representatives, community blood sources, reference laboratory personnel, and professional and technical employees in other areas of the hospital or agency or in State or community health care facilities.

Level 6-3 -- 60 Points

Personal contacts are with individuals or groups from outside the employing agency in a moderately unstructured setting (e.g., where the contacts are not established on a routine basis, the purpose and extent of each contact is different, and the role and authority of each party is identified and developed during the course of the contact). Typical of contacts at this level are those with persons in their capacities as contractors, inspectors, researchers, educators, attorneys,

community leaders, or representatives of other Federal agencies, State or local health departments, professional organizations, the news media, or organized or ad hoc public action groups.

FACTOR 7, PURPOSE OF CONTACTS

The purpose of personal contacts range from factual exchanges of information to situations involving significant or controversial issues and differing viewpoints, goals, or objectives. The personal contacts which serve as the basis for the level selected for this factor must be the same as the contacts which are the basis for the level selected for Factor 6.

Level 7-1 -- 20 Points

The purpose of contacts is to obtain, clarify, or give factual information ranging from easily understood to highly technical (e.g., to obtain information about requested procedures or other assigned activities, to report test results, or to explain special or unusual test procedures).

Level 7-2 -- 50 Points

The purpose of contacts is to plan or coordinate work efforts or to resolve operating problems by influencing or motivating individuals or groups who are working toward mutual goals and who have basically cooperative attitudes (e.g., coordinating work efforts or resolving operating problems concerning test methods, unexpected results, schedules, etc., with other laboratory workers and physicians; instructing students in basic theory and/or technical skills; discussing contract requirements or clarifying problems of equipment use, test accuracy, etc., with reference laboratories, product suppliers, or equipment manufacturers; advising laboratory managers or State representatives on the need for or the results of inspections; promoting conformity to safety plans and standards; encouraging patients to agree to various procedures and/or explaining the tests, e.g., a 5-hour glucose test, and their purpose).

Level 7-3 -- 120 Points

The purpose of contacts is to influence, motivate, or persuade persons or groups. At this level the persons contacted are typically skeptical or uncooperative. Therefore, the technologist must be skillful in approaching the individual or group to obtain the desired effect (e.g., gaining compliance with accrediting and regulatory agency requirements by persuasion or negotiation; negotiating and resolving difficult problems with suppliers or contractors involving discrepancies, price adjustments, quality control, and similar matters; representing the laboratory, as a member of institutional committees, on requests for difficult procedures, shortages, or similar problems; influencing or persuading clinicians and laboratory workers to use and accept new or improved methodologies about which there may be conflicting opinions; convincing individuals and family members of special patient populations, as in American Indian or non-English-speaking communities, to agree to procedures when conflicting values must be resolved or accommodated; challenging the results of surveys or inspections by accrediting

agencies; justifying the feasibility and desirability of plans or proposals significantly affecting laboratory practices).

FACTOR 8, PHYSICAL DEMANDS

This factor covers the requirements and physical demands placed on the medical technologist by the work assignment. This includes physical characteristics and abilities (e.g., specific agility and dexterity requirements) and the physical exertion involved in the work (e.g., climbing, lifting, pushing, balancing, stooping, kneeling, crouching, crawling, or reaching). To some extent the frequency or intensity of physical exertion must also be considered -- for example, a job requiring prolonged standing involves more physical exertion than a job requiring intermittent standing.

Level 8-1 -- 5 Points

The work is primarily sedentary, although there may be some walking or standing; carrying of light items such as manuals, blood supplies, and small instruments; driving a bloodmobile or similar vehicle; etc.

Level 8-2 -- 20 Points

The work requires regular and recurring physical exertion such as prolonged standing, bending over microscopes, reaching for supplies or materials, and lifting moderately heavy items such as centrifuges and record boxes (or occasionally lifting heavier items such as reagent packs). The work may require specific physical characteristics and abilities such as dexterity (to perform intricate collection or analysis procedures) and color vision.

FACTOR 9, WORK ENVIRONMENT

This factor considers the risks and discomforts in the medical technologist's physical surroundings or the nature of the work assigned and the safety regulations required. Although the use of safety precautions can practically eliminate a danger or discomfort, such situations typically place additional demands upon the technologist in carrying out safety regulations and techniques.

Level 9-1 -- 5 Points

The work environment involves everyday risks or discomforts which require normal safety precautions typical of such places as offices, training rooms, libraries, waiting areas, donor rooms, or mobile units (e.g., use of safe work practices with equipment, avoidance of trips and falls, observance of fire regulations and traffic signals). The work area is adequately lighted, heated, and ventilated. There may be occasional exposure to moderate risks or discomforts in clinical laboratories.

Level 9-2 -- 20 Points

The work involves regular and recurring exposure to moderate risks or discomforts which require special safety precautions (e.g., working in a hospital laboratory where there is a risk of exposure to contagious diseases, carcinogenic materials, caustic reagents, noxious fumes, flammable liquids, and low-level radiation). The medical technologist is required to use protective clothing or gear such as laboratory coats, fume hoods, safety goggles, radiation badges, aprons, gloves, and shields, and to adopt sterile techniques.

OPM BENCHMARK DESCRIPTIONS**MEDICAL TECHNOLOGIST, GS-0644-09, BMK #01***Duties*

Serves as the medical technologist in charge of the night shift in the emergency procedures section of a clinical laboratory, with responsibility for supervising/performing the full range of emergency procedures in the areas of chemistry, urinalysis, hematology, serology, bacteriology, and immunohematology (e.g., blood gas-pH, toxic and therapeutic drug levels, solving CBC problems, body fluid differentials, direct smears, blood cultures, emergency ABO typing, Rh typing and cross matching). The hospital has an organized emergency department that provides definitive emergency care and treatment 24 hours a day.

- Evaluates requested procedures to determine the suitability of specimen for analysis, requesting new specimen if determined to be unusable. Prepares specimens for analysis, insuring that the physiologic state of the properties is maintained.
- Prepares reagents and primary reference materials.
- Selects, performs, evaluates, and monitors the performance of nonroutine and specialized test procedures using manual and/or instrumental techniques in accordance with established protocols. Recognizes and reacts to indicators of malfunction; locates and implements corrections. Obtains analytical data (e.g., color end points, digital read outs, tracings, patterns, agglutinations); converts to prescribed units for reporting; and correlates data to verify results. Writes laboratory reports (identifying sample and stating methods and results); reports results to appropriate individuals.
- Calibrates, standardizes, adjusts, and maintains instruments. Verifies correct instrument operation using established procedures and quality control checks (e.g,

- mechanical, optical, scintillation, gasometric, photometric, electrometric, automated). Identifies the cause of common problems and makes simple repairs.
- Conducts quality control procedures on equipment, reagents, and products, and maintains proper records for quality control reports.
- Evaluates and recommends that new tests be incorporated into the emergency list.
- Instructs medical technicians, residents, and others in emergency techniques, equipment use, test slip requirements, etc.
- Supervises the work of one or two medical technicians as directed.

Factor 1, Knowledge Required by the Position -- Level 1-6 -- 950 Points

- Professional knowledge of medical technology principles, concepts, and methodology sufficient to perform a broad range of emergency tests, including complex and nonroutine analyses; run quality controls; research and implement procedures; etc. Knowledge of mathematical and statistical processes sufficient to calculate and convert analytical data to test results.
- Knowledge and skill sufficient to use and maintain complicated instruments (e.g., spectrophotometer, automatic blood cell counters, automatic clinical analyzers, fibrometer). Knowledge of technical, physiologic, and mechanical indicators of malfunction (e.g., test conditions, patient variables) sufficient to locate and correct errors.
- Knowledge of related disciplines to integrate and correlate test results with other laboratory data (e.g., functional testing) to draw conclusions.
- Knowledge of medicolegal and accrediting/regulatory agency requirements sufficient to insure that work is consistent with standards (e.g., maintaining chain of custody, handling blood components in accordance with the Federal Code of Regulations).

Factor 2, Supervisory Controls -- Level 2-3 -- 275 Points

The supervisor indicates the types of requests to be handled and defines objectives, deadlines, and priorities. In situations not covered by instructions, assistance is provided by the physician on call.

The medical technologist selects an analytical approach appropriate for each assay and the degree of quantification desired, and carries out the successive steps, handles problems, and determines corrective actions in accordance with established policies and instructions. The medical technologist decides whether to process requests for special studies usually available only during normal working hours.

The supervisor reviews work reports the following day for technical soundness and conformity to policy and established requirements.

Factor 3, Guidelines -- Level 3-3 -- 275 Points

Guidelines include hospital policies and directives, instrument handbooks and logs, and procedural manuals which contain descriptions and instructions for analytic methods and procedures, including control and calibration procedures and pertinent literature references. Decision criteria are not specific to every situation (e.g., recognizing instrument malfunctions, reacting appropriately to control sample results including extraneous reactions and/or false positive and false negative results).

The medical technologist uses judgment in interpreting and adapting instructions to recognize and react to indicators of malfunction (e.g., patient immunologic status, drug interference) and evaluate validity of data in relation to the test system.

Factor 4, Complexity -- Level 4-3 -- 150 Points

Assignments involve a variety of duties including checking specimens, preparing reagents, calibrating and operating instruments, performing analyses, correcting malfunctions, calculating results, and validating the data.

The technologist's evaluations and interpretations are based on an analysis of the suitability of the specimen; the requirements of the requested test; the purpose of the analysis; the events of reactivity e.g., test conditions, chemical reactions, instrument function); types and frequency of control procedures; validity of data in relation to the test system and assay procedures; correlation of the test result with other laboratory and/or patient data; and other similar factors.

Assignments usually require selecting alternative procedures as in correction of errors, but standard techniques and practices are applied in most situations encountered.

Factor 5, Scope and Effect -- Level 5-3 -- 150 Points

The purpose of the position is to supervise or personally perform the full range of emergency procedures, including nonroutine and specialized tests, offered by the laboratory on the night shift.

The work affects the efficient operation of the emergency procedures section and the adequacy of test services provided the medical staff.

Factor 6, Personal Contacts -- Level 6-2 -- 25 Points

Contacts are with other laboratory workers and with patients, physicians, nurses, and other hospital staff.

Factor 7, Purpose of Contacts -- Level 7-2 -- 50 Points

The purpose of contacts is to plan and schedule processing of tests on the night shift; coordinate work efforts with other shifts; and resolve operating problems concerning test results, special requests, etc.

Factor 8, Physical Demands -- Level 8-2 -- 20 Points

The work requires regular and recurrent standing to perform tests, walking between the different sections of the laboratory, and reaching and bending to obtain supplies and operate instruments. Occasionally lifts 30/40-pound containers of liquid reagent.

Factor 9, Work Environment -- Level 9-2 -- 20 Points

The work involves moderate risks or discomforts associated with working in a clinical laboratory with regular and recurrent exposure to hazards such as infectious materials, chemicals, and electrical appliances. The technologist must use protective clothing and gear such as gloves, face masks, eye protectors, and biologic safety hoods.

TOTAL POINTS -- 1915

MEDICAL TECHNOLOGIST, GS-0644-09, BMK #02

Duties

Serves as a medical technologist in the hematology section of a clinical laboratory, with responsibility for performing a variety of procedures including complex analyses and infrequently requested tests; evaluating abnormal results; using and maintaining equipment; and setting up and monitoring quality controls.

- Selects the procedures which are appropriate for the request for service and congruent with patient considerations.
- Processes specimens using equipment, instruments, or techniques that are necessary to prepare them for specific analysis; controls physical conditions; responds to time factors to insure that the physiologic state of the specimen is maintained.
- Prepares reagents, assembles equipment, verifies correct instrument operation; standardizes, performs, and calculates results for a variety of complex tests such as bone marrow studies and associated special stains and procedures, lupus erythematosus

preparations, buffy coat examinations, special cytochemical stains, cell enzyme assays, special tests for hemolytic anemias, special coagulation tests (e.g., factor analysis, prothrombin consumption), and body fluid differentials and smears.

- Identifies unusual results or discrepancies/conditions which cause erroneous results (instrument malfunctions, conditions of test performance, reaction systems, and/or test procedures used). Takes appropriate action to make corrections and solve problems. Conducts literature search if indicated.
- Evaluates the validity of data in relation to the test system and assay procedures. Correlates quantitative, biochemical, physiologic, and morphologic data with other laboratory data (e.g., blood smear estimates with leukocyte and platelet counts, RBC appearance with indices) and/or other patient data (e.g., history, physical findings, medications) to verify results. Performs additional tests to clarify or confirm abnormal patient results and reports results.
- Accepts referrals of abnormal or unusual results and observations from lower-grade laboratory personnel. Advises on course of action to follow when values obtained from standard or control sample values are unacceptable. Examines functions of instruments, rechecks conditions of test performance, evaluates reaction systems and/or procedural techniques utilized, and identifies function with symptom.
- Sets up and develops protocols for new instruments and procedures from a well-established reference. Tests and develops quality control methods, calculating the mean, standard deviation, and coefficient of variation, and determining statistical significance.
- Assists in developing, maintaining, and modifying various computer applications. Maintains liaison with technical representatives to correct computer programming and resolves common problems.
- Plans and conducts a course (including classroom lectures and bench instruction) in clinical hematology (basic principles and practical application) in the hospital's school of medical laboratory technique. Supplements prescribed course content and instructional materials as necessary.

Factor 1, Knowledge Required by the Position -- Level 1-6 -- 950 Points

- Professional knowledge of the principles, concepts, and methodology of medical technology, including quality assurance and clinical correlation (and the theories and techniques unique to hematology) sufficient to carry out a variety of diagnostic tests and verify results.
- Knowledge of hematologic test systems sufficient to make minor modifications to logic schema to determine corrective actions for problems. Familiarity with computers, computer terminals, and computer interphase functions. Skill in calibrating, operating,

and maintaining instruments and equipment appropriate to the requirements of various assays.

- Knowledge of related disciplines to evaluate test results in relation to other patient and drug parameters and other laboratory data.
- Knowledge of medicolegal requirements (as for spermatazoa analysis for rape) and Federal and State laws and regulations sufficient to assure conformity with requirements.
- Knowledge of instructional techniques sufficient to plan, present, and evaluate a course in basic hematology.

Factor 2, Supervisory Controls -- Level 2-3 -- 275 Points

The supervisor outlines assignment parameters, deadlines, and priorities and provides advice on how to proceed when unusual problems or defects are encountered which cannot be corrected except by substantial modification of methods.

The medical technologist independently plans and carries out the procedures necessary to complete the work and handles problems and corrects errors in accordance with established decision criteria or accepted practices.

Completed work is usually evaluated for technical soundness, appropriateness, and conformity to policy and requirements.

Factor 3, Guidelines -- Level 3-3 -- 275 Points

Guidelines include laboratory SOP's, instrument manuals, and quality control requirements. Guides do not cover every possible problem (e.g., checking unexpected or unusual results, unacceptable control values, etc.).

The medical technologist uses judgment in selecting appropriate procedural and/or instructional modifications for accuracy and speed consistent with the daily workload and characteristics of the specimen (e.g., white blood cell count too high to report value from automated instrument) and congruent with patient considerations (e.g., age, medications); modifying logic schema to identify and determine corrective action for problems relating to instrument malfunction, conditions of test performance, reaction systems and/or procedural techniques utilized; and developing protocols for new tests being introduced into the laboratory.

Factor 4, Complexity -- Level 4-3 -- 15 Points

The work involves various duties concerned with test performance, identification and correction of errors, evaluation/interpretation of test results, correlation of data, and validation/verification of results.

The medical technologist considers such factors as the complex network of steps and variables and discrimination required by some tests; conditions which produce erroneous results (e.g., hemoglobin value from dialyzed blood, decreased values from infusion site); specimen properties, physical conditions, and time factors critical to the test; instrument malfunction and test procedure variations; and physiologic conditions that affect test results (e.g., drug interference, autoimmune diseases).

Verification of test results requires analysis of physiologic, pathphysiologic, biochemical, morphologic, quantitative, and other laboratory data and recognition of the interdependency of tests. Most problems are solved by the application of standard techniques and practices.

Factor 5, Scope and Effect -- Level 5-3 -- 150 Points

The purpose of the position is to perform a variety of hematologic tests to provide accurate test results to physicians and to present a complete education/training course that meets defined learning objectives.

The work of the medical technologist directly affects the efficiency and effectiveness of laboratory operations and the ability of the laboratory to meet the needs of patients as determined by the medical staff; and it affects the operation of the school for medical technicians.

Factor 6, Personal Contacts -- Level 6-2 -- 25 Points

Personal contacts are with coworkers, technologists and technicians in other sections of the laboratory, physicians and nurses in other departments of the hospital, students, and patients.

Factor 7, Purpose of Contacts -- Level 7-2 -- 50 Points

The purpose of contacts is to explain test procedures, report on and clarify test results, and instruct and assist subordinates or student in solving anticipated problems or using quality control procedures.

Factor 8, Physical Demands -- Level 8-2 -- 20 Points

The work requires regular and recurring physical exertion such as standing for long periods of time and bending over microscopes.

Factor 9, Work Environment -- Level 9-2 -- 20 Points

The work involves regular and recurring risks or discomforts associated with working in a clinical laboratory (e.g., working with infectious substances and irritant reagents). The technologist wears protective clothing such as coats, goggles, or gloves and takes special safety precautions such as adopting sterile techniques.

TOTAL POINTS – 1915

MEDICAL TECHNOLOGIST, GS-0644-11, BMK #01

Duties

Serves as a medical technologist in the laboratory of a general medical and surgical hospital, with responsibility for developing and maintaining a quality control program for all sections of the laboratory including microbiology, bacteriology and mycology, parasitology, infection control, chemistry, toxicology/drug abuse, urinalysis, hematology, transfusion/coagulation, immunology, and anatomic pathology. Insures compliance with accrediting and regulatory agency requirements.

- Develops quality control procedures for new tests as they are introduced into the laboratory and modifies existing procedures as needs change. Assesses data needed, designs data collection procedures, identifies parameters and determines acceptable range for each parameter.
- Identifies control samples appropriate to monitor assays/procedures; establishes protocols for evaluating control sample value (e.g., within-day variation, day-to-day variation, trends, shifts); and defines action to be taken when control sample is outside limits.
- Conducts quality control procedures on equipment, reagents, and products by designing and implementing instrument, reagent, and product check systems. Evaluates results and implements corrective actions when indicated.
- Establishes and maintains record keeping systems (e.g., specimen accession and retention, instrument maintenance, quality control samples); controls specimen accession through the computer system to insure accuracy of data input and output.
- Develops and maintains quality control portions of procedural manuals. Designs forms as necessary to comply with regulatory agency and laboratory needs.
- Responds to external proficiency testing programs. Prepares reports and responds to requests for quality control information from hospital staff and regulatory agencies.

- Reviews current literature for improved quality control procedures. Evaluates new quality control protocols to determine their suitability for local use.
- Instructs medical technology students and residents in theoretical and practical aspects of quality assurance.
- Represents the laboratory on the Utilization Review Committee.

Factor 1, Knowledge Required by the Position -- Level 1-7 -- 1250 Points

- Professional knowledge of medical technology principles, theories, practices, and methodologies sufficient to perform the full range of duties connected with the development and maintenance of a quality control program.
- Knowledge of mathematics and statistics as related to quality assurance.
- Knowledge of the types of surveillance needed to monitor variables that affect the quality of services, and skill in evaluating and interpreting results of quality control procedures and implementing corrective action where indicated.
- Practical knowledge of computer operations to insure proper control of patient specimens.
- Knowledge of accrediting and regulatory agency requirements sufficient to ensure that quality control procedures are in compliance with such requirements.

Factor 2, Supervisory Controls -- Level 2-4 -- 450 Points

The supervisor assigns the work in terms of overall objectives and program emphasis and works with the technologist to develop projects and deadlines.

The medical technologist independently plans and carries out the quality control program, selecting the methods to use, resolving most technical problems, and coordinating and implementing the approved program with laboratory staff. The technologist keeps the supervisor informed of deficiencies in test performance and potential problems in meeting patient needs.

Completed work is reviewed for effectiveness in meeting accrediting and regulatory agency requirements and overall management objectives of data reliability.

Factor 3, Guidelines -- Level 3-3 -- 275 Points

The guidelines includes agency/hospital policies and regulations, test procedure manuals, instrument specifications, technical journals, and textbooks and literature on quality assurance. The guidelines are generally applicable, but do not specifically cover many of the test conditions and problems encountered.

The technologist uses judgment in interpreting and adapting such guides to establish quality control procedures; developing documents and manuals to ensure proper implementation of procedures; and adapting or extending standard methods (or selecting from among alternative procedures) to ensure reliability of laboratory data.

Factor 4, Complexity -- Level 4-4 -- 225 Points

The work typically involves planning and implementing a quality control program, designing and modifying quality control procedures, checking and evaluating the results, and taking corrective actions.

The medical technologist considers such factors as the use of proficiency testing programs; availability and currency of procedural instructions; validation of methods used; types of surveillance needed to monitor results; documentation of remedial action taken for detected deficiencies/defects; preventive maintenance and performance testing of equipment and instruments; proper preparation and storage of reagents; and procedures for the collection and preservation of specimens, identification of specimens, etc.

The technologist assesses the effect of such variables as the precision and sensitivity of methods and instruments; the range of malfunctions (instrument function, reaction systems, test conditions, etc.); and the parameters of control sample results including extraneous reactions and/or false positive and false negative results. Accordingly, the technologist often modifies or adapts conventional quality control procedures and techniques to insure validity of data in relation to test systems.

Factor 5, Scope and Effect -- Level 5-3 -- 150 Points

The purpose of the position is to design, maintain, and evaluate a quality control system and measures that assure the medical reliability of laboratory data in accordance with accrediting and regulatory agency requirements.

The work has a significant impact on the adequacy and effectiveness of laboratory services and helps laboratory management officials identify areas of deficiency.

Factor 6, Personal Contacts -- Level 6-2 -- 25 Points

Contacts are with physicians, nurses, clinical scientists, other medical technologists and technicians, officials and managers, and inspectors in the laboratory, in other services of the hospital, and at higher organizational levels.

Factor 7, Purpose of Contacts -- Level 7-2 -- 50 Points

The purpose of contacts is to plan and coordinate a quality control program, provide technical advice and resolve operating problems, and maintain compliance with control procedures.

Factor 8, Physical Demands -- Level 8-1 -- 5 Points

The work is primarily sedentary. There may be some walking and standing.

Factor 9, Work Environment -- Level 9-1 -- 5 Points

The work is typically performed in an office setting. There may be occasional exposure to moderate risks in the clinical laboratory.

TOTAL POINTS – 2435

MEDICAL TECHNOLOGIST, GS-0644-11, BMK #02

Duties

Serves as a medical technologist in the hematology section of a reference laboratory which supports agency hospitals for the diagnosis of hemostatic disorders, with responsibility for performing specialized studies in blood coagulation and the physiology of platelet function, solving highly complex diagnostic problems, and modifying or adapting new methods or techniques to improve or expand services.

- Determines procedures for hematologic tests to be performed in the section. Develops and implements the use of protocols for performance of tests and evaluation of results. Monitors conformity to protocols.
- Develops procedures and establishes parameters for correlation of test results and preset troubleshooting protocols.
- Defines reference values/ranges using statistical methods; sets up and monitors recordkeeping systems and effective quality control procedures. Identifies/implements changes needed in the quality assurance program.
- Prepares reagents and stores of coagulation factor-deficient plasma for functional and immunologic assays of specific coagulation factors.
- Performs complex and unusual tests and studies requiring specialized knowledge and skill (e.g., fibrin split products, quantitative and qualitative abnormalities of fibrinogen, platelet life span, platelet procoagulant and aggregation abnormalities, platelet function and nucleotide metabolism in patients on certain antineoplastic drugs).
- Evaluates the validity of data in relation to the test system and assay procedures. Integrates and correlates test data with other laboratory and patient data to lead to a conclusion about the normality of a system. Creates, uses, or modifies logic schema to determine corrective actions for problems.

- Determines if additional information is needed for clarification of test results and/or to establish a definitive diagnosis, and confers with physicians on additional tests as necessary.
- Evaluates, modifies, or adapts new methods or revises standard techniques to improve or expand quantitiveness, accuracy, precision, specificity, or proficiency of analyses (e.g., evaluates new test systems, kits, and equipment for the assessment and quantification of normal and abnormal hemostatic function and for platelet isolation and storage and recommends procurement or adapts for local use). Compares new methods with existing or reference methods by performance (analysis of error types) and suitability (analysis of cost, convenience, efficiency, etc.). Assesses advances in the fields of cellular and molecular biology for relevance to hematologic analysis.

Factor 1, Knowledge Required by the Position -- Level 1-7 -- 1250 Points

- Knowledge of professional medical technology principles, practices, and concepts (and the theories and techniques unique to hematology) sufficient to develop and establish procedures for hematologic determinations; perform the more difficult and infrequent tests in the section; evaluate, modify, and implement new methods; and participate in the selection of supplies and equipment.
- Knowledge and skill sufficient to consult with physicians on logical protocol to follow in attempting to confirm the diagnosis of a patient; provide technical instructions on problems others have been unable to solve by use of established decision criteria; and advise specialists in other sections of the laboratory or other departments of the hospital on advanced hematologic techniques.
- Knowledge of related disciplines such as antineoplastic therapy and pharmacology to coordinate the testing program with other laboratory components and to select and evaluate procedures for the section.
- Knowledge of recognized reference standards, medicolegal responsibilities, accrediting agency requirements, and Federal and State laws and regulations sufficient to ensure that section plans and procedures are consistent with requirements.

Factor 2, Supervisory Controls -- Level 2-4 -- 450 Points

The supervisor makes assignments by setting the overall objectives and general approach to be taken; the technologist and supervisor generally confer on deadlines and priorities.

As a technical specialist, the medical technologist independently plans and carries out the assignments, develops the techniques to be used, coordinates the work with others, and keeps the supervisor informed of potential problems.

Completed work is reviewed for overall effectiveness in meeting the needs of agency hospitals for specialized reference services.

Factor 3, Guidelines -- Level 3-3 -- 275 Points

Guidelines include agency/hospital policies and regulations, precedents, technical references, professional journals, laboratory operating procedures, methodology manuals, and regulatory agency requirements. Guides often do not have adequate or complete information to deal with the more complex and unusual problems.

The technologist uses initiative and resourcefulness in deviating from or extending traditional methods to solve testing problems and in developing new or modified procedures/protocols.

Factor 4, Complexity -- Level 4-4 -- 225 Points

Assignments involve performing unusually difficult or uncommon hematologic tests; modifying, adapting, or revising procedures to improve services; and developing written descriptions and instructions, including decision criteria, for all changes.

Assignments involve consideration of such complicating factors as the interdependency of tests; the interrelationships of physiologic, mechanical, and technical information; the absence of directly applicable criteria, requiring, for example, determination of normal range values for special groups or development of procedures for correlating results; and the frequent introduction of new methodologies and equipment.

The work typically requires the evaluation and interpretation of many physiologic, technical, and mechanical alternatives; the extension or adaptation of existing techniques; or the development of new approaches to determine corrective action for problems.

Factor 5, Scope and Effect -- Level 5-3 -- 150 Points

The purpose of the position is to perform very complex analyses, design and evaluate new methods, and provide advice and assistance to technologists and medical staff on hematologic tests/problems.

The work affects the accuracy and proficiency of the analytical services provided by the laboratory and the ability of the medical staff to meet the needs of patients.

Factor 6, Personal Contacts -- Level 6-2 -- 25 Points

Personal contacts are with physicians, nurses, scientists in other disciplines, and medical technologists and technicians in other sections of the laboratory, other departments of the hospital, and other laboratories/hospitals.

Factor 7, Purpose of Contacts -- Level 7-2 -- 50 Points

The purpose of contacts is to advise on test results, resolve testing problems, and explain and gain acceptance of selected methodologies.

Factor 8, Physical Demands -- Level 8-2 -- 20 Points

The work requires regular and recurring physical exertion such as prolonged standing.

Factor 9, Work Environment -- Level 9-2 -- 20 Points

The work involves moderate risks with regular and recurring exposure to contaminated materials and chemicals. The technologist is required to wear protective clothing or gear such as coats, gloves, and masks.

TOTAL POINTS -- 2465

MEDICAL TECHNOLOGIST, GS-0644-11, BMK #03

Duties

Serves as the sole medical technologist in the clinical laboratory of a rural health center/outpatient clinic, with responsibility (as chief technologist) for planning and carrying out a diagnostic testing program providing microbiology, blood bank, hematology, chemistry, urinalysis, serology, and parasitology services.

- Determines and plans the type and extent of services to be provided. Establishes systems and procedures for test performance and quality assurance which optimize the level of use of in- house and reference laboratory resources. Manages resources effectively.
- Evaluates and selects reagents and supplies, and establishes and maintains inventory control systems.
- Establishes and implements specimen collection and preparation procedures.
- Performs/monitors routine and specialized tests. Reports test results and consults with physicians on additional tests that may be useful or necessary to clarify problems. Contracts for and evaluates referred testing.
- Conducts quality control procedures on equipment, reagents, and products by designing and implementing instrument, reagent, and product check systems. Responds to external proficiency testing programs.

- Establishes a preventive maintenance program for all instruments. Calibrates or standardizes equipment, troubleshoots malfunctions, and makes simple repairs or identifies need for external services.
- Maintains a current procedural manual, reviewing and revising as needed. Designs appropriate forms.
- Researches, tests, and implements new procedures and equipment.
- Ensures that policies and procedures as well as safety practices are effectively followed.
- Supervises one or two laboratory technicians; trains technicians and others in techniques, instrumentation, and organization of work.
- Participates in providing health instruction to clinic patients, family members, and community groups.

Factor 1, Knowledge Required by the Position -- Level 1-7 -- 1250 Points

- Professional knowledge of medical technology concepts, principles, and practices sufficient to develop and implement a full-service laboratory program for a remote clinic.
- Knowledge of quality control, workload reporting, and proficiency testing to design programs to assure the reliability of data and measure laboratory productivity.
- Management, administrative, and professional knowledge sufficient to enable the medical technologist to effectively manage the work carried out in a small clinical laboratory.
- Skill in evaluating new tests and instruments and modifying and adapting standard methods and procedures consistent with a small-lab approach.

Factor 2, Supervisory Controls -- Level 2-4 -- 450 Points

The supervisor assigns the work by setting the overall objectives and resources available.

The medical technologist is responsible for planning and carrying out the work. (A pathologist is not available on site to provide technical guidance or supervision.)

Completed work is reviewed in terms of effectiveness in meeting requirements, including accreditation requirements.

Factor 3, Guidelines -- Level 3-3 -- 275 Points

Guidelines include agency policies and regulations, area office directives, local customs, accrediting agency requirements, prescribed quality control and workload reporting programs, manufacturers' protocols, instrumentation manuals and schematics (and occasionally telephoned repair instructions), and technical journals.

The medical technologist uses judgment and initiative in interpreting and adapting guidelines for application to specific laboratory problems, developing and maintaining current procedural manuals, formulating alternative approaches where space or equipment limitations make a standard procedure impossible or infeasible, and adapting established methodologies and practices to meet the needs of the laboratory and the community.

Factor 4, Complexity -- Level 4-4 -- 225 Points

The work involves planning and carrying out a clinical laboratory testing program to meet the needs of a small rural clinic.

Deciding what tests can be offered and what new tests or equipment should be recommended requires consideration of such factors as laboratory workload and patient population, relative technical and troubleshooting staff capabilities, availability of instrument service and/or backup instrumentation, and cost and feasibility of using reference laboratory services.

The technologist plans and carries out the work and adapts or otherwise modifies conventional techniques as necessary to perform specific analyses, preserve stock cultures, prepare reagents, etc., using limited equipment and facilities. When a new test or instrument is introduced, the technologist develops guidelines, including quality control standards, writes procedures, and establishes parameters for instrument performance.

Factor 5, Scope and Effect -- Level 5-3 -- 150 Points

The assignment involves planning the clinical laboratory program, developing the documents and procedural manuals to ensure proper performance of laboratory tests, and supervising or personally performing the full range of tests.

The work affects the reliability and adequacy of the laboratory's diagnostic testing services and assists the clinic's medical staff in providing primary health care and referral services to patients.

Factor 6, Personal Contacts -- Level 6-2 -- 25 Points

In addition to contacts with clinic staff (health professionals, administrative workers, etc.) and agency personnel (area coordinator, agency inspectors, etc.), personal contacts are with groups and individuals from outside the clinic, such as staff of area hospitals, reagent and media suppliers, reference laboratory officials, equipment sales representatives, instrument repairers, health educators, students, and Indian patients and their families.

Factor 7, Purpose of Contacts -- Level 7-2 -- 50 Points

The purpose of contacts is to plan, coordinate, advise, and report on testing work and results, recommend additional tests or equipment, obtain supplies or repairs, obtain reference laboratory services, instruct clinic/laboratory staff in proper techniques, and promote better health care among members of the community.

Factor 8, Physical Demands -- Level 8-2 -- 20 Points

The work requires regular and recurring periods of standing or walking, bending, reaching for glassware and supplies, etc.

Factor 9, Work Environment -- Level 9-2 -- 20 Points

The work involves regular and recurring exposure to contagious disease, caustic reagents, etc. Special safety precautions and protective clothing and gear such as a laboratory coat and gloves are required.

TOTAL POINTS -- 2465

MEDICAL TECHNOLOGIST, GS-0644-12, BMK #01

Duties

Serves as a medical technologist in an area office of a public health agency, with responsibility for coordinating the full range of clinical laboratory services in agency hospitals, outpatient clinics, and satellite stations throughout a multistate area.

- Evaluates the quality of area laboratory services and adequacy of equipment, personnel, and working accommodations through onsite inspections and/or review of reports. Assesses laboratory needs and explores sources and methods of obtaining necessary resources. Assures compliance with quality control and proficiency testing programs, safety standards, accreditation requirements, and agency policies. Plans for and implements laboratory improvement programs.
- Plans, implements, and coordinates quality control programs and assures participation in acceptable proficiency testing programs in all areas of laboratory medicine.
- Plans, implements, and coordinates preventive maintenance programs and reviews record-keeping.
- Coordinates procurement of supplies, equipment, and instrumentation and assures compliance with budgetary and geographic limitations. Evaluates and advises on contract services.
- Coordinates recruitment, placement, and other personnel actions. Develops and maintains a career development program for laboratory personnel; identifies training needs and arranges for/personally conducts in-service training.

- Assesses operating costs and develops budget input. Writes summaries, reports, position papers, and issue papers on topics concerning laboratory services and quality assurance. Analyzes historical data and trends.
- Plans and conducts studies on technical and administrative problems involving personnel shortages, organizational structure, new technology, program deficiencies, reporting systems, etc.; recommends changes based on findings.
- Serves as a consultant and advisor to area officials and laboratory personnel on various aspects of laboratory management and testing. Interprets agency policies and directives, prepares guidelines governing laboratory operations, and advises supervisors on the preparation, maintenance, review, and revision of procedural manuals.
- Establishes and maintains liaison with other Federal and State agencies, accrediting organizations, academic institutions, commercial and private laboratory facilities, professional organizations, and Indian communities to keep abreast of new developments, obtain services, and develop and coordinate mutually beneficial projects.

Factor 1, Knowledge Required by the Position -- Level 1-7 -- 1250 Points

- Professional knowledge of the concepts, principles, and practices of medical technology sufficient to coordinate clinical laboratory services, assess needs, and plan for and implement improvement programs in laboratories throughout a multistate area.
- Knowledge of quality control systems, proficiency testing programs, and procedures for preventive maintenance and performance testing of instruments and equipment sufficient to identify and resolve problems and assure compliance with applicable requirements.
- Knowledge of Federal rules and regulations, certifying and accrediting agency requirements, and State and local laws pertaining to clinical laboratories sufficient to provide interpretation to area officials and laboratory personnel and assess impact on laboratory operations.
- Management, administrative, and coordinative skill sufficient to effectively coordinate laboratory activities to minimize duplication of services and improve utilization of total laboratory resources available.
- Skill in making qualitative evaluations of laboratory services, developing/revising guidelines and standards for use by operating personnel, and incorporating new technology in laboratory programs.

Factor 2, Supervisory Controls -- Level 2-4 -- 450 Points

The supervisor assigns work in terms of overall objectives, special problem areas that need attention, and resources available to the program.

The medical technologist plans and carries out the assignments independently, resolving most technical problems, coordinating the work with others as necessary, and keeping the supervisor informed of potentially controversial matters or problems having far reaching implications.

Work is reviewed for fulfillment of management objectives (e.g., assuring that area laboratories meet and maintain accreditation standards and criteria) and effect of advice and influence on the overall program, as evidenced by internal and external quality control evaluations.

Factor 3, Guidelines -- Level 3-4 -- 450 Points

Guidelines are primarily general in nature and require considerable interpretation. They include agency policies and directives; Federal and State laws and regulations; accrediting, certifying, and regulatory agency requirements; manufacturers' catalogs and specifications; and professional journals and literature.

Although technical references may be used, they are seldom directly applicable to the work. The medical technologist uses initiative and resourcefulness in researching new methodologies (tests and/or techniques), instrumentation, and advances in the areas of laboratory management (quality assurance, workload reporting and proficiency testing, laboratory safety, etc.) and incorporating pertinent concepts and practices in area programs. The technologist is expected to develop new methods and procedures or substantially modify existing guidelines to resolve technical problems related to the diversity of laboratories in the area, including very small laboratories where the optimal technological procedures may not be economically feasible or acceptable.

Factor 4, Complexity -- Level 4-5 -- 325 Points

The work requires developing plans and strategies to promote effective and technologically improved laboratory testing and management practices and procedures, particularly quality assurance and proficiency testing techniques, ranging from control systems and validation methods to the review of performance of personnel and maintenance of appropriate records.

The medical technologist considers such diverse factor as Federal and State laws and regulations, certification/accreditation requirements, technological developments, new products and instruments, economic feasibility and desirability, cost effectiveness, and the varying size and complexity of the laboratories in the area.

The work requires innovation and resourcefulness in designing quality assurance systems and measures; developing new approaches to measuring laboratory efficiency, providing for inservice education, and maximizing services in very small laboratories; originating guidelines incorporating new methods and procedures in the laboratory program; and developing solutions to very unusual/novel problems of laboratory testing and management.

Factor 5, Scope and Effect -- Level 5-4 -- 225 Points

The work involves serving as a technical specialist and includes investigating and analyzing a variety of unusual problems, assessing program effectiveness, and providing authoritative guidance for operating personnel and managers.

The work affects the long-term ability of the agency to meet the needs of area patients for medical laboratory services and consultation, the quality of health care provided, and the maintenance of accrediting agency standards and level of third party reimbursement for services.

Factor 6, Personal Contacts -- Level 6-3 -- 60 Points

Personal contacts are with area laboratory and clinic/hospital staffs and supervisors; area-office and agency-level officials; other area coordinators; and health care professionals and officials in other Federal agencies, State and local governments, accrediting organizations, private laboratories, equipment firms, and academic institutions.

Factor 7, Purpose of Contacts -- Level 7-3 -- 120 Points

The purpose of contacts is to plan and coordinate laboratory activities; obtain compliance with established policies, regulations, and standards; assess the adequacy of and advise on laboratory systems and programs; resolve significant technical/operational problems (e.g., disputed deficiencies); explain and defend testing methods; settle differences with suppliers and manufacturers; and develop cooperative programs with community/tribal officials, representatives of educational institutions, and others.

Factor 8, Physical Demands -- Level 8-1 -- 5 Points

The work is mostly sedentary. There is some walking, frequent travel by automobile or light aircraft.

Factor 9, Work Environment -- Level 9-1 -- 5 Points

The work is performed in an office setting or in training or conference rooms. There is occasional exposure to moderate risk in clinical laboratories.

TOTAL POINTS -- 2890