U.S. Department of Transportation

National Highway Traffic Safety Administration

In cooperation with

U.S. Department of Health & Human Services
Public Health Service

HRSA

Health Resources & Human Services Administration
Maternal & Child Health Bureau

EMT-PARAMEDIC

National Standard Curriculum

EMT-PARAMEDIC: NATIONAL STANDARD CURRICULUM

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PREFACE

The National Highway Traffic Safety Administration (NHTSA) has assumed responsibility for the development of training courses that are responsive to the standards established by the Highway Safety Act of 1966 (amended). Since these courses are designed to provide national guidelines for training, it is NHTSA's intention that they be of the highest quality and be maintained in a current and up-to-date status from the point of view of both technical content and instructional strategy.

To this end, NHTSA supported the current project which involved revision of the 1985 *Emergency Medical Technician-Paramedic: National Standard Curriculum*, deemed of high value to the states in carrying out their annual training programs. This curriculum was developed to be consistent with the recommendations of the *National Emergency Medical Services Education and Practice Blueprint*, the *EMT and Paramedic Practice Analysis*, and the *EMS Agenda for the Future*. This course is one of a series of courses making up a National EMS training program for prehospital care. The *EMT-Paramedic: National Standard Curriculum*, represents the highest level of education in EMS prehospital training.

The EMT-Paramedic: National Standard Curriculum represents the minimum required information to be presented within a course leading to certification as a Paramedic. It is recognized that there is additional specific education that will be required of Paramedics who operate in the field, i.e. ambulance driving, heavy and light rescue, basic extrication, special needs, and so on. It is also recognized that this information might differ from locality to locality, and that each training program or system should identify and provide special instruction for these training requirements. This curriculum is intended to prepare a medically competent Paramedic to operate in the field. Enrichment programs and continuing education will help fulfill other specific needs for the Paramedic's education.

ACKNOWLEDGMENTS

From the very beginning of this revision project, the Department of Transportation relied on the knowledge, attitudes, and skills from hundreds of experts and organizations. These individuals and organizations sought their own level of involvement toward accomplishing the goals of this project. These contributions varied from individual to individual, and regardless of the level of involvement, everyone played a significant role in the development of the curriculum. It is essential that those who have assisted with the achievement of this worthy educational endeavor be recognized for their efforts. For every person named, there are many more individuals who should be identified for their contributions. For all who have contributed, named and unnamed, thank you for sharing your vision. Your efforts have helped assure that the educational/training needs of Paramedics are met so that they can provide appropriate and effective patient care.

Special thanks for the knowledge, expertise, and dedication given to this project by the Project Director, Principal Investigator, Co-Medical Directors, and all the members of the Writing Groups and the National Review Team.

NHTSA would also like to recognize the following individuals and/or organizations for their significant contributions to this project. Their order of appearance is no implication of their relative importance to the success of this monumental project.

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THE EMT-PARAMEDIC: NATIONAL STANDARD CURRICULUM

History

The last revision of the EMT-Paramedic: National Standard Curriculum occurred in the early 1980s with a completed curriculum published in 1985. This current revision came about as a result of the National Highway Traffic Safety Administration's (NHTSA) January 1990 *Consensus Workshop on Emergency Medical Services Training Programs.* Participants discussed the national training curricula needs of Emergency Medical Service (EMS) providers. Using a nominal group process, the participants identified the top priority needs for EMS training in the United States.

The top priorities identified at that meeting led to revision of the EMT-Basic: National Standard Curriculum in 1994 and the First Responder: National Standard Curriculum in 1995. Upon the completion of these curricula, NHTSA funded a project to revise the EMT-Paramedic: National Standard Curriculum, EMT-Intermediate: National Standard Curriculum, and Associated Refresher programs. This curriculum is a result of that contract.

As stated in the contract, this curriculum is specifically designed to address the educational needs of the traditional paramedic. It is not intended to expand the scope of practice of the Paramedic. It is designed to provide a solid foundation for professional practice and additional education with a heavy emphasis on clinical problems solving and decision making.

The development utilized a variety of resources to help in curricular decision making. They included, but were not limited to: National Emergency Medical Services Education and Practice Blueprint, ASTM F1489-93, A Standard Guide for Performance of Patient Assessment by the EMT-Paramedic, Institute of Medicine's Report - Emergency Medical Services for Children, The EMS Agenda for the Future, The EMT and EMT-Paramedic Practice Analysis. These resources provided invaluable insight and assistance throughout the curriculum development.

The Curriculum Development Process

Because of the size of this project, many individuals were brought together to develop the curriculum. These extraordinarily talented individuals were organized into groups and teams. The Administrative Team's primary responsibility was to assure that the project was proceeding according to plan and to serve as a "hub" for the various groups and individuals involved in the many aspects of curriculum development.

The content of this curriculum was developed by writing teams that were each assigned a unit of the curriculum. Each writing team consisted of at least one author, one subject matter expert, and up to eight adjunct writers. These writing teams consisted of some of the most experienced educators and clinicians in emergency medicine. The authors were responsible for coordinating the writing group and actually developing the materials. The subject matter experts were responsible for the accuracy of each section. The subject matter experts were nationally recognized content experts. For all medical areas, the subject matter expert was a physician. The adjunct writers contributed to the development and review of the material.

The peer reviewers of the curriculum represented professionals from around the country who expressed

an interest in participating in the curriculum development process. They had the opportunity to submit comments about each draft of the curriculum to the writing team for consideration. The National Review Team consisted of representatives from national EMS organizations. The National Review team received every draft of the curriculum, and had the opportunity to register organizational opinions. Additionally, the National Review Team had two face-to-face meetings. These meetings were instrumental in developing consensus opinions on controversial issues.

The National Association of State EMS Directors and the National Council of State EMS Training Coordinators made extraordinary contributions to the overall design, development, and content of the curriculum throughout the project. More importantly, these organizations will assume the responsibility for implementing the curriculum in the coming years.

One pilot of the paramedic curriculum was conducted by the Center for Emergency Medicine in Pittsburgh, Pennsylvania. As part of their in-kind service to the project, the Joint Review Committee of Educational Programs for the EMT-Paramedic selected sites from around the country to serve as field test. These sites were asked to implement a draft of the curriculum and provide feedback to the administrative team. Both the pilot test and the field test sites were an important component of the curriculum development. The project team gained valuable insight into the implementation of this curriculum.

The National Registry of EMTs' support of this project was extraordinary. The National Registry contributed to the design and development of the examinations and final evaluation tools that were used in the pilot program, as well as the tabulation and evaluation of scores. They contributed significantly to the design and development of the skill sheets that are contained within this curriculum. The National Registry provided financial support for meetings of the group leaders.

The Joint Review Committee on Educational Programs for the EMT-Paramedic conducted surveys that were used to establish the clinical requirements. They also developed the affective evaluation tools.

Curriculum Goal and Approach

A curriculum is only one component of the educational process. Alone, it cannot assure competence. The goal of this curriculum is to be part of an educational system that produces a competent entry level paramedic. For the purpose of this project, competence was defined relative to the Description of the Profession.

Description of the Profession

The first step in the curriculum design phase of the project was to define the profession in terms of general competencies and expectations. The Description of the Profession was drafted and underwent extensive community and peer review. It was designed to be both practical and visionary, so as to not limit the growth and evolution of the profession. Ultimately it served as the guiding document for the curriculum development. The Description of the Profession also provided the philosophical justification of the depth and breadth of coverage of material. The Description of the Profession for the Paramedic is attached as Appendix A.

Educational Model

From the Description of the Profession, an Educational Model was developed to achieve the goals of the

course. This Educational Model also went thought extensive community and peer review. This is a graphical representation of the major components of the curriculum. The Paramedic Educational Model was designed to be consistent with, and build upon, the Educational Model for the EMT-Basic.
The Educational Model is not intended to imply a rigid order or sequence of the material. Course planners and educators should adapt and modify the order of the material to best meet their needs and those of their students.

Much of the material in the preparatory section sets the stage for the rest of the course. Although there is no requirement to adhere to the order of the model, most educators agreed that this information should be presented early in the course. Additionally, Airway and Ventilation and Patient Assessment are fundamental skills and knowledge areas and should be presented toward the beginning of the course of study. In the Educational Model, the Medical and Trauma modules appear on either side Patient Assessment. In general, it is assumed that most programs will cover this material after the Preparatory, Airway, and Patient Assessment material.

The Model is also designed to emphasize the role of professional education as part of life long learning (fig. 1).

Continuum of Life Long Learning

Basic Education ⇨Competencies/Prerequisites ⇨ Professional Education ⇨ Continuing Education

The EMT-Paramedic: National Standard Curriculum Diagram of Educational Model is attached as Appendix B.

Competencies

Paramedic program directors often comment that poor basic skills become problematic when attempting to teach many parts of the paramedic course. Deficiencies in basic skills are difficult to overcome throughout the course, but are most evident when teaching communication skills, documentation, and pharmacology math skills. It is not the intent of professional education to teach basic skills, but rather build on an existing base of academic competencies. The Paramedic curriculum assumes competence in English and math prior to beginning the course.

Documentation skills rely far more heavily on spelling, grammar, vocabulary and syntax than on the mastery of the specialized form of report writing that is found in health care. If, through program evaluation, a program identifies less than satisfactory results in documentation skills, it should raise the prerequisite level of English competence.

Similarly, if a program has difficulty with the student's pharmacology math skills, it is suggested that the prerequisite level of math competence be increased, rather than attempting to remediate these basic skills in the context of paramedic education.

The Functional Job Description of the Paramedic (appendix C), conducted by the National Registry of EMTs in 1997 identifies competence in math at the high school level and reading at the post high school level is necessary to perform as an entry level Paramedic. It is suggested that programs assess applicant's basic skills prior to entry into training. If the competence of the applicant falls below this level, the student should be encouraged to remediate the deficiency prior to pursuing paramedic certification. If the program chooses to enroll students below these basic skills levels, it is the program's responsibility to provide individual tutoring, increase course time, provide remedial education, or require co-requisite course work to improve the candidates basic skills prior to graduation.

Course Length

Basic academic skills play a very important role in course length and attrition rate. Attrition rate is a function of the groups basic academic skills and the length of the course. If course length remains constant, and the basic skills of the applicants decreases, the attrition rate will rise. Correspondingly, if a program seeks to decrease its attrition rate or increase examination performance, it may do so by increasing the basic academic skills of its students, increasing course length, or both. This information should be taken into account in course planning.

The emphasis of paramedic education should be competence of the graduate, not the amount of education that they receive. The time involved in educating a paramedic to an acceptable level of competence depends on many variables. Based on the experience in the pilot and field testing of this curriculum, it is expected that the average program, with average students, will achieve average results in approximately 1000-1200 hours of instruction. The length of this course will vary according to a number of factors, including, but not limited to:

-student's basic academic skills competence
-faculty to student ratio
-student motivation
-the student's prior emergency/health care experience
-prior academic achievements
-clinical and academic resources available
-quality of the overall educational program

Appendix D is a summary of the time that each of the eight field test sites needed to cover a draft of the curriculum. These times are meant only as a guide to help in program planing. Training institutes MUST adjust these times based on their individual needs, goals and objectives. These times are only recommendations, and should NOT be interpreted as minimums or maximums. Those agencies responsible for program oversight are cautioned against using these hours as a measure of program quality or having satisfied minimum standards. Competence of the graduate, not adherence to arbitrary time frames, is the only measure of program quality.

Prerequisites

There are two prerequisites for the Paramedic curriculum: EMT-Basic and Anatomy and Physiology.

EMT-Basic
It has been a long held tradition to use EMT-Basic certification as a prerequisite for more advanced EMS

education, and this curriculum continues that tradition. It is important to note that some educators have questioned the practice of using EMT-Basic as a required certification prior to enrollment in Paramedic education. In fact, no studies have been able to verify EMT-Basic certification or experience as a predictor of success in paramedic education. Of course, paramedics are required to be competent in *all* of the skills and knowledge of and EMT-Basic, and this knowledge base and skills competence should be verified during paramedic education.

Although this curriculum identifies EMT-Basic as a prerequisite, we have done so in the absence of empirical data suggesting that this is appropriate. We encourage flexibility in approaching the issue of EMT-Basic as a prerequisite to paramedic education. We also recognize that it may be possible to incorporate all of the material of an EMT-Basic class into a paramedic program, eliminating the need for it as a prerequisite. Clearly, more research is needed.

Anatomy and Physiology

The Paramedic curriculum has identified course work in anatomy and physiology as either a pre- or co-requisite. A mastery of anatomy and physiology, beyond that covered in the anatomy and physiology review of each section of the curriculum is assumed throughout this curriculum. EMS educational programs have many options to address anatomy and physiology in paramedic education. For programs that have access to formal anatomy and physiology classes, an appropriate level course can be identified as a pre or co-requisite to paramedic training. For other programs, anatomy and physiology can be "front loaded" in the paramedic course, or presented throughout the course.

There are many resources to aid EMS training sites and instructors in teaching an appropriate level of anatomy and physiology to current or prospective paramedic students. These texts and materials are available from many health care, medical and nursing publishers. Publishers usually have significant instructor and program support materials, usually including: textbooks, student workbooks, lesson plans, audiovisual materials, test banks, etc.

A list of objectives has been derived from many of the currently available resources in anatomy and physiology instruction. All of these objectives were consistently found in allied health educational programs or other non-science curricula. A list of the anatomy and physiology objectives that are considered pre- or co-requisite to paramedic education is found in appendix E. Paramedic programs should select courses or textbooks which cover this level of material.

Life Long Learning/Continuing Education

Continuing education is an integral component of any professional education process and the paramedic must be committed to life-long learning. The Paramedic curriculum must fit within the context of a continuing educational system. This is necessary due to the continually changing dynamics and evolution of medical knowledge.

This curriculum is designed to provide the student with the essentials to serve as an entry level paramedic. We recognize that enrichment and continuing education will be needed in some cases to bring the student to full competency. We strongly urge employers and service chiefs to integrate new graduates into specific orientation training programs.

It is important to recognize that this curriculum does not provide students with extensive knowledge in hazardous materials, blood-borne pathogens, emergency vehicle operations or rescue practices in

unusual environments. These areas are not core elements of education and practice as identified in the *National EMS Education and Practice Blueprint*. Identified areas of competency not specifically designed within the EMT-Paramedic: National Standard Curriculum should be taught in conjunction with this program as a local or state option.

PARAMEDIC EDUCATION

Society is becoming more demanding in all areas in education. The current trend in professional education is to demonstrate, in quantitative ways, the value and quality of the program. Simply adhering to standards is no longer adequate to convince the stake holders that educational programs are satisfying the needs of its constituency. Government, society, and the profession are demanding that educational programs are held accountable for the product that they are producing. This section of the curriculum briefly describes critical components, along with adherence to the Paramedic: National Standard Curriculum, that will enable programs to objectively demonstrate their value and quality.

Sponsorship

Paramedic education should take place in an academic environment. An academic environment has services such as a library, student counseling (education, academic, psychological, career, crisis intervention), admissions, financial aid, learning skills centers, student health services, etc. Additionally, an academic environment offers such advantages as admissions screening, standardized student selection criteria, registrar, record keeping, bursar, student activities, collegial environment, formal academic credit, medial resources, and vast institutional resources.

The financial resources should be adequate for the continued operation of the educational program to ensured each class of students is funded to complete the course. The budget should reflect sound educational priorities including those related to the improvement of the educational process.

Admissions fo students should bew made in accordance with clearly defined and published practices of the isntruction. Specific academic, health related, and/or technical requirements for admission shal be clearly defiined and published. The standards and /or prerequsited must be made know to all potential applicants.

The program should be responsible for establisng a procedure for determining that the aplicant's or students' health will permit them to meet the written technical standards of the program. Students shoulb be informed of and have access to health services. The health and safety of students, faculty, and patients associated with educational activites must be adequatley safeguarded.

Accurate information regarding program requirements, tuition and fees, institutional and programatic policies, procedures, and supportive services shall be available to all prospective students and provided to all enrolled students. There should be a descriptive synopsis of the current curriculum on fiel and available to candidates and enrolled students. There should be a statement of course objectives, copies of course outlines, class and laboratory schedules, clinical and field internship experience schedules, and teaching plans on file and available.

Student and faculty recruitment and student admission and faculty employment practices shall be non-discriminatory with respect to race, color, creed, sex, age, disabling conditions, and national origin. The program and sponsoring institution should have a defined and published policy and procedure for processing student and faculty grievances.

Policies and processes for student withdrawl and for refunds of tuition and fees shall be published and made known to all applicants. Polices by which student may perform service work while enrolled in the program must be published and made known to all concerned in order to avoid practices in which students are substituted for regular staff.

Student records shall be maintained for student admissions, attendance, academic counseling and evaluation. Grades and credits for courses shall be recorded and permanently maintained by the sponsoring institution.

Program Planning/Communities of Interest

As with all professional education, it is critically important that Paramedic education programs are planned, executed and evaluated in a continuous quality improvement model. Only through a thorough assessment of the needs of the community, the establishment of goals to meet those needs, and program evaluation relative to those needs, will a program be able to demonstrate its quality and value.

Every professional education program is designed and conducted to serve a number of communities of interest. It is incumbent on the program directors to identify who is being served by the program, and adapt the program to best meet those needs. The program's goal statement should help to clarify the communities that the program serves. Although students are the consumer of the educational program, they are not the customer of the product. Ultimately, the program serves the employers of graduates, not students. Typically, the communities of interest include directors, managers, and medical directors who hire or supervise graduates. Other communities of interest might include: colleagues, government officials, hospital administrators, insurance companies, patients, and the public.

As part of the planning process, the program should regularly assess the communities of interest, and establish objectives to best serve them. One way to survey the communities of interest is to establish an advisory board consisting of representatives from various communities of interest and regularly question them as to their expectations of entry level Paramedics. The program would use this information for program planning. Specifically, the program should use this information to clarify how to achieve their program goals and objectives.

Program Goal

Each paramedic program should have a program goal. The program goal is a statement of the desired outcome of the program, and typically references graduating competent entry-level providers. By design, program goals are broad based, but establish the parameters by which the effectiveness of the program will be evaluated. A program may have multiple goals, but most use one for clarity. For example, a typical program goals statement might read:

> The goal of the ABC Paramedic Education program is to produce competent, entry level

Paramedics to serve in career and volunteer positions in XYZ county.

If the program provided additional training that is clearly not within the definition of the entry level practitioner, then additional information should be included in the goal. Education planning should be based on the program goal, the mission of the sponsoring institution, and the expectations of the health care community. The goal should be made know to all members of the communities of interest, especially the students and faculty.

The goal will be used to select appropriate curricular materials, clinical experiences, and many other aspects of program planning.

Program Objectives

Objectives are more specific statements of the outcomes of the program, and are derived from the program goal in conjunction with the communities of interest. The program can establish as many objectives as they see fit to accurately reflect the program goal. Often, programs find it useful to establish objective along the three domains of learning. Examples might include:

Program Cognitive Objective:
At the completion of the program, the graduate of the ABC Paramedic Education Program will demonstrate the ability to comprehend, apply, and evaluate the clinical information relative to his role as an entry level paramedic in XYZ county.

Program Psychomotor Objective:
At the completion of the program, the student will demonstrate technical proficiency in all skills necessary to fulfil the role of entry level paramedic in XYZ county

Program Affective Objective:
At the completion of the program, the student will demonstrate personal behaviors consistent with professional and employer expectations for the entry level paramedic in XYZ county.

Goals and objectives must be consistent with the needs of the communities of interest, e.g. the program sponsors, employers, students, medical community, and profession. There may be some goals that are important institutional goals that are not useful program goals. The only goals that are considered program goals are those that relate specifically to the competencies attained in the program.

Use of the Goals and Objectives in Program Evaluation

Program goals and objectives form the basis for program assessment. Once the goals and objectives are established, they serve as a mechanism to evaluate the effectiveness of the program. By utilizing a variety of evaluation methodologies (performance of graduates on certification exams, graduate surveys, employer surveys, medical director surveys, patient surveys) the program can evaluate their effectiveness at achieving each objective. For example, if graduates consistently perform poorly on the cardiac section of certification exams, and graduates, employers, and medical directors all state that students are weak in cardiology, the program should critically evaluate this section of their curriculum.

Programs are encouraged to evaluate each objective in as many ways as possible. For example, graduate cognitive skills could be evaluated by performance on standardized tests, certification exams, graduate surveys, employer surveys, and medical director surveys. This provides much more information than using one source of data.

Course Design

The paramedic program should consist of four components of instruction: didactic instruction, skills laboratory, clinical education, and field internship. The first three typically occur concurrently, and the field internship serves as a verification that the student is serving as a competent, entry level practitioner.

Didactic Instruction

The didactic instruction represents the delivery of primarily cognitive material. Although this is often delivered as lecture material, instructors are strongly encouraged to utilize alternate delivery methods (video, discussion, demonstration, simulation, etc.) as an adjunct to traditional classroom instruction. The continued development and increased sophistication of computer aided instruction offers many options for the creative instructor. It is not the responsibility of the instructor to cover all of the material in a purely didactic format, but it is the responsibility of the program director to assure that all students are competent over the material identified by the declarative section.

Skills Laboratory

The skills laboratory is the section of the curriculum that provides the student with the opportunity to develop the psychomotor skills of the paramedic. The skills laboratory should be integrated into the curriculum in such a way as to present skills in a sequential, building fashion. Initially, the skills are typically taught in isolation, and then integrated into simulated patient care situations. Toward the latter part of the program, the skills lab should be used to present instructional scenarios to emphasize the application and integration of didactic and skills into patient management.

Clinical Education

Clinical education represents the most important component of paramedic education since this is where the student learns to synthesize cognitive and psychomotor skills. To be effective, clinical education should integrate and reinforce the didactic and skills laboratory components of the program. Clinical instruction should follow sound educational principles, be logically sequenced to proceed from simple to complex tasks, have specific objectives, and be closely supervised and evaluated. Students should not be simply sent to clinical environments with poorly planned activities and be expected to benefit from the experience.

The ability to serve in the capacity of an entry level paramedic requires experience with actual patients. This process enables the student to build a database of patient experiences that serves to help in clinical decision making and pattern recognition. A skilled clinical educator must point out pertinent findings and focus the beginner's attention.

Program directors should be cautioned against using time as a criteria to determine the quantity of clinical

education. More than any other phase of paramedic education, minimum amounts of patient contacts and frequency of skills performed must be established for clinical education. It is acceptable to use a time based system to help in program planning, but a system must be used to assure that every student satisfies each and every clinical objective.

Typically, clinical education for the paramedic takes place in both the hospital and field environments:

> Hospital Clinical - Because of the unpredictable nature of emergency medicine, the hospital environment offers two advantages in paramedic education: volume and specificity. In the hospital setting, the paramedic student can see many more patients than is possible in the field. This is a very important component in building up a "library" of patient care experiences to draw upon in clinical decision making.
>
> The use of multiple departments within the hospital enables the student to see an adequate distribution of patient situations. In addition to emergency departments, which most closely approximate the types of patients that paramedics should see, clinical education should take advantage of critical care units, OB/GYN, operating rooms/anesthesia, recovery, pediatrics, psychiatric, etc. This will help assure a variety of patient presentations and complaints. These also provide a more holistic view of health care and an appreciation for the care that their patients will undergo throughout their recovery. This places emergency care within context.
>
> Paramedic programs throughout the country have created clinical learning experiences in many environments. There is application to emergency medical care in almost any patient care setting. When a particular location lacks access to some patient populations, educational programs have created innovative solutions. Programs are encouraged to be creative and seek out clinical learning experiences in many settings. Examples include: morgues, hospices, nursing homes, primary care settings, doctor's offices, clinics, laboratories, pharmacies, day care centers, well baby clinics, and community and public health centers.
>
> Field Clinical - It is unreasonable to expect students to derive benefit from being placed into a field environment and performing. Field clinical represents the phase of instruction where the student learns how to apply cognitive knowledge and the skills developed in skills laboratory and hospital clinical to the field environment. In most cases, field clinical should be held concurrently with didactic and hospital clinical instruction.
>
> Field instruction, as well as hospital clinical, should follow a logical progression. In general, students should progress from observer to participant to team leader. The amount of time that a student will have to spend in each phase will be variable and depend on many individual factors. One of the largest factors will be the amount and quality of previous emergency care experience. With the trend toward less and less EMT experience prior to paramedic education, program directors must adjust the amount of field experience to the experience of the students.

Clinical affiliations shall be established and confirmed in written affiliation agreements with institutions and agencies that provide clinical experience under appropriate medical direction and clinical supervision. Students should have access to patients who present common problems encourage in the delivery of advanced emergency distributed by age and sex. Supervision should be provided by instructors or preceptors appointed by the program. The clinical site should be periodically evaluated with respect to its continued appropriateness and efficacy in meeting the expectations of the programs. Clinical affiliates should be accredited by the Joint Commission on Accreditation of Healthcare Organizations.

Field Internship

The final ability to integrate all of the didactic, psychomotor skills, and clinical instruction into the ability to serve as an entry level paramedic is conducted during the field internship phase of the program. The field internship in not an instructional, but rather an evaluative, phase of the program. The field internship should occur toward the end of the program, with enough coming after the completion of all other instruction to assure that the student is able to serve as an entry level paramedic. During the field internship the student should be under the close supervision of an evaluator.

Field internship must occur within an emergency medical service which demonstrates medical accountability. Medical accountability exists when there is good evidence that the EMS providers is not operating as an independent practitioner, and when field personnel are under direct medical control of on-line physicians or in a system utilizing standing orders where timely medical audit and review provide quality improvement.

Quality improvement is also a required component of EMS training. The role of medical direction is paramount in assuring the provision of highest quality out-of-hospital care. Medical Directors should work with individuals and systems to review out-of-hospital cases and strive to achieve a sound method of continuous quality improvement.

Student Assessment

Any educational program must include several methods for assessing student achievement. As mentioned before, quizzes of the cognitive and psychomotor domains should be provided regularly and frequently enough to provide the students and the faculty with valid and timely indicators of the student's progress toward and the achievement of the competencies and objectives stated in the curriculum. Ultimately, the program director is responsible for the design, development, administration and grading of all written and practical examinations. This task is often delegated to others. Some programs use outside agency developed or professionally published evaluation instruments. This does not alleviate the program's responsibility to assure the appropriateness of these exam materials. All examinations used within the program must have demonstrated validity and reliability and conform to psychometric standards. Programs are encouraged to use outside sources to validate examinations and/or as a source of classroom examination items.

The primary purpose of this course is to meet the entry-level job expectations as indicated in the job description. Each student, therefore, must demonstrate attainment of knowledge, attitude, and skills in each area taught in the course. It is the responsibility of the educational institution, program director, medical director, and faculty to assure that students obtain proficiency in all content areas. If after counseling and remediation a student fails to demonstrate the ability to learn specific knowledge, attitudes and skills, the program director should not hesitate to dismiss the student. The level of knowledge, attitudes and skills attained by a student in the program will be reflected in his performance on the job as a paramedic. This is ultimately a reflection on the program director, primary instructor, medical director and educational institution. It is not the responsibility of the certifying examination to assure competency over successful completion of the course. Program directors should only recommend qualified candidates for licensure, certification or registration.

Requirements for successful completion of the course are as follows:

Cognitive - Students must demonstrate competency of all content areas. This is most often done using quizzes, regular topical exams, and some combination of comprehensive exams (mid terms and finals). Cognitive evaluations must be reliable and viable. Programs should incorporate psychometric principles whenever possible. For example, item analysis should be utilized to assure discrimination on achievement tests. Scores on tests of known validity and reliability should be correlated to teacher made examinations. Medical director should take examinations and provide content validity input. Examinations should be balanced to areas within the course. Pass/fail scores should be established with an understanding of standard setting. Decisions regarding the continuation of students in class need to be made following a pattern of performance. One test failure should not result in failure from the program. Grading practices should be standardized to prevent bias by instructional staff. Essay and open ended questions should be clearly written and acceptable answers should be known before the examination is administered. Test should be kept secure and reviewed by students during class time. Programs should investigate methods to Special remedial sessions may be utilized to assist in the completion of a unit or module of instruction. Scoring should be in accordance with accepted practices.

Affective - Students must demonstrate professionalism, conscientiousness and interest in learning. The affective evaluation instruments contained within this curriculum were developed using a valid process and their use is strongly recommended. Just as with cognitive material, the program cannot hold a student responsible for professional behaviors that were not clearly taught. The professional attributes evaluated using this instrument references the material in the Roles and Responsibilities of the Paramedic section of the curriculum. The instruments can be incorporated into all four components of the program: didactic, practical laboratory, clinical and field internship. Students who fail to do so should be counseled while the course is in progress in order to provide them the opportunity to develop and exhibit the proper attitude expected of a paramedic. See appendix F.

Psychomotor - Students must demonstrate proficiency in all skills. A complete list of skill competencies expected to be completed within the program should be available to each student. Students should know pass/fail score of any instrument utilized within an educational program. Whenever possible multiple evaluators recording performance of a student should be made. Scenarios should be medically accurate and flow as they would in a typical EMS call. In clinical and field internship all instructional staff must be familiar with psychomotor instruments and expectations. Inter-rater reliability between various instructional staff must be monitored by the program. Clinical and field instructional staff orientations may help resolve issues of inter-rater reliability. Course ending skills examinations should be administered. Special remedial sessions may be utilized to assist in the completion of a unit or module of instruction. Pass/fail scores should be in accordance with accepted practices. It is strongly recommended that program utilize the skills evaluation instruments provided in this curriculum. See appendix G.

Students should be evaluated in all three domains in didactic, practical laboratory, clinical and field internship. For example, the students cognitive knowledge can be evaluated in the clinical setting by direct questioning or discussions. Secondly, if an IV is started on a patient, the psychomotor skill should

be evaluated. Finally, the affective domain, their professional attributes can be measured. This example also applies to skills laboratories. In the skills laboratory, the cognitive domain can be measured by asking questions about the skill, and the affective domain can be measured by their attitude in learning and practicing the skills.

Program Personnel

There are typically many individuals involved in the planning and execution of a paramedic program. For clarity, the following terms are defined as they will be used throughout this document.

These identified roles and responsibilities are a necessary part of each paramedic program. The individuals carrying them out may vary from program to program and from locality to locality as the exact roles interface and overlap. In fact, one person, if qualified, may serve in multiple roles.

Program Director

The Program Director is the individual responsible for course planning, organization, administration, periodic review, program evaluation, continued development, and effectiveness. The program should have a full-time Program Director while the program is in progress, whose primary responsibility is to the educational program. The program Director should contribute an adequate amount of time to assure the success of the program. The program director shall actively solicit and require the cooperative involvement of the medical director of the program.

The program director must have appropriate training and experience to fulfill the role. They should have at lease equivalent academic training and preparation and hold all credentials for which the students are being prepared, or hold comparable credentials which demonstrate at least equivalent training and experience.

The program director should have training and education in education and evaluation and be knowledgeable in administration of education and related legislative issues for paramedic education. The program director should assume ultimate responsibility for the administration of the didactic, clinical, and field internship phases of the program. It is the program directors responsibility to monitor all phases of the program and assure that they are appropriate and successful.

Program Faculty

The depth and breadth of paramedic education has evolved through the years and expanded considerably from the early days of emergency medicine. It is no longer reasonable to assume that one individual possesses the required depth of knowledge to be able to teach the entire program. As a result the Program Director and/or Course Coordinator should use content area experts extensively through the program.

Course Medical Director

Medical direction of the paramedic is an essential component of out-of-hospital training. Physician involvement should be in place for all aspects of EMS education. The Course Medical Director of the paramedic program should be a local physician with emergency medical experience who will act as the ultimate medical authority regarding course content, procedures, and protocols. All of the program faculty

should work closely together in the preparation and presentation of the program.

The Course Medical Director can assist in recruiting physicians to present materials in class, settling questions of medical protocol and acting as a liaison between the course and the medical community. During the program the Medical Director will be responsible for reviewing the quality of care rendered by the paramedic student in the clinical and field setting. The Course Medical Director should review all course content material and examinations. The medical director should periodically observe lectures and practical laboratories, field and clinical internships. The medical director should participate in clinical instruction, student counseling, psychomotor and oral testing, and summative evaluation.

Most importantly, the Course Medical Director is responsible to verify student competence in the cognitive, affective and psychomotor domains. Students should not be awarded course ending certificates unless the medical director and program director can assure through documentation of completion of terminal competencies that each student has completed the full complement of education. Documentation of completion of course competencies should be affixed to the student file with signatures of the medical director and program director at the completion of the course.

Licensure, Certification and Registration

State regulatory agencies may require specific evaluation of cognitive and psychomotor performance prior to official licensure, certification or registration as a Paramedic. This is in addition to course completion and may be required by state regulations. The National Registry of EMTs is a recognized agency that provides examinations for certification and registration that may be required by your state. The program director should contact the State Office of Emergency Medical Services for licensure, certification or registration information.

Program Evaluation

On-going evaluation must be initiated to identify instructional or organizational deficiencies which affect student performance. The evaluation process should include both objective and subjective methods. Main methods of objective evaluation generally used are: 1) Graduates' performance on standardized examinations, and 2) Graduates' performance in practice in accordance with established standards of care. Group and individual deficiencies may indicate problems in conducting the education program.

Subjective evaluation should be conducted at regular intervals by providing students with written questions on their opinions of the program's strengths and weaknesses. Students should be given the opportunity to comment on the instruction, presentation style and effectiveness. Students should also be asked to comment on the program's compliance with the specified course of instruction, the quality and quantity of psychomotor skills labs, clinical rotations, and the validity of the examinations.

The purpose of this evaluation process is to strengthen future educational efforts. All information obtained as part of the subjective evaluation should be reviewed for legitimacy and possible incorporation into the course. Due to the important nature of this educational program, every effort should be made to ensure the highest quality instruction.

Facilities

The physical environment for the provision of the paramedic program is a critical component for the success of the overall program. The facility should sufficient space for seating all students. Abundant space should be made available for demonstration during the presentation of the course material. Additional rooms or adequate space should be available to serve as a practice area. The facility should be well lit for adequate viewing of various types of visual aids and demonstrations. Heating and ventilation should assure student and instructor comfort and the seats should be comfortable with availability of desk tops or tables for taking notes. There should be an adequate number of tables for display of equipment, medical supplies, and training aids. A chalkboard (flip chart, grease board) should be in the main hall. A projection screen and appropriate audio visual equipment should be located in the presentation facility. Practice areas should be carpeted and large enough to accommodate six students, one instructor, and the necessary equipment and medical supplies. Tables should be available for practice areas, with appropriate and sufficient equipment and medical supplies.

Equipment and Supplies

Sufficient supplies and equipment to be used in the provision of instruction shall be available and consistent with the needs of the curriculum and adequate for the students enrolled. The equipment must be in proper working order and sufficient to demonstrate skills of patients in various age groups. It is recommended that all the required equipment for the program be stored at the facility to assure availability for its use.

HOW TO USE THE CURRICULUM

There are eight modules of instruction in the core content. There are 52 sections within the eight modules. Each section has the following components:

Unit Terminal Objective

The unit terminal objective represents the desired outcome of completion of the block of instruction. In most cases it is a very high level objective, which can make it difficult to evaluate. This global objective represents the desired competency following completion of the section. Although this objective may be viewed as the aggregate of lower level objectives, in many cases, the whole is greater than the sum of the parts.

Objectives

These are the individual objectives of the curriculum. Mastery of each of these objectives provides the foundation for the higher order learning that is expected of the entry level provider. The instructor and student should strive to understand the complex interrelationships between the objectives. These objectives are not discrete, disconnected bits of knowledge, but rather fit together in a mosaic that is inherently interdependent. The objectives are divided into three categories: Cognitive, Affective, and Psychomotor.

Cognitive	Affective	Psychomotor
mental process--	emotional process--	physical process--
perception	feelings	muscular activity
reasoning		
intuition		

To assist with the design and development of a specific unit, each objective has a numerical value, e.g., 3-2.1. The first number is the module of instruction, followed by a hyphen and the number of the specific unit. For example, 3-2.1 is:

Module 3:	Patient Assessment
Unit 3-2:	The Initial Assessment
Objective 3-2.1	Summarize the reasons for forming a general impression of the patient. (C-1)

At the end of each objective is a letter for the type of objective: C = Cognitive; A = Affective; and P = Psychomotor. (The example above is cognitive). The number following the type of objective represents the level of objective: 1 = Knowledge; 2 = Application; and 3 = Problem Solving. (The example above is knowledge).

Declarative

This material is designed to provide program directors and faculty with clarification on the depth and breadth of material expected of the entry level paramedic. **The declarative material is not all inclusive. The declarative section of the curriculum lack much of the specific information that must be added by the instructor.** The declarative information represents the bare minimum that should be covered, but the instructor must elaborate on the material listed. Every attempt has been made in development of the declarative material to avoid specific treatment protocols, drug dosages or other material that changes over time and has regional variations. It is the responsibility of the instructors to provide this information.

Specifically, the declarative material is used to help instructors develop lesson plans and instructional strategies. It is also designed to assist examination and publishers in developing appropriate evaluation materials and instructional support materials. **It is of upmost importance to note that the declarative material is not designed to be used as a lesson plan, but rather it should be used by instructors to help develop their own lesson plans.**

Clinical Rotations

The clinical rotations that appear in the EMT-Paramedic: National Standard Curriculum represent a stark departure from previous clinical education recommendations. In the past, clinical competence was determined simply by the number of hours spent in various clinical environments. As there is no assurance that time produced an adequate number of clinical exposures resulting in entry level clinical competence, a different approach was taken with this curriculum. In-kind services were provided by the Joint Review Committee for EMT-Paramedic Program Accreditation (JRC).

The JRC survey all existing accredited programs and asked them to identify the number of psychomotor skills, patient age groups, pathologies, patient complaints and team leader skills they were currently

utilizing in order to identify competent entry level Paramedics. The results of the survey were then presented to the JRC sponsoring organization committee members who possess expertise in cardiology, pediatrics, anesthesia, surgery, emergency medicine and Paramedic education. Using both subject matter expertise and the results of the surveys of accredited programs, the JRC established the clinical rotation goals presented in this curriculum. Items presented in bold are essentials and must be completed by each student within the program. Items in italics are recommendations to achieve the essential.

Although these patient exposures cover a wide domain of skills, pathologies, complaints and ages, they can be achieved in either the clinical or field internship. For example, a student may demonstrate the ability to perform a comprehensive assessment, formulate and implement an treatment plan for patients with chest pain in either a hospital critical care unit or during an encounter in the field. If the patient in this example was not experiencing chest pain at the time of the student evaluation, but had experienced chest pain which resulted in admission to the critical care unit. This interaction would suffice for meeting the clinical rotation for one encounter with a chest pain patient. During this experience the student should complete an evaluated physical examination, a history based upon the initial and present condition of the patient and formulate a treatment plan for the patient based upon initial field or admission findings. This same principle of encountering patients who have identified pathologies or complaints within the past 48 hours will suffice for meeting the clinical rotation requirement.

Some categories can be counted more than once. For example if a student in the field internship encounter a patient with chest pain who was 68 years old and start an IV, the student would obtain credit for a complaint, an age and a skill. The established IV and chest pain assessment, and treatment and implementation plan must be evaluated and the patient age group credit must be recorded. Encounters without evaluation and recording should not be awarded credit.

Obviously during the education the best experience would occur in the field setting which most approximates the function of the job. Recognizing the extended field time that would be necessary to see the recommend variety of patient conditions and skills would be infeasible, the curriculum permits students to obtain these experiences in either hospital clinical or field. The team leaders skills can not be met during hospital rotations. The JRC recommends that a student will obtain credit for one patient for each encounter. For example if a patient has both chest pain and a syncope episode, the student can utilize this experience for either a chest pain patient or a syncope patient, but not for both. The program must develop a clinical rotation patient tracking system in order to assure that each student encounters the recommended number of skills, ages, pathologies, complaints and team leader skills.

The clinical rotations contained within this curriculum are being accomplished by Paramedic education programs at the time of the curriculum revision. These rotations do not represent an increase in clinical requirements. The program director along with the community of interest should use feedback loops that are part of the program evaluation process to either increase or decrease the number of patient exposures based upon valid measurement instruments utilized in graduate surveys. If employers or graduates indicate the need for increased patient encounters in order to bring current graduates to the level of competency then the program should increase the number of encounters to correspond to this need. Likewise if graduates and employers indicate some rotations provided more than competent experience the program may reduce the number of patient encounters within the recognized category.

Although the categories were researched by the JRC, a program director, medical director or community of interest may add different encounters in order to meet community needs. For example if a program is located in an area with a large geriatric population, the program may increase the number of encounters with geriatric patients to correspond to community needs.

EDUCATING PROFESSIONALS

It has long been recognized that paramedics, as an integral part of the health care team, are health care professionals. As such, the education of paramedics should follow a professional, rather than purely technical, model of instruction. Employers and patients are significantly increasing their expectations of paramedics, and EMS education will need to respond.

In *Responsive Professional Education*, Stark, Lowther, and Hagerty (1986), propose that professional preparation is a combination of developing both professional competence and professional attitudes.

Historically, most EMS education has focused primarily on technical competence. Technical competence is only one component of professional competence. Professional competence includes six subcategories:

> *Conceptual competence* - Understanding the theoretical foundations of the profession
> *Technical competence* - Ability to perform tasks required of the profession
> *Interpersonal competence* - Ability to use written and oral communications effectively
> *Contextual competence* - Understanding the societal context (environment) in which the profession is practiced
> *Integrative competence* - Ability to meld theory and technical skills in actual practice
> *Adaptive competence* - Ability to anticipate and accommodate changes (e.g. technological changes) important to the profession.

The main areas of focus of the National Standard Curriculum are on conceptual and technical competence. This revision of the paramedic curriculum is the first to address the strategies of interpersonal and therapeutic communication. Unfortunately, conceptual, technical, and interpersonal competencies are only part of the competencies required for reflective practice.
It is incumbent on the program to keep contextual, integrative and adaptive competence in mind through the entire program. These are not discreet topic areas and do not easily lend themselves to behavioral objectives. Programs and faculty members must constantly weave these issues into the conceptual and technical components of the course.

Contextual competence is an appreciation for how the professional's practice fits into larger pictures. Professional practice in not conducted in a vacuum, but impacts, and is impacted upon, by many forces. Of course, entry level paramedics understand how their practice affects individual patients. In addition, they must appreciate how their actions impact the EMS system where the work, the overall EMS system, the profession, the health care system, and society in general.

Teaching to improve contextual competence requires constant reinforcement of the interdependent nature of professional practice. Faculty must have a clear understanding of the relationship that EMS has with the health care system, the environment and society in general. Faculty must strive to repeatedly emphasize the "big picture" and not to fall into the trap of considering the individual practitioner, or the EMS profession, as a separate entity.

Integrative competence is generally built by having a strong mastery of the theoretical base of the content material. Students can often memorize treatment protocols (practice) without having a grasp of the underlying pathophysiology. In the short term, this enables them to pass the test, but results in poor ability

to integrate the material. Eventually, this shortfall manifests itself as poor decision making and problem solving skills. Medical education must balance theory and practice and constantly emphasize the relationship between the two. Theory and practice are not discreet, mutually exclusive concepts, but rather the flip sides of the same coin.

Another way to improve integrative competence is to broaden the base of educational exposures of the student. It has been repeatedly demonstrated that a broad distribution of course work, typical in liberal studies educational approach, increases integrative competence. Although not always possible, programs which are not satisfied with their graduates' ability to integrate theory and practice may find that adding additional courses from other disciplines will improve the students higher level cognitive skills.

It is effectively impossible for a centrally developed curriculum to identify specific objective and declarative material for contextual, integrative and adaptive competence, but their importance cannot be overstated. Individual instructors and programs must keep these competencies in mind as they are developing instruction strategies to build entry level competence. These competencies are often the result of leadership, mentoring, role modeling, a focus on high level cognition, motivation and the other teaching skills of the faculty.

Professional attitudes, in large part, represent the affective objectives of the program. Unfortunately the development of true professional attitudes are much more than the aggregate sum of the individual objectives. These attitudes represent the social climate, moral and ethical identity of the individual and the profession. These attitudes are influenced and shaped, through role modeling, mentoring, and leading by example. It is very difficulty to "teach" in a didactic sense and this is often interpreted by students as preaching. Generally, professional attitudes are best nurtured through leadership and mentoring. Faculty are encouraged to provide a positive role model for the development of professional attitudes in all interactions with students. Paramedic programs should take seriously their responsibility to develop the following professional attitudes:

Professional identity - The degree to which a graduate internalized the norms of a professional
Ethical standards - The degree to which a graduate internalizes the ethics of a profession
Scholarly concern for improvement - The degree to which a graduate recognizes the need to increase knowledge in the profession through research
Motivation for continued learning - The degree to which a graduate desires to continue to update knowledge and skills.
Career marketability - The degree to which a graduate becomes marketable as a result of acquired training

Emergency medicine, like all professions, has a professional culture, personality, behaviors and attitudes that we consider acceptable. The opinion that others have about our profession are profoundly influenced by the professional identity of each of our members. It is very important that we shape our identity consciously, or run the risk of being misunderstood by others. The degree to which new graduates adopt the behaviors and attitudes that the profession considers to be acceptable is a measure of our success in shaping each student's professional identity.

Ethical behavior is one of the cornerstones of professional attitudes. Ethics involves the critical evaluation of complex problems and decision making that takes into account the ambiguity that is most often present in professional decisions. Ethical behavior and decision making involves the ability to consider the greater social ramifications of your actions.

It is becoming increasingly important to have empirical data to validate clinical decisions. This fact is significantly increasing the role of research in medicine. Every medical professional must understand and appreciate the role of research in the future of health care. Of course, not all health care providers will be conducting research, but everyone must be committed to the concept of research as the foundation for decision making.

Primary professional education is just the beginning of a life long journey. The art and science of medicine changes over time. This requires that the professional adopt, from the beginning of practice, a sincere commitment to personal growth and continual improvement.

The last professional attitude is really a function of all that we have discussed. An individual's career marketability is a function of his ability to integrate professional competencies and professional attitudes into his own practice and work habits. Not only will this affect the ability to gain initial employment, but they will significantly impact his promotion potential. It is a very real and practical responsibility of education to prepare professionals for the work place and position them to be able to progressively be promoted. This keeps quality individuals intellectually stimulated, professionally challenged, and financially satisfied so they will not feel a need to leave the profession.

Professional education is a journey; not a destination. It is impossible, and fruitless, to dissect professionalism into increasingly smaller objectives. Mastery of hundreds or thousands of individual objectives does not assure that the graduate will integrate these objectives into professional behaviors. Like Humpty Dumpty, all of the parts may not be able to be assembled into a meaningful whole. There are many people who have mastered various parts of professional competence, but are not able to integrate and synthesize the skills into effective practice. This is the art of medicine, and is not taught specifically, but nurtured and allowed to grow through the creation of a supportive and positive environment.

Appendix A

EMT-Paramedic: Description of the Profession

Appendix B

EMT-Paramedic: Educational Model

Appendix C

Paramedic: Functional Job Analysis

Appendix D
Field Test Program Hours

Appendix D includes information to help program directors make decisions about the length of the program. A pilot test of the curriculum was conducted and all of the cognitive, psychomotor, and clinical objectives were completed in 1122 hours (435 classroom, 171 practical laboratory, clinical/field 516). The following information represents the amount of time needed to complete the course objectives by the pilot and field test sites.

For each unit, we have reported the range, average, standard deviation (SD),and median number of hours spent in didactic and practical laboratory.

Based on this information, and the performance of students in the pilot and field test program, it is recommended that the course be planned for approximately 1000-1200 total hours of instruction (500-600 classroom/practical laboratory, 250-300 clinical, 250-300 field internship.)

Appendix E

Anatomy and Physiology Prerequisite Objectives

Appendix F
Affective Evaluations

Appendix G
Psychomotor Skills Evaluations

Appendix H

Module and Unit Objective Summary

Description of the Profession
Paramedic

Paramedics have fulfilled prescribed requirements by a credentialing agency to practice the art and science of out-of-hospital medicine in conjunction with medical direction. Through performance of assessments and providing medical care, their goal is to prevent and reduce mortality and morbidity due to illness and injury. Paramedics primarily provide care to emergency patients in an out-of-hospital setting.

Paramedics possess the knowledge, skills and attitudes consistent with the expectations of the public and the profession. Paramedics recognize that they are an essential component of the continuum of care and serve as linkages among health resources.

Paramedics strive to maintain high quality, reasonable cost health care by delivering patients directly to appropriate facilities. As an advocate for patients, paramedics seek to be proactive in affecting long term health care by working in conjunction with other provider agencies, networks, and organizations. The emerging roles and responsibilities of the Paramedic include public education, health promotion, and participation in injury and illness prevention programs. As the scope of service continues to expand, the Paramedic will function as a facilitator of access to care, as well as an initial treatment provider.

Paramedics are responsible and accountable to medical direction, the public, and their peers. Paramedics recognize the importance of research and actively participate in the design, development, evaluation and publication of research. Paramedics seek to take part in life-long professional development, peer evaluation, and assume an active role in professional and community organizations.

EMT-PARAMEDIC: NATIONAL STANDARD CURRICULUM
DIAGRAM OF EDUCATIONAL MODEL

COMPETENCIES

Mathematics, reading, and writing

PRE- or CO-REQUISITE

EMT or EMT-Basic
Human Anatomy and Physiology

Clinical/Field

PREPARATORY

EMS Systems/The Roles and Responsibilities of the Paramedic
The Well-Being of the Paramedic
Illness and Injury Prevention
Medical / Legal Issues
Ethics
General Principles of Pathophysiology
Pharmacology
Venous Access and Medication Administration
Therapeutic Communications
Life Span Development

AIRWAY MANAGEMENT AND VENTILATION

Clinical/Field

MEDICAL

Pulmonary
Cardiology
Neurology
Endocrinology
Allergies and Anaphylaxis
Gastroenterology
Renal/Urology
Toxicology
Hematology
Environmental Conditions
Infectious and Communicable Diseases
Behavioral and Psychiatric Disorders
Gynecology
Obstetrics

PATIENT ASSESSMENT

History Taking
Techniques of Physical Examination
Patient Assessment
Clinical Decision Making
Communications
Documentation

TRAUMA

Trauma Systems/Mechanism of Injury
Hemorrhage and Shock
Soft Tissue Trauma
Burns
Head and Facial Trauma
Spinal Trauma
Thoracic Trauma
Abdominal Trauma
Musculoskeletal Trauma

Clinical/Field

SPECIAL CONSIDERATIONS

Neonatology
Pediatrics
Geriatrics
Abuse and Assault
Patients with Special Challenges
Acute Interventions for the Chronic Care Patient

ASSESSMENT BASED MANAGEMENT

OPERATIONS

Ambulance Operations
Medical Incident Command
Rescue Awareness and Operations
Hazardous Materials Incidents
Crime Scene Awareness

Clinical/Field

LIFE LONG LEARNING

Continuing Education

cynthia.mcnair

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Functional Job Analysis

Paramedic Characteristics

The Paramedic must be a confident leader who can accept the challenge and high degree of responsibility entailed in the position. The Paramedic must have excellent judgement and be able to prioritize decisions and act quickly in the best interest of the patient, must be self disciplined, able to develop patient rapport, interview hostile patients, maintain safe distance, and recognize and utilize communication unique to diverse multicultural groups and ages within those groups. Must be able to function independently at optimum level in a non-structured environment that is constantly changing.

Even though the Paramedic is generally part of a two- person team generally working with a lower skill and knowledge level Basic EMT, it is the Paramedic who is held responsible for safe and therapeutic administration of drugs including narcotics. Therefore, the Paramedic must not only be knowledge about medications but must be able to apply this knowledge in a practical sense. Knowledge and practical application of medications include thoroughly knowing and understanding the general properties of all types of drugs including analgesics, anesthetics, anti-anxiety drugs, sedatives and hypnotics, anti-convulsants, central nervous stimulants, psychotherapeutics which include antidepressants, and other anti-psychotics, anticholerginics, cholergenics, muscle relaxants, anti-dysrythmics, anti-hypertensives, anticoagulants, diuretics, bronchodilators, opthalmics, pituitary drugs, gastro-intestinal drugs, hormones, antibiotics, antifungals, antiinflammatories, serums, vaccines, anti-parasitics, and others.

The Paramedic is personally responsible, legally, ethically, and morally for each drug administered, for using correct precautions and techniques, observing and documenting the effects of the drugs administered, keeping one's own pharmacological knowledge- base current as to changes and trends in administration and use, keeping abreast of all contraindications to administration of specific drugs to patients based on their constitutional make-up, and using drug reference literature.

The responsibility of the Paramedic includes obtaining a comprehensive drug history from the patient that includes names of drugs, strength, daily usage and dosage. The Paramedic must take into consideration that many factors, in relation to the history given, can affect the type medication to be given. For example, some patients may be taking several medications prescribed by several different doctors and some may lose track of what they have or have not taken. Some may be using non-prescription/over the counter drugs. Awareness of drug reactions and the synergistic effects of drugs combined with other medicines and in some instances, food, is imperative. The Paramedic must also take into consideration the possible risks of medication administered to a pregnant mother and the fetus, keeping in mind that drugs may cross the placenta.

The Paramedic must be cognizant of the impact of medications on pediatric patients based on size and weight, special concerns related to newborns, geriatric patients and the physiological effects of aging such as the way skin can tear in the geriatric population with relatively little to no pressure. There must be an awareness of the high abuse potential of controlled substances and the potential for addiction, therefore, the Paramedic must be thorough in report writing and able to justify why a particular narcotic was used and why a particular amount was given. The ability to measure and re-measure drip rates for controlled substances/medications is essential. Once medication is stopped or not used, the Paramedic must send back unused portions to proper inventory arena.

The Paramedic must be able to apply basic principles of mathematics to the calculation of problems associated with medication dosages, perform conversion problems, differentiate temperature reading

between centigrade and Fahrenheit scales, be able to use proper advanced life support equipment and supplies (i.e. proper size of intravenous needles) based on patient's age and condition of veins, and be able to locate sites for obtaining blood samples and perform this task, administer medication intravenously, administer medications by gastric tube, administer oral medications, administer rectal medications, and comply with universal pre-cautions and body substance isolation, disposing of contaminated items and equipment properly.

The Paramedic must be able to apply knowledge and skills to assist overdosed patients to overcome trauma through antidotes, and have knowledge of poisons and be able to administer treatment. The Paramedic must be knowledgeable as to the stages drugs/medications go through once they have entered the patient's system and be cognizant that route of administration is critical in relation to patient's needs and the effect that occurs.

The Paramedic must also be capable of providing advanced life support emergency medical services to patients including conducting of and interpreting electrocardiograms (EKGs), electrical interventions to support the cardiac functions, performing advanced endotracheal intubations in airway management and relief of pneumothorax and administering of appropriate intravenous fluids and drugs under direction of off-site designated physician.

The Paramedic is a person who must not only remain calm while working in difficult and stressful circumstances, but must be capable of staying focused while assuming the leadership role inherent in carrying out the functions of the position. Good judgement along with advanced knowledge and technical skills are essential in directing other team members to assist as needed. The Paramedic must be able to provide top quality care, concurrently handle high levels of stress, and be willing to take on the personal responsibility required of the position. This includes not only all legal ramifications for precise documentation, but also the responsibility for using the knowledge and skills acquired in real life threatening emergency situations.

The Paramedic must be able to deal with adverse and often dangerous situations which include responding to calls in districts known to have high crime and mortality rates. Self-confidence is critical, as is a desire to work with people, solid emotional stability, a tolerance for high stress, and the ability to meet the physical, intellectual, and cognitive requirements demanded by this position.

Physical Demands

Aptitudes required for work of this nature are good physical stamina, endurance, and body condition that would not be adversely affected by frequently having to walk, stand, lift, carry, and balance at times, in excess of 125 pounds. Motor coordination is necessary because over uneven terrain, the patient's, the Paramedic's, and other workers' well being must not be jeopardized.

Comments

The Paramedic provides the most extensive pre-hospital care and may work for fire departments, private ambulance services, police departments or hospitals. Response times for nature of work are dependent upon nature of call. For example, a Paramedic working for a private ambulance service that transports the elderly from nursing homes to routine medical appointments and check-ups may endure somewhat less stressful circumstances than the Paramedic who works primarily with 911 calls in a districts known to have high crime rates. Thus, the particular stresses inherent in the role of the Paramedic can vary, depending on place and type of employment.

However, in general, in the analyst's opinion, the Paramedic must be flexible to meet the demands of the ever-changing emergency scene. When emergencies exists, the situation can be complex and care of the patient must be started immediately. In essence, the Paramedic in the EMS system uses advanced training and equipment to extend emergency physician services to the ambulance. The Paramedic must be able to make accurate independent judgements while following oral directives. The ability to perform duties in a timely manner is essential, as it could mean the difference between

life and death for the patient.

Use of the telephone or radio dispatch for coordination of prompt emergency services is required, as is a pager, depending on place of employment. Accurately discerning street names through map reading, and correctly distinguishing house numbers or business addresses are essential to task completion in the most expedient manner. Concisely and accurately describing orally to dispatcher and other concerned staff, one's impression of patient's condition, is critical as the Paramedic works in emergency conditions where there may not be time for deliberation. The Paramedic must also be able to accurately report orally and in writing, all relevant patient data. At times, reporting may require a detailed narrative on extenuating circumstances or conditions that go beyond what is required on a prescribed form. In some instances, the Paramedic must enter data on computer from a laptop in ambulance. Verbal skills and reasoning skills are used extensively.

Job Analysis Schedule

1. Establish Job Title: Emergency Medical Technician—Paramedic
2. D. O. T. Title, Industry Designation and Code 079.374.010
3. WTA Group: Occupations in medicine and health,
4. SIC Code
5. SOC Code 3690 Emergency medical technicians
6. GOE 10.03.02 (medical services)

7. Job Summary: In emergency situations, administers all facets of basic and advanced life support medical services to injured and sick persons in pre-hospital settings as directed by physician.

8. Work Performed Estimates:

Worker Functions	Data	People	Things
	3	7	4

3. Compiling
7. Serving
4. Manipulating

Work Field: 294 Health, Caring, and Medical
M.P.S.M.S. 920 (Materials, Products, Subject Matter, and Services) Medical and other health services.

9. Worker Traits Ratings:

General Education Development (GED) encompasses three broad areas which are rated independently in relation to the occupation being assessed: **Reasoning Development, Mathematical Development, and Language Development.** General Educational Development (GED) embraces those aspects of education (both formal and informal) which contribute to the worker's reasoning development, the ability to follow instructions, and to the acquisition of "tool" knowledge such as language and mathematical skills. This is education of a general nature which does not have a recognized, fairly specific occupational objective. Ordinarily, such education is obtained in elementary school, high school, or college. However, it may be obtained from experience and self study. Description of rating on the GED Scale: Level 1= lowest level; Level 6 = highest level.

Low					Hig h
1	2	3	**Math 4**	**Reasoning 5** **Language 5**	6

Bolded and underlined areas define the analyst's rating for the Paramedic. (Other numbers are shown for informational purposes only). A detailed explanation follows:

Reasoning development (R)
Level 5
Two relevant examples from text are provided for assignment to Level 5 for the Paramedic:
Example from text: Level R-5:5

> Prepares and conducts in service training for company personnel. Evaluates training needs in order to develop educational materials for improving performance standards. Performs research relating to course preparation and presentation. Compiles data for use in writing manuals, handbooks, and other training aids. Develops teaching outlines and lesson plans, determines content and duration of courses, and selects appropriate instructional procedures based on analyses of training requirements of company personnel.

Example from text: Level R 5:6

> Renders general nursing care to patients in hospital, infirmary, sanitarium, or similar institution. Administers prescribed medications and treatments in accordance with approved techniques. Prepares equipment and aids physician during treatments or examination of patients. Observes, records, and reports to supervisor or physician patient conditions, reactions to drugs, treatments, and significant incidents.

Examples of job duties of the Paramedic that align themselves with the above examples related to "Reasoning" include:

> Visually inspects and assesses or "sizes up" the scene upon arrival to determine if scene is safe, determines the mechanism of illness or injury, the

total number of patients involved, and remains calm and confident while demonstrating leadership and responsibility. Reports verbally to the responding EMS unit or communications center as to the nature and extent of injuries and the number of patients. Recognizes hazards. Conducts triage, sorting out and classifying priorities for most immediate need for treatment Uses excellent judgement to identify priorities based on the most critical needs for patient survival. Directs Basic EMT to assist.

Determines nature and extent of illness or injury in patient, takes pulse, blood pressure, and temperature, visually observes patient, recognizes the mechanisms of injury and takes comprehensive medical history of patient, including patient's current usage of prescribed and non-prescribed medications/drugs.

Accepts primary responsibility for all aspects of advanced life support given to the patient, including use of advanced life support equipment and administration of medication that includes narcotics; responsible for thorough written documentation of all activity related to patient care and medication dispensation. Uses good judgement to draw conclusions with often, limited information; verbally communicates effectively to provide quality treatment to diverse age and cultural groups. Provides family support, manages the difficult patient, conducts fundamental mental status assessment, retrains patient, and intervenes pharmacologically.

Uses advanced life support equipment and administers medication through the patient's most appropriate body route, including intravenous. Provides pre-hospital emergency care of simple and multiple system trauma such as controlling hemorrhage, bandaging wounds, manually stabilizing painful, swollen joints and injured extremities, and immobilizing spine. Uses automatic defibrillator apparatus in application of electric shock to heart, manages amputation, uses anti-shock garment, conducts peripheral venous access, intra-osseous infusion, manual defibrillation, interprets EKGs, manually stabilizes neck and body of child and adult, immobilizes extremities, straightens selected

fractures, and reduces selected dislocations. Delivers newborn. Complies with practices and policies, established protocols within organization of employment according to state regulations. Maintains confidentiality, responsible for the safe and therapeutic administration of drugs including narcotics, must be able to apply this knowledge in a practical through a thorough knowledge and understanding of the general properties of all types of drugs including analgesics, anesthetics, anti-anxiety drugs, sedatives and hypnotics, anti-convulsants, central nervous stimulants, psychotherapeutics which include antidepressants, and other anti-psychotics, anticholerginics, cholergenics, muscle relaxants anti-dysrythmics, anti-hypertensives, anticoagulants, diuretics, bronchodilators, opthalmics, pituitary drugs, gastro-intestinal drugs, hormones, antibiotics, antifungals, antiinflammatories, serums, vaccines, anti-parasitics, and others.

The Paramedic is personally responsible legally, ethically, morally for each drug administered, using correct precautions and techniques, observing and documenting the effects of the drugs administered, keeping one's own pharmacological knowledge base current as to changes and trends in administration and use, keeping abreast of all contraindications to administration of specific drugs to patients based on their constitutional make-up, and using drug reference literature.

Note: In the analyst's opinion, while many aspects of Level 4 "Reasoning" are pertinent to the Paramedic role such as "using rational systems to solve practical problems where limited standardization exists", and "cares for patients and children in private homes, hospitals, sanitariums, and similar institutions, takes and records temperature, pulse and respiration rate, sterilizes equipment and supplies using germicides, sterilizer or autoclave", this definition is somewhat limiting. There are also many abstract variables with which the Paramedic must contend on a regular basis. Strong reasoning ability is required to deal with the complexity and variety of the situations in which the Paramedic works. This includes not only the aspects of providing quality advanced emergency medical care requiring the use of logic and reason to define problems

and arrive at solutions on a practical basis, but also contributing to the Paramedic profession by using reasoning to define and analyze problems and arrive at solutions to enhance the field through teaching, and contributing to research through written media/journals. Thus, the reasoning level for the Paramedic is more like a level 5 than a level 4.

Mathematical development (M)
Level 4
Example from text: Shop math: Practical application of fractions, percentages, ratio and proportion, and measurement.

Examples of the above level (math) in relation to work performed by the Paramedic include:

Calculating correctly the amount of medication to be given in relation to patient's weight, age, and other factors that warrant adjustment of volume. Measuring and re-measuring drip rates of medications/controlled substances administered intravenously. Sending back to inventory area, any unused portions. Completing log sheets that detail the numbers and totals of services provided and amounts of medications used.

Note: The Paramedic is legally accountable and responsible for maintaining Class I Medications (narcotics) and must keep accurate count and inventory of such items.

Language development (L)
Level 5
Reading-Read literature, book and play reviews, scientific and technical journals, abstracts, financial reports and legal documents.

Examples of job duties that align themselves with the above examples in relation to the reading level assigned include that:

The Paramedic must be able to accurately read a Drug Reference Manual to determine not only the name of the drug on a label, but to recognize that a generic

name and a brand name may not always appear on a prescription label, thus the need for cross/referencing through written reference materials. The Paramedic needs to know what type of drug(s) the patient is taking, how long ago it was taken, how long the effects are expected to remain in the body based on the patient's constitutional make-up, what condition for which it was prescribed, general information, cautions and warnings, possible side effects, possible adverse side effects, drug and food interactions, the usual dosage an duration of dosage for adult and child, antidotes for overdoses, and other special information.

The Paramedic also takes a comprehensive medical history of patient, including patient's current usage of prescribed and non-prescribed medications/drugs. At times, the patient does not know when or if he/she took a certain medication. Often, many individuals are taking multiple medications simultaneously and it will be up to the Paramedic to read from the medication bottles or containers the exact names of the medications and the dosages. It is absolutely essential that the Paramedic read correctly and expediently. For example, the drug "Milontin" must not be construed as "Melatonin". Milontin, a drug used for control of petit mal seizures may be associated with severe reduction in white blood cell platelet counts and when used alone for both grand mal and petit mal seizures may increase the number of grand mal seizures and necessitate more medicine to control the seizures. It can also cause a person's urine to turn pink or brown. Although the discoloration is harmless, it could cause alarm in the patient. In addition, sudden stoppage of this medication may bring on more seizures. While it is a good idea for patients using this drug to wear identification, they may or may not be. On the other hand, Melatonin, a currently popular over the counter remedy purported to improve sleep and general well being has none of the ramifications as Miltonin. The preceding is but one example. There are numerous examples of names of medications which if not read correctly, could mean the difference in the treatment administered, and ultimately, whether or not the patient lives or dies.

The Paramedic must also be able to read and interpret EKGs. In addition, as a basic part of emergency care, the Paramedic searches for medical clues/identification on a patient. These are generally in written form on a bracelet. In addition, the Paramedic gathers demographic patient information that must be recorded during the interview. At times, if the patient has poor vision and cannot see, hear or cannot read, and there is no family member to assist, the Paramedic may be asked to gather pertinent data through reading such documents as a driver's license, a health care provider form or human services agency card. The Paramedic must be able to accurately read a street map, both for name of street and number of building/residence location.

Detailed written reports are an essential part of the Paramedic's job and the Paramedic must be able to review the narrative he/she writes to verify for accuracy. Legally, the Paramedic is accountable for what is written.

It is ideal that the Paramedic read professional journals to keep current with his/her profession. However, it is mandatory that the Paramedic keep abreast of new equipment, techniques for using the equipment and new medications on the market. Information of this nature is generally transmitted through written literature and manuals. The Paramedic, in practice, will refer to algorithms and basic care protocols (which do vary), in much the same manner that a physician uses the Physicians' Desk Reference or a licensed professional therapist uses the Diagnostic & Statistical Manual IV. The Paramedic must successfully complete continuing education programs that involve accurate reading of course materials to update skills and competencies as required by employers, medical direction, and licensing or certifying agencies.

The Paramedic is personally responsible legally, ethically, and morally for each drug administered, reading the labels, using correct precautions and techniques, observing and documenting the effects of the drugs administered, keeping one's own pharmacological knowledge base current as to changes and trends in administration and use,

keeping abreast of all contraindications to administration of specific drugs to patients based on their constitutional make-up, and using up to date drug reference literature.

Writing - Write novels, plays, editorials, journals, speeches, manuals, critiques, poetry, and songs.

Example from text: L5-4

Write service manuals and related technical publications concerned with installation, operation, and maintenance of electrical, electronic mechanical and other equipment. Interviews workers to acquire or verify technical knowledge of a subject. Rewrites articles, bulletins, manuals or similar publications.

Examples of the above (writing) in relation to work performed by the Paramedic:

Writes detailed comprehensive narrative report on patient care given. Writes professional journal articles for Emergency Medical Technician literature. Writes and prepares lesson plans, manuals and curriculum for instructional purposes.

Speaking - Conversant in the theory, principles, and methods of effective and persuasive speaking, voice and diction, phonetics, and discussion and debate.

Examples of the above (speaking) in relation to work performed by the Paramedic:

Answers verbally to telephone or radio emergency calls from dispatcher to provide advanced efficient and immediate emergency medical care to critically ill and injured persons.

Interviews patient and or significant others to gain comprehensive understanding of patient's condition for development of workable patient diagnosis. Adjusts/alters verbal communication with patient and family/significant others to reflect and ensure adequate and appropriate care and treatment with respect to the age of the patient, i.e. child,

adolescent, or geriatric, and cultural status. Provides family support through good communication and responding appropriately verbally, manages the difficult patient through use of voice and choice of words, conducts fundamental mental status assessment by asking pertinent questions, restrains patient often using persuasive verbal techniques to which patient can relate. Teaches curriculum to other EMTs, communicates with other EMS providers, physicians, hospital staff, police departments, fire departments, and relays findings verbally.

Note: With respect to Language Development, there are components of both "Level 4" and "Level 5" in the role of the Paramedic, such as Level 4's " reading novels, poems, newspapers, periodicals, journals, manuals, dictionaries, thesauruses, and encyclopedias; writing and preparing business letters, expositions, summaries and reports, using prescribed format and conforming to all rules of punctuation, grammar, diction and style; and speaking by participating in panel discussions, dramas and debates, and speaking extemporaneously on a variety of subjects". However, there are more Level 5 components as are shown above, than there are Level 4, thus it is deemed to be at Level 5.

10. FORMAL EDUCATION: High school diploma/GED with advanced training and certification

11. SPECIAL VOCATIONAL PREPARATION (SVP) (Time requirement of an additional 900-1200 classroom hours beyond the 110 hours acquired at the Basic EMT level SVP is defined as the amount of lapsed time required by a typical worker to learn the techniques, acquire the information, and develop the facility needed for average performance in a specific job worker situation. Level 6 is the approximate time ascribed for completion of preparation for a Paramedic (other numbers are listed for informational purposes only).

SVP	1	2	3	4	5	***6***	7	8	9

Explanation of scale:

Level	**Time**[1]

1	Short demonstration only
2	Anything beyond short demonstration up to and including one month
3	Over one month up to and including three months
4	Over three months up to and including six months
5	Over six months up to and including one year
6	Over one year up to and including two years
7	Over two years up to and including four years
8	Over four years up to and including ten years
9	Over ten years

NOTE: The levels of this scale are mutually exclusive and do not overlap

[1] Time that applies to General Educational Development is not considered in estimating SVP

APTITUDES

Aptitudes, a component of Worker Characteristics, are the capacities or specific abilities which an individual must have in order to learn a given work activity. There are 11 Aptitudes used for job analysis. Aptitude estimates are useful as analytic and descriptive tools and can be expressed in terms of the following levels or categories which reflect the amounts of the aptitudes possessed by the segments of the working population.

These ratings are explained by the number preceding the rating.

1. The top 10 % of the population. This segment of the population possesses an extremely high degree of the aptitude.
2. The highest third exclusive of the top 10% of the population. This segment of the population possesses an above average or high degree of the aptitude.
3. The middle third of the population. This segment of the population possesses a medium degree of the aptitude, ranging from slightly below to slightly above average.
4. The lowest third exclusive of the bottom 10 % of the population. This segment of the population possesses a below average degree of the aptitude.
5. The lowest 10% of the population. This segment of the population possesses a negligible degree of the aptitude.

Level 1 indicates a higher degree of particular aptitude

whereas Level 5 indicates a lower degree of an aptitude pertinent to a job. If an aptitude is rated as a Level 5, it means that for the job under study, the amount of aptitude required is negligible or not required at all. The ratings for aptitudes for the Paramedic are as follows and are explained below in further detail: **C1 G 2 P 2 K 2 M 2 E 2 V 3 N 3 S 3 Q 3**

1. Highest 10 % of the population has this aptitude	C= Color Discrimination
2. Highest middle third	G= General Learning Ability P= Form Perception K= Motor Coordination M= Manual Dexterity E= Eye, Hand, Foot Coordination
3. Middle middle third	V= Verbal N= Numerical S= Spatial Q= Clerical
4. Lower middle third	N/A
5. Lowest 10 % of the population has this aptitude	N/A

The following is an explanation of each of the above aptitude ratings.

G - Intelligence (General Learning Ability)

Level 2 Represents a high degree of aptitude or ability. This ranks the Paramedic in the highest third of the population, excluding the top 10 percent.

Note: Level 2 and Level 3 overlap, thus a rating judgement must be made. Level 3 represents the middle third of the population and includes aptitudes that run slightly above and slightly below average. It is the analyst's opinion that intelligence/general learning aptitude is at least average to slightly above average for the Paramedic position. While with Level 3, intelligence is required to learn and apply principles of anatomy, physiology, microbiology, nutrition, psychology, and patient care used in nursing; to make independent judgements in absence of doctor and to determine methods and treatments to use when caring for patients with injuries or illnesses, Level 2, which is higher, is more appropriate based on the following related, but not specific example:

Example from text G: 2

Compounds and dispenses medications, following prescriptions: understands the composition and effects of drugs and is able to test them for strength and purity. Checks prescriptions to determine whether dosages are reasonable and the drugs chemically and physiologically compatible. Must be able to compound ingredients to form powders, pills, ointments and solutions. Must make sterile solutions, buy medical supplies, and advise medical staff on the selection and effects of drugs.

Another related example from text is G2-5

Intelligence is required to learn the basic principles relating to biochemistry, microbiology, parasitology, blood cells, body cells, viruses, serum and vaccines and the preparation and examination of tissues.

Note: Overall, general intelligence (learning ability) must be of the level required for the Paramedic to acquire the skills and knowledge necessary in applying principles of advanced patient life support in emergency medical situations through extensive knowledge of pharmacological principles. Thus intelligence is more like a Level 2 than a Level 3.

V - Verbal Aptitude

Level 2 Fairly high degree of aptitude required.

No text illustrations in medical area.
Closely related skills appear comparable to text example, V2-3: Studies origin, relationship, development, anatomy, and other basic principles of plant and animal life, usually specializing in research centering around a particular plant, animal or aspect of biology: Verbal aptitude is required to read and comprehend information concerning biological sciences and to express orally or in writing findings from investigations in various fields such as agriculture, animal or plant life, genetics, pharmacology and microbiology.

On the job:
The most relevant applications of the above are speaking, writing, and communicating with physicians, nurses, and other EMS systems, and the findings pertinent to patients in emergency medical situations.

N - Numerical Aptitude (Perform arithmetic operations quickly and accurately)

Level 3 Average degree of aptitude required. No illustrations in medical area.

Somewhat related is text Example N2-3 whereby numerical aptitude is required to compute size of individual portions needed to obtain required nutritional values for regular or special diets, and to calculate total quantity of foodstuffs needed for specific period based on number to be fed, menus for period and individual quantities needed. Numerical aptitude is also required to break down total into number of units by standard sizes to prepare requisitions for vendors, and to maintain and analyze food cost records.

On the job:
Calculates in expedient manner, the amount of supplies/medications needed immediately, especially when occasions of multiple injuries occur. Calculates the amount of medication to be given in relation to patient's weight, age, and other factors that warrant adjustment of volume using oral, auto-injection, sublingual, inhalation, subcutaneous, intramuscular, intraosseous, transcutaneous, rectal, endotracheal, and central intravenous routes, as well as infusion pumps to administer medications. Administers in practical sense, the amount calculated. Tracks and logs all medications/narcotics administered.

S - Spatial Aptitude (Comprehend forms in space and understand relationships to plane and solid objects)

Level 3
Example from text: Level S - 3:1
Spatial aptitude is required to visualize anatomic positions and the relationship between the

point of application of forces and the area affected (as in traction); and to place treatment devices or administer manual treatment in relationship to the affected body part.

On the job :
Mobilizes spine, sets select fractures and dislocations. Sets up and administers intravenous medications and narcotics. Applies manual and advanced life support techniques to resuscitate patient. Carefully transports patient as to avoid further injury.

P - Form Perception (Ability to make visual comparisons and discriminations and see slight differences in shapes and shadings of figures and widths and lengths of lines)

Level 2 High degree of aptitude required

Example from text:

P - 2:6 Form perception is required to perceive pertinent details of size, shape, and form in skeletal structure, organs, tissue, and specimens of various animals.

On the job:
Conducts patient assessment through visually observing any changes in size of pupils, swelling, shrinking, or dislocations/protrusions of all body parts. Checks for most appropriate vein to administer medication.

Q - Clerical Perception (Ability to perceive pertinent detail in verbal or tabular material-proof read)

Level 3
Example from text: Q - 3:13
Assists in care of hospital patients under direction of nursing and medical staff. Clerical perception is required to read and report such data as temperatures, pulse rate and respiration rate, to report patient's food and fluid intake and output, and to read charts and instructions accurately. Generally completes documentation of relevant data on pre-printed form. Must be able to read form accurately and report patient information in appropriate allocated space. Occasionally, may be required to submit short narrative report.

On the job:
Takes and records vital signs, reads EKGs and compiles log of work performed.

K - Motor Coordination (Ability to make a movement response quickly and accurately and coordinate eye-hand)

Level 2 High degree of aptitude required

Example from text: K - 2:5
Renders general nursing care to patients in hospital, infirmary, sanitarium, or similar institution.

On the job:
Coordinates vision, finger and hand movements in taking vital signs, freeing airway including surgery, performing CPR, administering medication/narcotics through grasping of and inserting needle into skin, delivering newborn, setting up equipment, turning equipment off and on, balancing self when lifting /moving or stabilizing patients, and other.

F - Finger Dexterity (Ability to move fingers and manipulate small objects rapidly and quickly)

Level 2 High degree of aptitude required

No illustrations in medical field.

On the job:
Recommended due to necessity of positioning needle for injection, opening and maintaining airway, ventilating patient, controlling hemorrhage, bandaging wounds, administer medications, manually stabilizing painful swollen and deformed extremities, and performing other basic and advanced life support functions.

M - Manual Dexterity (Ability to move the hands easily and skillfully)

Level 2 High degree of aptitude required

On the job:
No illustrations given. Recommended due to nature of work which involves moving the hands skillfully and quickly to perform essential functions of advanced/ skilled emergency patient care.

E - Eye-Hand-Foot Coordination (Ability to coordinate these)

Level 2 High degree of aptitude required

No text illustrations given.

On the job:
Recommended as job may require balancing on ladders, stairs, or walking on uneven terrain while assisting in carrying patients. In the interest of time and safety, may be required to move quickly.

C - Color Discrimination (Ability to perceive difference in colors, shades, or harmonious combinations, or to match colors)

Level 1 Highest degree of aptitude and ability required.

Example from text: C-1:4 Uses color discrimination and color memory in making diagnosis of patients' affliction or condition, by recognizing any deviations in color of diseased tissue from healthy tissue; evaluating color characteristics such as hue and saturation of affected body parts; and making determination as to extent or origin of condition.

Temperament

D	R	I	V	E	A	S	T	U	P	J	M

Explanation of terms:
Terms bolded and underlined above are those deemed most pertinent to temperament of the Paramedic when performing the job a Paramedic is expected to perform. Temperaments are the adaptability requirements made on the worker by specific types of jobs. Below is a list of various temperament factor definitions. The shaded areas are those deemed applicable to the role of the

Paramedic.

D	**Directing**, controlling, or planning the activities of others
R	Performing **repetitive** or short cycle work
I	**Influencing** people in their opinions, attitudes or judgments
V	Performing a **variety** of duties
E	Expressing personal feelings
A	Working **alone** or in part in physical isolation from others
S	Performing effectively under **stress**
T	Attaining precise set limits, **tolerances**, and standards
U	Working **under** specific instructions
P	Dealing with **people**
J	Adaptability to making **judgments** and decisions based on sensory or judgmental criteria
M	Adaptability to making judgements based on measurable or verifiable criteria

Interests

Interests	1a	1b	2a	**2b**	3a	3b	**4a**	4b	5a	5b

The Paramedic is seen as having interests that relate to:
4a - A preference for working for the presumed good of the people.
2b - A preference for activities of a scientific and technical nature

Physical Demands

Physical Demands	S	L	M	H	**V**	**2**	**3**	**4**	**5**	**6**

The Paramedic's job involves very heavy lifting (50 pounds frequently, no maximum) and involves climbing, balancing, stooping, kneeling, crouching, crawling, reaching, handling, fingering, feeling, talking, hearing, and seeing on a frequent basis. Shaded, underlined, bolded areas above are applicable to the job of the Paramedic.

Explanation of terms:

1. Strengths
   S = Sedentary (10 pounds maximum)
   L = Light work (10 pounds frequently, 20 pounds maximum)
   M = Medium work (25 pounds frequently, 50 pounds maximum)
   H = Heavy work (50 pounds frequently, 100 pounds maximum)
   V = Very heavy work (50 pounds frequently, no maximum)

2. Climbing and/or balancing
3. Stooping, kneeling, crouching and crawling
4. Reaching, handling, fingering and/or feeling
5. Talking and hearing
6. Seeing

Environmental Conditions

Working Conditions	Location
1. Exposure to weather (outside atmospheric conditions)	Indoors, Outdoors, Both
2. Extreme cold with or without temperature changes (Exposure to non-weather related cold temperatures)	Indoors, Outdoors, Both
3. Extreme heat with or without temperature changes (Exposure to non-weather related hot temperatures)	Indoors, Outdoors, Both
4. Wet and humid (Contact with water or other liquids or exposure to non-weather related humid conditions)	Indoors, Outdoors, Both
5. Noise intensity levels (Can range from very quiet, quiet, moderate, loud to very loud)	Indoors, Outdoors, Both
6. Vibration (Exposure to a shaking object or surface)	Indoors, Outdoors, Both
7. Atmospheric conditions (Exposure to conditions such as fumes, noxious odors, dusts, mists, gases, and poor ventilation that affect the respiratory system, eyes or the skin)	Indoors, Outdoors, Both
8. Proximity to moving mechanical parts (Exposure to possible bodily injury from moving mechanical parts of equipment, tools, or machinery)	Indoors, Outdoors, Both
9. Exposure to electrical shock (Exposure to possible bodily injury from electrical shock)	Indoors, Outdoors, Both
10. Working in high exposed places (Exposure to possible bodily injury	Indoors,

. from falling)	Outdoors, Both
1 Other environmental conditions: mines, 1 slopes, fumes, smoke, dust, high crime . neighborhoods, darkness, law violators	Indoors, Outdoors, Both

Note: In the analyst's opinion, the general environmental conditions in which the Paramedic works cannot be adequately assessed in an indoor evaluative environment. The Paramedic in an actual work situation can be exposed to any working condition listed above. Because of the variance in climate, environmental conditions and locations in the United States and the infinite possibilities in which a Paramedic is expected to provide advanced life support, working conditions, at best, may be less than optimal. The Paramedic must be able to focus on providing the best care possible in often adverse and dangerous situations. This can include servicing neighborhoods known to have high crime rates and performing optimally in situations where multiple incidents and trauma exist, i.e. a major highway accident that involves numerous persons and vehicles. The Paramedic may be required frequently to walk, climb, crawl, bend, pull, push, or lift and balance over less than ideal terrain, such as an icy highway, muddy ground, dilapidated stairs/flooring and any other scenario or combination of scenarios. There may be exposure to a variety of noise levels, which at times can be quite high, particularly when multiple sirens are sounding, and crowds/bystanders/families are upset and may be screaming, crying hysterically, and making demands that may or may not be reasonable.

U. S. Department of Labor
Manpower Administration

Analyst: Cathy Cain, Ph. D. **Date: 2/16/98**

Physical Demands and Environmental Conditions

ESTAB. JOB TITLE Paramedic **ESTAB. & SCHED. NO.**
DOT TITLE & CODE 079.010
GOE CODE & TITLE 100302 Medical services; SOC 3690

Code: F = Frequently
O = Occasionally
NP = Not Present
C = Constantly

Job Summary: In emergency medical situations, takes leadership role and assumes responsibility for applying specific knowledge and skills related to basic and advanced life support to patients; provides advanced life support to patients under supervision of physician and directs lower level EMTs to assist based on their levels of competency within their scope of practice.

	Physical Demands				Comments
1	**Strength**				
a.	Standing	47 %	1 a		Walking and standing are major components of this job. Sitting is necessary for transportation to and from scene of emergency.
	Walking	50 %			
	Sitting	3%			
b.	Lifting		F	1 b	The Paramedic is required to assist in lifting and carrying injured or sick persons to ambulance and from ambulance into hospital. May be required to engage in pushing
	Carrying		F		
	Pushing		O		

	Pulling	O		and/or pulling to assist other EMS providers to extricate patient from scenes to include but not limited to closed upright vehicles, patient in closed overturned vehicle, patient pinned beneath vehicle, pinned inside vehicle, in vehicles with electrical hazards.
2	**Climbing**	F	2	Climbing and balancing may be required to gain access to site of emergency, i.e., stairs, hillsides, ladders, and in safely assisting in transporting patient.
	Balancing	F		
3	**Stooping**	F	3	Patients are often found injured or sick in locations where assessment of patient is possible only through the Paramedic's stooping, kneeling, crouching, or crawling.
	Kneeling	F		
	Crouching	F		
	Crawling	F		
4	Reaching	F	4	Required for assessing pulse, assessing breathing, blocking nose and checking ventilation, lifting chin, head, or jaw for opening airway, following angle of ribs to determine correct position for hands after each ventilation, compressing sternum, and assisting in lifting of patient, administering medications through intravenous therapy or other means, and handling of advanced life support equipment, such as mirror airway devices. Extension of arms to use hands and fingers to assess vital signs, feeling and touching of patient's skin to assess body warmth, handling limited equipment, and transporting of patient are important aspects of this position. Finger dexterity needed to insert needle, and prepare fluids/medication for administration and to operate equipment.
	Hadeling	F		
	Fingering	F		
	Feeling	F		

Talking		5	Responding to patients, physicians, and co-workers through hearing is necessary in transmitting patient information and following directions. May be required to shout for help and additional assistance.
Ordinary	F		
Other	O		
Hearing		5	Verbally responding to dispatcher's message on phone or radio is necessary for quick, efficient service that can be vital to life in emergency situations. Communication on scene is critical for interviewing patient and in some instances, significant others, and in relaying this information in most expedient manner. Sounds of vehicles may alert Paramedic that additional help is on the way. Other sounds can alert the Paramedic that other persons may be hurt or injured, i.e., someone thrown behind a bush in a vehicle accident who cannot be seen and whose voice may be barely audible.
Ordinary conversation	F		
Other	F		
Seeing		6	Sight is used to drive ambulance to scene of injury or illness, to visually inspect patient and area, to read map, to read small print on medication/prescription containers, to read drug reference manuals, and to administer treatment.
Acuity, Near	F		
Acuity, Far	F		
Depth Perception	F		
Accommodation	F		
Color Vision	F		
Field of Vision	F		

7. General Education: High school graduation or equivalency is required.

8. **Vocational Preparation:**

a. College: None

2. Vocational Education Courses: An additional 900-1200 hours of education beyond the 110 required for the Basic EMT.

c. Apprenticeship: None

d. In-plant Training: None

5. On-the-Job-Training: During course of training, the Paramedic in training status will spend varying amounts of time in supervised clinical work in hospital and field settings.

6. Performance on Other Jobs: None required; however, training in the military as a medic is seen as beneficial.

9. Experience: None

10. Orientation:

11. Licenses, Etc.: Certification as Emergency Medical Technician: Paramedic, ACLS and CPR. Must maintain annual certification through continuing education.

12. Relation to Other Jobs and Workers:

Promotion: In some locations, Paramedics may become instructors, dispatchers or administrators.

Transfers: None

Supervision Received: Physician

Supervision Given: Some to lower level Basic EMTs.

13. Machines, Tools, Equipment, and Work Aids: Ambulance, radio/telephone/pager, blood pressure cuff, thermometer, extrication devices, esophageal airway obturator, ventilation mask, spinal boards, intravenous therapy equipment: needles and fluids, anti-shock garments, wheelchairs, and stretchers, EKG machines, defibrillator, visual airway intubation and other complex equipment, and sometimes, a computer for documentation.

14. Materials and Products: Broad range of medications including narcotics, disposable latex gloves, bandages, universal dressings such as gauze pads, tape, blankets, pillows and sheets, oxygen, drugs, and intravenous fluids.

Description of tasks
(encompasses the range of all tasks performed by lower level EMTs)

1. Answers verbally to telephone or radio emergency calls from dispatcher to provide advanced efficient and immediate emergency medical care to critically ill and injured persons using a full range of equipment.

2. Drives ambulance to scene of emergency, reads map, responds safely and quickly to the address or location as directed by radio dispatcher. observes traffic ordinances and regulations. Visually inspects and assesses or "sizes up" the scene upon arrival to determine if scene is safe, determines the mechanism of illness or injury, the total number of patients involved, and remains calm and confident while demonstrating leadership and responsibility.

3. Radios dispatcher for additional help or special rescue and /or utility services. Reports verbally to the responding EMS unit or communications center as to the nature and extent of injuries and the number of patients. Recognizes hazards. Conducts triage, sorting out and classifying priorities for most immediate need for treatment. Uses excellent judgement to identify priorities based on the most critical needs for patient survival.

4. searches for medical identification as clue in providing emergency care, i.e. identification bracelet for patient who is diabetic. Reassures patient and bystanders while working in a confident and efficient manner, avoids misunderstandings and undue haste while working expeditiously to accomplish the task. Extricates patient from entrapment, works with other EMS providers in rendering emergency care and protection to the entrapped patient. Performs emergency moves, assists other EMS providers in the use of prescribed techniques and appliances for safe removal of the patient.

5. Determines nature and extent of illness or injury in patient, takes pulse, blood pressure, and temperature, visually observes patient, recognizes the mechanisms of injury, takes comprehensive medical history of patient, including patient's current usage of prescribed and non-prescribed medications/drugs. Communicates with and provides verbal direction to Basic EMT to assist with tasks within the Basic's scope of practice. Obtains consent and

refusal. Uses good judgement to draw conclusions with often, limited information; verbally communicates effectively to provide quality treatment to diverse age and cultural groups. Provides family support, manages the difficult patient, conducts fundamental mental status assessment, restrains patient, and intervenes pharmacologically.

6. Positions unresponsive patient, protects the seizing patient, identifies and treats the hypoglycemic patient, provides heating/cooling interventions, manages burns and exposures, overdoses, conducts ingestion management. Manually stabilizes neck and body of child and adult, immobilizes extremities, straightens selected fractures and reduces selected dislocations. Delivers newborn. Provides pre-hospital emergency care of simple and multiple system trauma such as controlling hemorrhage, bandaging wounds, manually stabilizing painful, swollen joints and injured extremities, and immobilizing spine.

7. Uses basic and advanced life support equipment to open airway and upper airway adjuncts, removes foreign bodies, uses upper airway suction devices, performs orotracheal intubation, nasotracheal intubation, oral intubation with pharmacological assistance and surgery on airway. Uses dual or single lumen airway devices. Provides mouth to mouth barrier device ventilation, oxygen administration, chest injury management, bag-valve mask resuscitation. Uses powered ventilation devices, hand held aerosol nebulizer. Performs cardio-pulmonary resuscitation, uses automatic defibrillator apparatus in application of electric shock to heart, manages amputation, uses anti-shock garment, conducts peripheral venous access, intraosseous infusion, manual defibrillation, interprets EKGs, uses external pacemaker.

8. Administers medication (narcotics), determines the patient's most appropriate body route based on patient diagnosis. Calculates amount of medication to be given in relation to patient's weight, age, and other factors that warrant adjustment of volume. Uses oral, auto-injection, sublingual, inhalation, subcutaneous, intramuscular, intraosseous, transcutaneous, rectal, endotracheal, and intravenous routes including central and peripheral lines and venesection as well as infusion pumps to administer medications.

9. Assists other EMS providers in lifting patient onto stretcher, places patient in ambulance, secures stretcher. Continues to monitor patient en route to hospital.

10. Checks, maintains vehicles, and provides mechanical report. Restocks and replaces used supplies, uses appropriate disinfecting procedures to clean equipment, checks all equipment to insure adequate working condition for next response. Takes inventory of and accounts for all medications (narcotics) given. Keeps log of all transactions. Prepares accurate and legible medical reports. Provides medical reports to staff.

11. Transports non-emergency patients to regularly scheduled appointments, for example, transport geriatric patients in nursing homes. Uses computer to enter data for EMS reports.

12. Supervises the activities and educational experiences of assigned observers and students. Complies with regulations in handling the deceased.

13. Functions as the primary direct care provider of emergency health care services to sick and injured patients in pre-hospital settings. Works primarily in advanced life support units affiliated with fire departments, police departments, rescue squads, hospitals, or private ambulance services under the off-site supervision of a physician, usually through radio communication, is usually the senior level member of a two person team, working in conjunction with a Basic EMT.

14. Accepts primary responsibility for all aspects of advanced life support given to the patient, including use of advanced life support equipment and administration of medication that includes narcotics; responsible for thorough written documentation of all activity related to patient care and medication dispensation. Successfully completes continuing education and refresher courses as required by employers, medical direction, and licensing or certifying agencies. Meets qualifications within the functional job analysis.

Qualifications

Must be at least 18 years of age and be a high school graduate or equivalent. Must have proof of valid driver's license. Ability to communicate verbally; via telephone and radio equipment; ability to lift, carry, and balance up to 125 pounds (250 with assistance); ability to interpret and respond to written, oral, and diagnostic form instructions; ability to use good judgment and remain calm in high-stress situations and take on role of "leader".

Must have the ability to read road maps; drive vehicle, accurately discern street signs and address numbers, read medication/prescription labels and directions for usage in quick, accurate, and expedient manner, ability to communicate verbally with patients and significant others in diverse cultural and age groups to interview patient, family members, and bystanders, and ability to discern deviations/changes in eye/skin coloration due to patient's condition and to the treatment given. Must be able to document, in writing, all relevant information in prescribed format in light of legal ramifications of such; ability to converse with dispatcher and EMS providers via phone or radio as to status of patient.

Good manual dexterity with ability to perform all tasks related to advanced emergency patient care and documentation. Ability to bend, stoop, balance, and crawl on uneven terrain; and the ability to withstand varied environmental conditions such as extreme heat, cold, and moisture. Ability to perform quickly, precise, practical mathematical calculations pertinent to ratio and proportion of medication and supplies used in emergency patient care. Must be independent, confident, able to work independently without defined structure, have good stable reasoning ability with ability to draw valid conclusions expediently relevant to patient's condition, often, using limited information. Must have knowledge and skills relevant to position and be able to implement them in stressful situations. Must be cognizant of all legal, ethical, and moral obligations inherent within scope of practice.

Must be able to perform mathematical calculations/ratios and apply them in expedient, practical manner. Must be independent, confident, able to work independently without structure, have good stable reasoning ability and able to draw valid conclusions quickly relevant to patient's condition, often, using limited information. Must have knowledge and skills relevant to position and be able to implement them in practical fashion in stressful situations. Must be cognizant of

all legal, ethical, and moral obligations inherent within scope of practice.

Must have successful completion of approved curriculum with achievement of passing scores on written and practical certification examinations as defined by programmatic guidelines. Re-certification is dependent upon an individual's successful completion of inter-agency approved Paramedic continuing education fresher courses. At any given time, performs any or all tasks performed by a lower level EMT. May supervise activities of students or interns, and/or may engage in writing of journal articles or teach. Meets qualifications within the functional job analysis.

EMT-PARAMEDIC: NATIONAL STANDARD CURRICULUM

FIELD AND PILOT TEST DIDACTIC AND PRACTICAL LABORATORY
HOURS REPORT

	Didactic					Practical Laboratory				
	Min. (hours)	Max. (hours)	Ave. (hours)	Stand. Dev.	Median	Min (hours)	Max (hours)	Ave. (hours)	Stand. Dev.	Median
Preparatory										
Well Being Paramedic	1.00	11.00	3.97	3.73	2.00	1.00	1.00	1.00	N/A	1.00
Roles & Responsibilities	1.00	5.50	2.81	1.56	2.00	1.00	1.00	1.00	N/A	1.00
Illness/Injury Prevention	0.00	4.00	2.14	1.36	2.00	1.00	1.00	1.00	N/A	1.00
Medical/Legal	2.00	5.00	3.22	0.97	3.00	1.00	2.00	1.50	0.71	1.50
Ethics	0.00	3.50	1.44	0.98	1.00	1.00	1.00	1.00	0.00	1.00
Pathophysiology	8.00	35.00	18.06	8.72	20.00	2.00	8.50	6.17	3.62	8.00
Pharmacology	8.00	45.00	26.33	13.08	22.50	4.00	18.75	10.25	7.63	8.00
Medication Administration	2.00	24.00	9.63	6.80	8.50	2.00	20.00	9.86	6.54	9.00
Thera. Communication	1.00	4.50	2.28	1.20	2.00	1.00	2.00	1.50	0.71	1.50
Life Span Development	2.00	10.00	3.75	2.50	3.00	1.00	1.00	1.00	N/A	1.00
Module Totals	*38.00*	*101.00*	*72.56*	*19.84*	*73.00*	*0.00*	*36.25*	*14.47*	*10.95*	*12.00*
Airway Management & Ventilation										
Airway and Ventilation	5.00	16.00	10.58	4.16	12.00	8.00	20.00	11.88	4.16	10.50
Module Totals	*5.00*	*16.00*	*10.58*	*4.16*	*12.00*	*0.00*	*20.00*	*10.56*	*5.55*	*10.00*
Patient Assessment										
History Taking	1.50	4.00	2.47	0.83	2.00	1.00	4.00	2.75	1.50	3.00
Technique of PE	1.00	31.50	8.72	10.41	4.00	2.00	22.00	8.29	7.78	4.00
Patient Assessment	4.00	15.50	6.92	3.68	6.00	4.00	12.00	6.25	2.92	5.00
Clinical Decision Making	0.00	4.00	1.88	1.25	2.00	2.00	6.00	3.33	2.31	2.00
Communications	1.00	4.00	1.94	1.01	2.00	1.00	5.00	3.00	1.83	3.00
Documentation	1.00	4.00	1.94	1.01	2.00	1.00	5.00	2.60	1.82	2.00
Module Totals	*12.00*	*42.00*	*23.67*	*9.11*	*25.00*	*6.00*	*26.00*	*17.11*	*7.15*	*20.00*
Trauma										
Trauma System/ MOI	1.00	4.00	2.75	1.39	3.00	1.00	4.00	2.75	1.50	3.00
Hemorrhage and Shock	4.00	14.00	6.78	4.04	5.00	4.00	30.25	11.85	10.75	8.00
Soft Tissue Trauma	1.00	5.00	3.06	1.43	3.50	1.00	3.00	2.20	0.84	2.00
Burns	1.00	4.00	3.06	1.15	3.50	2.00	16.00	6.25	6.55	3.50
Head and Face Trauma	2.00	7.00	4.31	1.79	4.00	1.00	4.00	3.20	1.30	4.00
Spinal Trauma	2.00	6.00	3.31	1.39	3.25	1.00	5.00	3.33	1.51	4.00
Thoracic Trauma	2.00	6.00	3.69	1.16	3.75	2.00	7.25	3.85	2.15	4.00
Abdominal Trauma	1.50	4.00	2.69	1.10	2.00	1.00	4.00	2.50	1.38	2.50
Musculoskeletal Trauma	2.00	8.50	4.13	1.90	4.00	1.00	7.25	3.71	2.05	3.50
Module Totals	*0.00*	*44.00*	*30.03*	*14.02*	*36.00*	*0.00*	*73.75*	*22.08*	*23.66*	*16.00*

	Didactic					Practical Laboratory				
	Min. (hours)	Max. (hours)	Ave. (hours)	Stand. Dev.	Median	Min (hours)	Max (hours)	Ave. (hours)	Stand. Dev.	Median
Medical										
Pulmonology	4.00	20.00	11.25	5.73	10.00	1.00	12.00	6.00	4.04	4.00
Cardiology	24.00	126.75	51.31	32.63	38.00	8.00	108.00	34.89	32.10	26.00
Neurology	4.00	22.50	10.50	5.52	8.00	1.00	5.00	2.67	2.08	2.00
Endocrinology	2.00	6.00	4.47	1.38	4.00	1.00	3.00	2.00	1.00	2.00
Allergies & Anaphylaxis	1.00	4.00	3.16	1.09	3.50	0.50	2.00	1.17	0.76	1.00
Gastroeneterology	2.00	12.00	5.69	3.25	4.00	1.00	2.00	1.50	0.71	1.50
Urology	1.00	4.00	2.72	1.03	2.88	1.00	2.00	1.50	0.71	1.50
Toxicology	3.00	18.50	7.03	5.05	5.75	1.00	3.00	2.00	1.41	2.00
Environmental Conditions	2.00	9.00	5.14	2.00	5.00	0.50	3.00	1.50	1.32	1.00
Infectious & Comm	1.00	10.50	5.67	2.82	5.00	1.00	3.00	2.00	1.41	2.00
Behavioral/Psychiatric	3.00	9.75	5.03	2.64	4.00	0.50	8.75	3.42	4.63	1.00
Hematology	1.00	4.00	3.16	1.13	3.63	1.00	2.00	1.50	0.71	1.50
Gynecology	4.00	16.00	7.69	4.74	6.00	1.00	16.75	8.88	11.14	8.88
Obstetrics	4.00	12.00	7.00	3.55	6.00	1.00	10.00	5.00	4.58	4.00
Module Totals	*74.00*	*237.75*	*125.42*	*48.59*	*122.00*	*9.50*	*138.50*	*48.67*	*46.00*	*30.00*
Special Considerations										
Neonatology	2.00	8.00	5.63	2.00	6.00	1.00	9.00	4.60	3.65	3.00
Pediatrics	4.00	32.00	16.38	10.34	16.00	2.00	29.00	11.00	10.77	8.00
Geriatrics	4.00	12.00	6.66	2.78	6.63	1.00	6.00	3.00	2.16	2.50
Abuse & Assault	1.00	4.00	2.75	1.39	3.00	1.00	2.00	1.50	0.71	1.50
Pts with Sp. Challenges	2.00	6.00	3.59	1.30	3.88	1.00	2.00	1.50	0.71	1.50
Acute Int in CCP	3.00	4.00	3.69	0.46	4.00	2.00	2.00	2.00	0.00	2.00
Module Total	*0.00*	*54.00*	*34.39*	*17.33*	*40.00*	*0.00*	*40.00*	*11.11*	*13.19*	*8.00*
Assessment Based Management										
Assess Based Mgmt	2.00	8.00	4.40	2.19	4.00	2.00	28.00	10.00	12.11	5.00
Module Totals	*0.00*	*8.00*	*2.44*	*2.79*	*2.00*	*0.00*	*28.00*	*4.44*	*9.10*	*0.00*
Operations										
Medical Incident Cmnd.	2.00	6.00	3.50	1.41	4.00	2.00	9.00	4.67	3.79	3.00
Rescue A & O	2.00	36.25	9.66	11.50	4.00	2.00	45.00	26.33	22.05	32.00
Haz Mat Incidents	2.00	16.00	6.50	5.10	4.00	2.00	12.00	6.00	5.29	4.00
Crime Scene Awareness	1.00	5.00	3.39	1.38	4.00	2.00	2.00	2.00	0.00	2.00
Module Totals	*0.00*	*58.00*	*20.11*	*18.07*	*16.00*	*0.00*	*60.00*	*12.78*	*23.46*	*0.00*
Miscellaneous Classroom Time										
Exams & Reviews	16.00	59.00	32.86	15.32	32.00	8.00	91.50	34.88	38.31	20.00
Final Testing	4.00	40.00	14.64	12.63	8.00	4.00	52.00	17.00	23.41	6.00
BLS Labs	8.00	78.00	42.00	35.04	40.00	15.00	101.00	51.50	37.93	45.00
Misc Total	*0.00*	*159.50*	*50.94*	*50.07*	*32.00*	*0.00*	*244.50*	*45.94*	*80.29*	*12.00*

EMT-PARAMEDIC: NATIONAL STANDARD CURRICULUM

FIELD AND PILOT TEST CLINICAL
HOURS REPORT

	Min. (hours)	Max. (hours)	Average (hours)	Standard Deviation	Median
Clinical Rotations					
Anesthesia	6.00	52.00	17.75	15.02	14.00
Critical Care	8.00	80.00	32.00	22.63	24.00
Emergency Department	80.00	256.00	137.25	57.58	116.00
Triage	8.00	12.00	9.60	2.19	8.00
IV Team	8.00	12.00	9.00	2.00	8.00
Morgue	4.00	6.00	4.67	1.15	4.00
Operating Room Observation	6.00	16.00	9.00	4.76	7.00
Pediatric ED	16.00	48.00	29.33	16.65	24.00
Pediatric OR	4.00	4.00	4.00	N/A	4.00
Pediatric PAR	4.00	8.00	6.00	2.83	6.00
Psychiatrics	6.00	8.00	7.60	0.89	8.00
Labor & Delivery	8.00	39.00	15.88	10.80	12.00
Elective/Miscellaneous	16.00	56.00	30.40	17.34	24.00
Field Internship	108.00	1160.00	347.88	345.39	260.00
Field Summative Evaluation	8.00	240.00	118.40	85.30	120.00
Clinical Total	*0.00*	*1731.00*	*602.89*	*474.06*	*516.00*

The following list of objectives have been derived from many of the currently available resources in anatomy and physiology instruction that are typically part of allied health educational programs or other non-science curricula. The objectives that are listed below are in common with most of these programs. Paramedic education program should select courses or textbooks which cover this level of material.

OBJECTIVES:

Define anatomy, physiology, and pathophysiology
Name the levels of organization of the body and explain each
Name the organ systems of the body
Define homeostasis and give an example of a typical homeostatic mechanism
Describe the anatomical position
Describe the sagittal, midsagittal, transverse and frontal planes
Use proper terminology to describe the location of body parts with respect to one another
Name the body cavities, their membranes and some organs within each cavity
Explain the four quadrants of the abdomen and name the organs in those areas
Define matter, element, atom, proton, neutron, and electron
Using symbols, name some common elements found in the body
Describe the purpose of ionic, covalent and hydrogen bonds in the body
Describe what happens in synthesis and decomposition reactions
Explain the importance of water to the function of the body
Describe where water is found in the body
Explain the roles of oxygen and carbon dioxide in cell respiration
Explain pH and state normal pH ranges in body fluids
Explain how a buffer system resists major pH changes
Describe the functions and types of sugars, fats, and proteins
Explain how enzymes function as catalysts
Describe the function of DNA, RNA and ATP
Name the organic molecules that make up the cell membrane and state their functions
State the arrangement of the molecules in the cell membrane
State the five functions of proteins in the cell membrane
Describe the cytoplasm
Describe how the cell membrane regulates the composition of the cytoplasm
Explain isotonic, hypotonic, and hypertonic solutions and their effects on the cell
State the function of the nucleus and chromosomes
Describe the function of the cell organelles
Define each of these cellular transport mechanisms and give an example of the role of each in the body: diffusion, osmosis, facilitated diffusion, active transport, filtration, phagocytosis and pinocytosis
Describe what happens in mitosis and meiosis and describe the importance of each
Describe the four major categories of tissues and give general characteristics of each
Describe the function of epithelial tissue depending on their location
Describe the functions of connective tissue and relate them to the function of the body or an organ system
Explain the basic differences between smooth, skeletal and cardiac muscle
Describe in brief nervous tissue
Name the organs made of nerve tissue
Describe the location of pleural membranes, pericardial membranes, and the perineum-mesentery
State the location of mucous membranes and state the function of mucus
Name some membranes made of connective tissue
State the three functions of the integumentary system
Name the two layers of skin
State the location and function of the stratum corneum and the stratum germinativum
Describe the function of melanocytes and melanin
Describe the function of hair and nails
Describe the functions of the secretions of sebaceous glands, ceruminous glands and eccrine sweat glands
Describe how the arterioles in the dermis respond to heat, cold, and stress
Name the tissues that make up the subcutaneous tissue and describe their functions
Describe the function of the skeleton
Explain how bones are classified and give an example of each
Describe how the embryonic skeleton is replaced by bone

State the nutrients necessary for bone growth
Name the hormones involved in bone growth and maintenance
Explain what is meant by exercise for bones and explain its importance
Identify the two major subdivisions of the skeleton and list the bones in each area
Explain how joints are classified; give an example of each and describe the movements possible
Describe the parts of a synovial joint and explain their function
Describe muscle structure in terms of muscle cells, tendons and bones
Describe the difference between antagonistic and synergistic muscles
Name the energy sources for muscle contraction and state the simple equation for cell respiration
Explain the importance of hemoglobin and myoglobin and oxygen debt and lactic acid
Describe the neuromuscular junction and explain the function for each part
Describe the structure of a sarcomere
Explain polarization, depolarization and repolarization in terms of ions and charges
Describe the sliding filament theory of muscle contraction
State the major muscles of the body and their functions
Name the divisions of the nervous system and state the general functions of each
Name the parts of a neuron and the function of each
Explain the importance of Schwann cells in the peripheral nervous system and neuroglia in the central nervous system
Describe the electrical nerve impulse and impulse transmission at the synapse
Describe the types of neurons, nerves and nerve tracts
Explain the importance of stretch reflexes and flexor reflexes
Describe the reflex arc
State the functions of the parts of the brain and locate each part on a diagram
Name the meninges and describe their locations
State the locations and functions of cerebrospinal fluid
Explain the general purpose of sensations
Name the parts of the sensory pathway and the general functions of each part
Describe the characteristics of sensations
Name the cutaneous senses and explain their purpose
Explain referred pain and explain its importance
Explain the importance of proprioception, or muscle sense
Describe the pathways for the senses of smell and taste and explain how these senses are interrelated
Name the parts of the eye and explain their function in sight
Name the parts of the ear and explain their function in hearing
Describe the physiology of equilibrium
Distinguish between endocrine and exocrine glands
Define hormone and prostaglandin
Identify the primary endocrine glands and list the major hormones secreted by each
Explain the roles of positive and negative feedback mechanisms in hormone secretions
Describe the relationship between parathyroid hormone and calcitonin
Describe the relationship between insulin and glucagon
Explain what prostaglandins are made of and state some of their functions
Explain how protein hormones are believed to exert their effects
Explain how steroid hormones are believed to exert their effects
Describe the primary functions of blood
List the formed elements of blood and state the primary functions of each
Name the hemopoietic tissues and the kinds of blood cells each produces
Describe what happens to red blood cells at the end of their life span including the fate of hemoglobin
Explain the ABO and Rh blood types
Name the five kinds of white blood cells and the functions of each
State what platelets are and explain how they are involved in hemostasis
Describe the three stages of blood clotting
Explain how abnormal clotting is prevented in the vascular system
Describe the location of the heart in terms of body cavities and relationship to other structures
Name the chambers of the heart and the vessels that enter or leave each
State the valves of the heart and their function
State how heart sounds are created
Trace the pathway of a blood cell throughout the body

Describe coronary circulation
Describe the cardiac conduction pathway and its relationship to a normal electrocardiogram
Explain stroke volume, cardiac output and Starling's law of the heart
Explain how the nervous system regulates the function of the heart
Describe the structure and function of each of the blood vessels: arteries, veins and capillaries
Describe the exchange of gases that occur at the capillary level
Name the major systemic arteries and the parts of the body they nourish
Name the major systemic veins and the parts of the body they drain of blood
Define blood pressure and state the normal ranges for the systolic and diastolic indices
Describe the functions of the lymphatic system
State how lymph is formed
Describe the system of lymph vessels and explain how lymph is returned to the blood
State the location and function of lymph nodules and nodes
State the location and function of the spleen
Define immunity
Explain the role of the thymus in immunity
Explain the differences between humoral immunity and cell mediated immunity
Compare and contrast the development and function of B cells and T cells
Describe the differences between acquired immunity and genetic immunity
Explain how vaccines work
State the general function of the respiratory system
State the pathway of the respiratory system including nasal cavities, pharynx and larynx
State the function of the turbinates in the nasal cavity
Describe the structure and function of the larynx and the speaking mechanism
State the roles of the visceral and parietal pleura in respiration
State the changes in air pressure within the thoracic cavity during respiration
Explain the diffusion of gases in external and internal respiration
Describe how oxygen and carbon dioxide are transported in the blood
Explain the nervous and chemical mechanisms that regulate respiration
Explain how respiration affects the pH of certain body fluids
Describe the general function of the digestive system and name the major divisions
Identify the accessory organs of digestion
Explain the difference between mechanical and chemical digestion
Describe the structure and function of the teeth and tongue
Explain the function of saliva
Describe the location and function of the pharynx and esophagus
List and describe the four layers of the alimentary canal
Describe the difference in absorption between the large and small intestine
Describe the function of the normal flora in the colon
Define peristalsis
Define chyme
State the normal range of body temperature
Define metabolism, catabolism and anabolism
State the different ways heat is generated and lost in the body
State why the hypothalamus is the thermostat of the body
State what the products of cell respiration are and how the body disposes of them
Describe the metabolic roles of fats, glucose and proteins
Describe basal metabolic rate and the factors that affect it
Define kilocalories
Describe the water compartments and the name for the water in each
Explain how water moves between the compartments
Explain how water is taken in by the body and exits the body
Describe the location and general function of each organ in the urinary system
Name the parts of a nephron
Define glomerular filtration rate
Describe how the kidneys function in maintaining normal blood volume and pressure
Describe how the kidneys help to maintain normal blood pH and electrolyte balance
State the hormones that affect kidney function
Explain the interaction between capillary blood pressure and blood proteins

Describe the characteristics of normal urine
Define diploid and haploid
Describe the difference between spermatogenesis and oogenesis
Define gametes
Name the hormones necessary for the formation of gametes
List the essential and accessory organs of the male and female, give the general function of each
Identify and describe the structures that constitute external genitals in both sexes
Name the parts of a sperm cell
Define endometrium
Briefly describe the life cycle of an oocyte
Describe the menstrual cycle in terms of change sin hormone levels and the condition of the endometrium
Beginning with fertilization, describe the major developmental changes during gestation
Describe the structure and function of the placenta and umbilical cord
Describe the difference between fetal circulation/respiration and adult circulation/respiration
State the length of an average gestation period
Describe the states of labor
Describe the major changes that take place in an infant at birth
Explain how microorganisms are named and classified
Describe the distribution of and the benefits of normal flora
Explain what is meant by infectious disease
Describe the different methods by which infectious diseases are spread
List some important infectious diseases
Define genetic disease
Explain how genes can cause disease
Define homologous chromosomes, autosomes, sex chromosomes and genes
Define alleles, genotype, phenotype, homozygous, and heterozygous
Discuss the difference between dominant and recessive traits
List some important genetic diseases

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INSTRUCTIONS FOR AFFECTIVE STUDENT EVALUATIONS

There are two primary purposes of an affective evaluation system: 1) to verify competence in the affective domain, and 2) to serve as a method to change behavior. Although affective evaluation can be used to ultimately dismiss a student for unacceptable patterns of behavior, that is not the primary purpose of these forms. It is also recognized that there is some behavior that is so serious (abuse of a patient, gross insubordination, illegal activity, reporting for duty under the influence of drugs or alcohol, etc) that it would result in immediate dismissal from the educational program.

The two forms included in the EMT-Paramedic: National Standard Curricula were developed by the Joint Review Committee on Educational Programs for the EMT-Paramedic. They represent extensive experience in the evaluation of student's affective domain. The nature of this type of evaluation makes it impossible to achieve complete objectivity, but these forms attempt to decrease the subjectivity and document affective evaluations.

In attempting to change behavior it is necessary to identify, evaluate, and document the behavior that you want. The eleven affective characteristics that form the basis of this evaluation system refer to content in the Roles and Responsibilities of the Paramedic unit of the curriculum. Typically, this information is presented early in the course and serves to inform the students what type of behavior that is expected of them. It is important that the instructor is clear about these expectations.

Cognitive and psychomotor objectives are relatively easy to operationalize in behavioral terms. Unfortunately, the nature of the affective domain makes it practically impossible to enumerate all of the possible behaviors that represent professional behavior in each of the eleven areas. For this reason, the instructor should give examples of acceptable and unacceptable behavior in each of the eleven attributes, but emphasize that these are examples and do not represent an all inclusive list.

The affective evaluation instruments included in this curriculum take two forms: A Professional Behavior Evaluation and a Professional Behavior Counseling Record. The Professional Behavior Evaluation should be completed regularly (i.e. every other week, once a month, etc.) by faculty and preceptors about each student. It is recommended that this form be completed by as many people as practically possible and that it becomes part of the students record. The more independent evaluations of the student, the more reliable are the results.

The only two options for rating the student on this form are "competent" and "not yet competent". For each attribute, a short list of behavioral markers is listed that indicates what is generally considered a demonstration of competence for entry level paramedics. This is not an all inclusive list, but serves to help the evaluator in making judgements. Clearly there are behaviors which warrant a "not yet competent" evaluation that are not listed. Any ratings of "not yet competent" require explanation in the space provided.

Establishing a cut score to use in conjunction with the Professional Behavior Evaluation instrument is important. A cut score can be established by judgement of the local programs community of interest. The question the community should ask is, what percent score do we expect of graduates of our education program to achieve in the affective domain in order to demonstrate entry level competency for a (first month, second semester, graduate, etc.) level student?

When the cut score judgement is made on acceptability or deviation of competent behavior for each characteristic a percent score can be achieved. For example, a student may received 10 competent checks out of 11 (10 of 11 = 91%), or 5 of 7 (because 4 areas were not evaluated) for a score of 71%. This student may then continue to obtain scores of 91%, 91% 82%, etc and have a term grade of 86% in the affective domain. Each student in the program would receive an average score. Results of multiple evaluations throughout the program would indicate if the score set by the community of interest was too

high or too low. When a number of evaluations had evolved adjustments in acceptable score would yield a standard for the community. This standard coupled with community of interest judgements based upon graduate student and employer survey feedbacks would identify additional validity evidence for the cut score each year. A valid cut score based upon years of investigation could then be used as a determining factor on future participation in the education program.

For all affective evaluations, the faculty member should focus on patterns of behavior, not isolated instances that fall outside the students normal performance. For example, a student who is consistently on time and prepared for class may have demonstrated competence in time management and should not be penalized for an isolated emergency that makes him late for one class. On the other hand, if the student is constantly late for class, they should be counseled and if the behavior continues, rated as "not yet competent" in time management. Continued behavior may result in disciplinary action.

The second form, the Professional Behavior Counseling form is used to clearly communicate to the student that their affective performance is unacceptable. This form should be used during counseling sessions in response to specific incidents (i.e. cheating, lying, falsification of documentation, disrespect/insubordination, etc.) or patterns of unacceptable behavior. As noted before, their is some behavior that is so egregious as to result in immediate disciplinary action or dismissal. In the case of such serious incidents, thorough documentation is needed to justify the disciplinary action. For less serious incidents, the Professional Behavior Counseling form can serve as an important tracking mechanism to verify competence or patterns of uncorrected behavior.

On the Professional Behavior Counseling form, the evaluator checks all of the areas that the infraction affects in the left hand column (most incidents affect more than one area) and documents the nature of the incident(s) in the right hand column. Space is provided to document any follow-up. This should include specific expectations, clearly defined positive behavior, actions that will be taken if the behavior continues, and dates of future counseling sessions.

Using a combination of these forms helps to enable the program to demonstrate that graduating students have demonstrated competence in the affective domain. This is achieved by having many independent evaluations, by different faculty members at different times, stating that the student was competent. These forms can also be used to help correct unacceptable behavior. Finally, these forms enable programs to build a strong case for dismissing students following a repeated pattern of unacceptable behavior. Having numerous, uncoberrated evaluations by faculty members documenting unacceptable behavior, and continuation of that behavior after remediation, is usually adequate grounds for dismissal.

PROFESSIONAL BEHAVIOR EVALUATION

Student's Name:_____

Date of evaluation:_____

1. INTEGRITY	Competent [ ] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Consistent honesty; being able to be trusted with the property of others; can be trusted with confidential information; complete and accurate documentation of patient care and learning activities.	
2. EMPATHY	Competent [ ] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Showing compassion for others; responding appropriately to the emotional response of patients and family members; demonstrating respect for others; demonstrating a calm, compassionate, and helpful demeanor toward those in need; being supportive and reassuring to others.	
3. SELF - MOTIVATION	Competent [ ] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Taking initiative to complete assignments; taking initiative to improve and/or correct behavior; taking on and following through on tasks without constant supervision; showing enthusiasm for learning and improvement; consistently striving for excellence in all aspects of patient care and professional activities; accepting constructive feedback in a positive manner; taking advantage of learning opportunities	
4. APPEARANCE AND PERSONAL HYGIENE	Competent [ ] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Clothing and uniform is appropriate, neat, clean and well maintained; good personal hygiene and grooming.	
5. SELF - CONFIDENCE	Competent [ ] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Demonstrating the ability to trust personal judgement; demonstrating an awareness of strengths and limitations; exercises good personal judgement.	
6. COMMUNICATIONS	Competent [ ] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Speaking clearly; writing legibly; listening actively; adjusting communication strategies to various situations	
7. TIME MANAGEMENT	Competent [ ] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Consistent punctuality; completing tasks and assignments on time.	
8. TEAMWORK AND DIPLOMACY	Competent [ ] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Placing the success of the team above self interest; not undermining the team; helping and supporting other team members; showing respect for all team members; remaining flexible and open to change; communicating with others to resolve problems.	
9. RESPECT	Competent [ ] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Being polite to others; not using derogatory or demeaning terms; behaving in a manner that brings credit to the profession.	

10. PATIENT ADVOCACY	Competent [ ]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Not allowing personal bias to or feelings to interfere with patient care; placing the needs of patients above self interest; protecting and respecting patient confidentiality and dignity.		
11. CAREFUL DELIVERY OF SERVICE	Competent [ ]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Mastering and refreshing skills; performing complete equipment checks; demonstrating careful and safe ambulance operations; following policies, procedures, and protocols; following orders.		

Use the space below to explain <u>any</u> "not yet competent" ratings. When possible, use specific behaviors, and corrective actions.

___________________________________- Faculty Signature

PROFESSIONAL BEHAVIOR EVALUATION

Sample

Student's Name: ~~Janet L~~

Date of evaluation: *September 1998*

1. INTEGRITY	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Consistent honesty; being able to be trusted with the property of others; can be trusted with confidential information; complete and accurate documentation of patient care and learning activities.		
2. EMPATHY	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Showing compassion for others; responding appropriately to the emotional response of patients and family members; demonstrating respect for others; demonstrating a calm, compassionate, and helpful demeanor toward those in need; being supportive and reassuring to others.		
3. SELF - MOTIVATION	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Taking initiative to complete assignments; taking initiative to improve and/or correct behavior; taking on and following through on tasks without constant supervision; showing enthusiasm for learning and improvement; consistently striving for excellence in all aspects of patient care and professional activities; accepting constructive feedback in a positive manner; taking advantage of learning opportunities		
4. APPEARANCE AND PERSONAL HYGIENE	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Clothing and uniform is appropriate, neat, clean and well maintained; good personal hygiene and grooming.		
5. SELF - CONFIDENCE	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Demonstrating the ability to trust personal judgement; demonstrating an awareness of strengths and limitations; exercises good personal judgement.		
6. COMMUNICATIONS	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Speaking clearly; writing legibly; listening actively; adjusting communication strategies to various situations		
7. TIME MANAGEMENT	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Consistent punctuality; completing tasks and assignments on time.		
8. TEAMWORK AND DIPLOMACY	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Placing the success of the team above self interest; not undermining the team; helping and supporting other team members; showing respect for all team members; remaining flexible and open to change; communicating with others to resolve problems.		

9. RESPECT	Competent [✓] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Being polite to others; not using derogatory or demeaning terms; behaving in a manner that brings credit to the profession.	
10. PATIENT ADVOCACY	Competent [✓] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Not allowing personal bias to or feelings to interfere with patient care; placing the needs of patients above self interest; protecting and respecting patient confidentiality and dignity.	
11. CAREFUL DELIVERY OF SERVICE	Competent [✓] Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Mastering and refreshing skills; performing complete equipment checks; demonstrating careful and safe ambulance operations; following policies, procedures, and protocols; following orders.	

Use the space below to explain any "not yet competent" ratings. When possible, use specific behaviors, and corrective actions.

⑥ Janet's run reports, written case reports, and home work are illegible and disorganized. She has numerous spelling and grammatical errors.

⑦ Janet repeatedly hands in assignments after due dates. She does not complete clinical time in a organized, organized manner. She did not report for five scheduled clinical shifts this semester and reported to medic 6 twice when she was not scheduled. Janet has not completed the required clinical for this semester.

Sample

John Brown - *Faculty Signature*

PROFESSIONAL BEHAVIOR EVALUATION

Student's Name: *Steve R.*

Date of evaluation: *December 1999*

1. INTEGRITY	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Consistent honesty; being able to be trusted with the property of others; can be trusted with confidential information; complete and accurate documentation of patient care and learning activities.		
2. EMPATHY	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Showing compassion for others; responding appropriately to the emotional response of patients and family members; demonstrating respect for others; demonstrating a calm, compassionate, and helpful demeanor toward those in need; being supportive and reassuring to others.		
3. SELF - MOTIVATION	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Taking initiative to complete assignments; taking initiative to improve and/or correct behavior; taking on and following through on tasks without constant supervision; showing enthusiasm for learning and improvement; consistently striving for excellence in all aspects of patient care and professional activities; accepting constructive feedback in a positive manner; taking advantage of learning opportunities		
4. APPEARANCE AND PERSONAL HYGIENE	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Clothing and uniform is appropriate, neat, clean and well maintained; good personal hygiene and grooming.		
5. SELF - CONFIDENCE	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Demonstrating the ability to trust personal judgement; demonstrating an awareness of strengths and limitations; exercises good personal judgement.		
6. COMMUNICATIONS	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Speaking clearly; writing legibly; listening actively; adjusting communication strategies to various situations		
7. TIME MANAGEMENT	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Consistent punctuality; completing tasks and assignments on time.		
8. TEAMWORK AND DIPLOMACY	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Placing the success of the team above self interest; not undermining the team; helping and supporting other team members; showing respect for all team members; remaining flexible and open to change; communicating with others to resolve problems.		

9. RESPECT	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Being polite to others; not using derogatory or demeaning terms; behaving in a manner that brings credit to the profession.		
10. PATIENT ADVOCACY	Competent [ ]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Not allowing personal bias to or feelings to interfere with patient care; placing the needs of patients above self interest; protecting and respecting patient confidentiality and dignity.		
11. CAREFUL DELIVERY OF SERVICE	Competent [ ]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Mastering and refreshing skills; performing complete equipment checks; demonstrating careful and safe ambulance operations; following policies, procedures, and protocols; following orders.		

Use the space below to explain any "not yet competent" ratings. When possible, use specific behaviors, and corrective actions.

#2 Steve is constantly disrupting class with irrelevant questions. He is disrespectful to guest instructors, classmates and the program.

#5 Steve seems to have an impression that he is better than the others students because he has more field experience. He is overconfident and overbearing.

#6 Steve has not changed his communication skills despite verbal counseling.

#8 Steve's disruptions are destructive to the team environment by placing his needs above those of the group.

#9 Disruptions are disrespectful.

Sample

A. Cox *-Faculty Signature*

PROFESSIONAL BEHAVIOR EVALUATION

Student's Name: *Steve R.*

Date of evaluation: *November 1999*

1. INTEGRITY	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Consistent honesty; being able to be trusted with the property of others; can be trusted with confidential information; complete and accurate documentation of patient care and learning activities.		
2. EMPATHY	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Showing compassion for others; responding appropriately to the emotional response of patients and family members; demonstrating respect for others; demonstrating a calm, compassionate, and helpful demeanor toward those in need; being supportive and reassuring to others.		
3. SELF - MOTIVATION	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Taking initiative to complete assignments; taking initiative to improve and/or correct behavior; taking on and following through on tasks without constant supervision; showing enthusiasm for learning and improvement; consistently striving for excellence in all aspects of patient care and professional activities; accepting constructive feedback in a positive manner; taking advantage of learning opportunities		
4. APPEARANCE AND PERSONAL HYGIENE	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Clothing and uniform is appropriate, neat, clean and well maintained; good personal hygiene and grooming.		
5. SELF - CONFIDENCE	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Demonstrating the ability to trust personal judgement; demonstrating an awareness of strengths and limitations; exercises good personal judgement.		
6. COMMUNICATIONS	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Speaking clearly; writing legibly; listening actively; adjusting communication strategies to various situations		
7. TIME MANAGEMENT	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Consistent punctuality; completing tasks and assignments on time.		
8. TEAMWORK AND DIPLOMACY	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Placing the success of the team above self interest; not undermining the team; helping and supporting other team members; showing respect for all team members; remaining flexible and open to change; communicating with others to resolve problems.		

9. RESPECT	Competent [ ]	Not yet competent [✓]
Examples of professional behavior include, but are not limited to: Being polite to others; not using derogatory or demeaning terms; behaving in a manner that brings credit to the profession.		
10. PATIENT ADVOCACY	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Not allowing personal bias to or feelings to interfere with patient care; placing the needs of patients above self interest; protecting and respecting patient confidentiality and dignity.		
11. CAREFUL DELIVERY OF SERVICE	Competent [✓]	Not yet competent [ ]
Examples of professional behavior include, but are not limited to: Mastering and refreshing skills; performing complete equipment checks; demonstrating careful and safe ambulance operations; following policies, procedures, and protocols; following orders.		

Use the space below to explain any "not yet competent" ratings. When possible, use specific behaviors, and corrective actions.

#2, 5, 6, 8, & 9 Steve has demonstrated inappropriate classroom behavior by monopolizing class time, answering questions intended for other students, and making sarcastic remarks about other students answers. Steve demonstrates a superiority complex over fellow classmates belittling and has repeatedly belittled their experience, while boasting and exaggerating about his field experience.

Sample

T. Jones - *Faculty Signature*

PROFESSIONAL BEHAVIOR COUNSELING RECORD

Student's Name:_____

Date of counseling:_____

Date of incident:_____

✔	Reason for Counseling	Explanation (use back of form if more space is needed):
	Integrity	
	Empathy	
	Self - Motivation	
	Appearance/Personal Hygiene	
	Self - Confidence	
	Communications	
	Time Management	
	Teamwork and Diplomacy	
	Respect	
	Patient Advocacy	
	Careful delivery of service	

Follow-up (include specific expectations, clearly defined positive behavior, actions that will be taken if behavior continues, dates of future counseling sessions, etc.):

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____-Faculty signature

I have read this notice and I understand it.

_____-Student signature

_____-Administrative or Medical Director Review

PROFESSIONAL BEHAVIOR COUNSELING RECORD

Student's Name: *Joe L.*

Date of counseling: *February 23, 1999*
Date of incident: *February 21, 1999*

✔	Reason for Counseling	Explanation (use back of form if more space is needed):
	Integrity	*Joe reported to a field rotation 16 minutes late, he was not wearing (nor*
	Empathy	*did he have in his possession) a uniform belt and with "at least 2 days*
	Self - Motivation	*beard growth" according to field supervisor Johnson. When Joe was*
✔	Appearance/Personal Hygiene	*approached regarding this situation he became argumentative and told*
	Self - Confidence	*Mr. Johnson to "... mind your own business." Joe was asked to leave.*
	Communications	*Others that witnessed this exchange were Paramedics Davis and*
✔	Time Management	*Lawrence.*
	Teamwork and Diplomacy	
✔	Respect	
	Patient Advocacy	
	Careful delivery of service	

Follow-up (include specific expectations, clearly defined positive behavior, actions that will be taken if behavior continues, dates of future counseling sessions, etc.):

- *Reviewed clinical Policies and Procedures manual section referring to personal appearance and hygiene, time management, and respect. I also reviewed the conduct at clinical rotations with Joe.*
- *Asked Joe to writ a letter of apology to field supervisor Johnson, and Paramedics Davis and Lawrence, which he agreed to do.*
- *I informed Joe that any further display of*

disrespectful behavior will result in dismissal from the program. A continued pattern of poor time management and/or poor appearance/personal hygiene could also result in dismissal.

_____

Bill Smith -*Faculty signature*

I have read this notice and I understand it.

Joe L. -*Student signature*

Dr. Jones -*Administrative or Medical Director Review*

PROFESSIONAL BEHAVIOR COUNSELING RECORD

Student's Name: *Steve*

Date of counseling: *December 14, 1998*
Date of incident: *November and December 1999*

✔	Reason for Counseling	Explanation (use back of form if more space is needed):
	Integrity	*This counseling session was in response to the two Professional Behavior*
✘	Empathy	*Evaluations file by Instructors Cox and Jones. They both indicated that*
	Self - Motivation	*Steve has been disruptive in classes (see attached)*
	Appearance/Personal Hygiene	
✘	Self - Confidence	
✘	Communications	
	Time Management	
✘	Teamwork and Diplomacy	
✘	Respect	
	Patient Advocacy	
	Careful delivery of service	

Follow-up (include specific expectations, clearly defined positive behavior, actions that will be taken if behavior continues, dates of future counseling sessions, etc.):

- *Student was advised that his behavior is inappropriate and unacceptable. Continuation of this behavior will result in dismissal from class.*

- *Written warning from program director.*

- *Instructors Cox and Jones to complete Professional Behavior Evaluations bi-weekly throughout next semester*

M. Travis _____ -Faculty signature

I have read this notice and I understand it.

Steve R. _____ -Student signature

Dr. O'Hara _____ -Administrative or Medical Director Review

The following skill evaluation instruments were developed by the National Registry of EMTs. They are in draft format and have not yet been approved for usage in Advanced Level National Registry examinations.

National Registry of Emergency Medical Technicians
Advanced Level Practical Examination

PATIENT ASSESSMENT-TRAUMA

NOTE: Areas denoted by "**" may be integrated within sequence of Initial Assessment	Possible Points	Points Awarded
Takes or verbalizes body substance isolation precautions	1	
SCENE SIZE-UP		
Determines the scene/situation is safe	1	
Determines the mechanism of injury/nature of illness	1	
Determines the number of patients	1	
Requests additional help if necessary	1	
Considers stabilization of spine	1	
INITIAL ASSESSMENT/RESUSCITATION		
Verbalizes general impression of the patient	1	
Determines responsiveness/level of consciousness	1	
Determines chief complaint/apparent life-threats	1	
Airway -Opens and assesses airway (1 point) -Inserts adjunct as indicated (1 point)	2	
Breathing -Assess breathing (1 point) -Assures adequate ventilation (1 point) -Initiates appropriate oxygen therapy (1 point) -Manages any injury which may compromise breathing/ventilation (1 point)	4	
Circulation -Checks pulse (1 point) -Assess skin (either skin color, temperature or condition) (1 point) -Assesses for and controls major bleeding if present (1 point) -Initiates shock management (1 point)	4	
Identifies priority patients/makes transport decision	1	
FOCUSED HISTORY AND PHYSICAL EXAMINATION/RAPID TRAUMA ASSESSMENT		
Selects appropriate assessment	1	
Obtains, or directs assistant to obtain, baseline vital signs	1	
Obtains SAMPLE history	1	
DETAILED PHYSICAL EXAMINATION		
Head -Inspects mouth**, nose**, and assesses facial area (1 point) -Inspects and palpates scalp and ears (1 point) -Assesses eyes for PEARRL **(1 point)	3	
Neck** -Checks position of trachea (1 point) -Checks jugular veins (1 points) -Palpates cervical spine (1 point)	3	
Chest ** -Inspects chest (1 point) -Palpates chest (1 point) -Auscultates chest (1 point)	3	
Abdomen/pelvis** -Inspects and palpates abdomen (1 point) -Assesses pelvis (1 point) -Verbalizes assessment of genitalia/perineum as needed (1 point)	3	
Lower extremities ** -Inspects, palpates, and assesses motor, sensory and circulatory functions (1 point/leg)	2	
Upper extremities -Inspects, palpates, and assesses motor, sensory, and circulatory functions (1 point/arm)	2	
Posterior thorax, lumbar, and buttocks** -Inspects and palpates posterior thorax (1 point) -Inspects and palpates lumbar and buttocks area (1 point)	2	
Manages secondary injuries and wounds appropriately (1 point/injury or wound)	1	
Ongoing assessment (1 point)	1	
TOTAL	43	

CRITICAL CRITERIA

____ Failure to initiate or call for transport of the patient within 10 minute time limit
____ Failure to take or verbalize body substance isolation precautions
____ Failure to determine scene safety
____ Failure to assess for and provide spinal protection when indicated
____ Failure to voice and ultimately provide high concentration of oxygen
____ Failure to find or appropriately manage problems associated with airway, breathing, hemorrhage or shock (hypoperfusion)
____ Failure to differentiate patient's need for immediate transportation versus continued assessment and treatment at the scene
____ Does other detailed or focused history or physical examination before assessing and treating threats to airway, breathing and circulation
____ Orders a dangerous or inappropriate intervention

National Registry of Emergency Medical Technicians
Advanced Level Practical Examination

PATIENT ASSESSMENT-MEDICAL

	Possible Points	Points Awarded
Takes or verbalizes body substance isolation precautions	1	
SCENE SIZE-UP		
Determines the scene/situation is safe	1	
Determines the mechanism of injury/nature of illness	1	
Determines the number of patients	1	
Requests additional help if necessary	1	
Considers stabilization of spine	1	
INITIAL ASSESSMENT		
Verbalizes general impression of the		

EMT-Paramedic: National Standard Curriculum

Module and Unit Objective Summary

1 At the completion of this module, the paramedics student will understand the roles and responsibilities of a Paramedic within an EMS system, apply the basic concepts of development, pathophysiology and pharmacology to assessment and management of emergency patients, be able to properly administer medications, and communicate effectively with patients.

- 1-1 At the completion of this unit, the paramedic student will understand his or her roles and responsibilities within an EMS system, and how these roles and responsibilities differ from other levels of providers.
- 1-2 At the completion of this unit, the paramedic student will understand and value the importance of personal wellness in EMS and serve as a healthy role model for peers.
- 1-3 At the completion of this unit, the paramedic student will be able to integrate the implementation of primary injury prevention activities as an effective way to reduce death, disabilities and health care costs.
- 1-4 At the completion of this unit, the paramedic student will understand the legal issues that impact decisions made in the out-of-hospital environment.
- 1-5 At the completion of this unit, the paramedic student will understand the role that ethics plays in decision making in the out-of-hospital environment.
- 1-6 At the completion of this unit, the paramedic student will be able to apply the general concepts of pathophysiology for the assessment and management of emergency patients.
- 1-7 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles of pharmacology and the assessment findings to formulate a field impression and implement a pharmacologic management plan.
- 1-8 At the completion of this unit, the paramedic student will be able to safely and precisely access the venous circulation and administer medications.
- 1-9 At the completion of this unit, the paramedic student will be able to integrate the principles of therapeutic communication to effectively communicate with any patient while providing care.
- 1-10 At the completion of this unit, the paramedic student will be able to integrate the physiological, psychological, and sociological changes throughout human development with assessment and communication strategies for patients of all ages.

2 At the completion of this module, the paramedic student will be able to establish and/ or maintain a patent airway, oxygenate, and ventilate a patient.

- 2-1 At the completion of this unit, the paramedic student will be able to establish and/ or maintain a patent airway, oxygenate, and ventilate a patient.

3 At the completion of this module, the paramedic student will be able to take a proper history and perform a comprehensive physical exam on any patient, and communicate the findings to others.

- **3-1** At the completion of this unit, the paramedic student will be able to use the appropriate techniques to obtain a medical history from a patient.
- 3-2 At the completion end of this unit, the paramedic student will be able to explain the pathophysiological significance of physical exam findings.
- 3-3 At the end of this unit, the paramedic student will be able to integrate the principles of history taking and techniques of physical exam to perform a patient assessment.
- 3-4 At the end of this unit, the paramedic student will be able to apply a process of clinical decision making to use the assessment findings to help form a field impression.
- 3-5 At the completion of this unit, the paramedic student will be able to follow an accepted format for dissemination of patient information in verbal form, either in person or over the radio.
- 3-6 At the completion of this unit, the paramedic student will be able to effectively document the essential elements of patient assessment, care and transport.

4 At the completion of this module, the paramedic student will be able to integrate

pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the trauma patient.

4-1 At the completion of this unit, the Paramedic student will be able to integrate the principles of kinematics to enhance the patient assessment and predict the likelihood of injuries based on the patient's mechanism of injury.

4-2 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with shock or hemorrhage.

4-3 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and the assessment findings to formulate a field impression and implement the treatment plan for the patient with soft tissue trauma.

4-4 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and the assessment findings to formulate a field impression and implement the management plan for the patient with a burn injury.

4-5 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the trauma patient with a suspected head injury.

4-6 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the patient with a suspected spinal injury.

4-7 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for a patient with a thoracic injury.

4-8 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and the assessment findings to formulate a field impression and implement the treatment plan for the patient with suspected abdominal trauma.

4-9 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and the assessment findings to formulate a field impression and implement the treatment plan for the patient with a musculoskeletal injury.

5 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the medical patient.

5-1 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with respiratory problems.

5-2 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with cardiovascular disease.

5-3 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with a neurological problem.

5-4 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement a treatment plan for the patient with an endocrine problem.

5-5 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement a treatment plan for the patient with an allergic or anaphylactic reaction.

5-6 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with a gastroenterologic problem.

5-7 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the patient with a renal or urologic problem.

5-8 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and

implement a treatment plan for the patient with a toxic exposure.

5-9 At the completion of this unit, the paramedic student will be able to integrate the pathophysiological principles of the hematopoietic system to formulate a field impression and implement a treatment plan.

5-10 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the patient with an environmentally induced or exacerbated medical or traumatic condition.

5-11 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement a management plan for the patient with infectious and communicable diseases.

5-12 At the end of this unit, the paramedic student will be able to describe and demonstrate safe, empathetic competence in caring for patients with behavioral emergencies.

5-13 At the end of this unit, the paramedic student will be able to utilize gynecological principles and assessment findings to formulate a field impression and implement the management plan for the patient experiencing a gynecological emergency.

5-14 At the completion of this unit, the paramedic student will be able to apply an understanding of the anatomy and physiology of the female reproductive system to the assessment and management of a patient experiencing normal or abnormal labor.

6 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for neonatal, pediatric, and geriatric patients, diverse patients, and chronically ill patients.

6-1 At the completion of this lesson, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the neonatal patient.

6-2 At the completion of this lesson, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for the pediatric patient.

6-3 At the completion of this unit, the paramedic student will be able to integrate the pathophysiological principles and the assessment findings to formulate and implement a treatment plan for the geriatric patient.

6-4 At the completion of this unit, the paramedic student will be able to integrate the assessment findings to formulate a field impression and implement a treatment plan for the patient who has sustained abuse or assault.

6-5 At the completion of this unit the paramedic student will be able to integrate pathophysiological and psychosocial principles to adapt the assessment and treatment plan for diverse patients and those who face physical, mental, social and financial challenges.

6-6 At the completion of this unit, the paramedic student will be able to integrate the pathophysiological principles and the assessment findings to formulate a field impression and implement a treatment plan for the acute deterioration of a chronic care patient.

7 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles and assessment findings to formulate a field impression and implement the treatment plan for patients with common complaints.

7-1 At the completion of this unit, the paramedic student will be able to integrate the principles of assessment based management to perform an appropriate assessment and implement the management plan for patients with common complaints.

8 At the completion of this unit, the paramedic student will be able to safely manage the scene of an emergency.

8-1 At the completion of this unit, the paramedic will understand standards and guidelines that help ensure safe and effective ground and air medical transport.

8-2 At the completion of this unit, the paramedic student will be able to integrate the principles of general incident management and multiple casualty incident (MCI) management

techniques in order to function effectively at major incidents.

8-3 At the completion of this unit, the paramedic student will be able to integrate the principles of rescue awareness and operations to safely rescue a patient from water, hazardous atmospheres, trenches, highways, and hazardous terrain.

8-4 At the completion of this unit, the paramedic student will be able to evaluate hazardous materials emergencies, call for appropriate resources, and work in the cold zone.

8-5 At the completion of this unit, the paramedic student will have an awareness of the human hazard of crime and violence and the safe operation at crime scenes and other emergencies.

UNIT TERMINAL OBJECTIVE

1-1 At the completion of this unit, the paramedic student will understand his or her roles and responsibilities within an EMS system, and how these roles and responsibilities differ from other levels of providers.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-1.1 Define the following terms: (C-1)
- a. EMS Systems
- b. Licensure
- c. Certification
- d. Registration
- e. Profession
- f. Professionalism
- g. Health care professional
- h. Ethics
- I. Peer review
- j. Medical direction
- k. Protocols

1-1.2 Describe key historical events that influenced the development of national Emergency Medical Services (EMS) systems. (C-1)
1-1.3 Identify national groups important to the development, education, and implementation of EMS. (C-1)
1-1.4 Differentiate among the four nationally recognized levels of EMS training/ education, leading to licensure/ certification/ registration. (C-1)
1-1.5 Describe the attributes of a paramedic as a health care professional. (C-1)
1-1.6 Describe the recognized levels of EMS training/ education, leading to licensure/ certification in his or her state. (C-1)
1-1.7 Explain paramedic licensure/ certification, recertification, and reciprocity requirements in his or her state. (C-1)
1-1.8 Evaluate the importance of maintaining one's paramedic license/ certification. (C-3)
1-1.9 Describe the benefits of paramedic continuing education. (C-1)
1-1.10 List current state requirements for paramedic education in his/ her state. (C-1)
1-1.11 Discuss the role of national associations and of a national registry agency. (C-1)
1-1.12 Discuss current issues in his/ her state impacting EMS. (C-1)
1-1.13 Discuss the roles of various EMS standard setting agencies. (C-1)
1-1.14 Identify the standards (components) of an EMS System as defined by the National Highway Traffic Safety Administration. (C-1)
1-1.15 Describe how professionalism applies to the paramedic while on and off duty. (C-1)
1-1.16 Describe examples of professional behaviors in the following areas: integrity, empathy, self-motivation, appearance and personal hygiene, self-confidence, communications, time management, teamwork and diplomacy, respect, patient advocacy, and careful delivery of service. (C-1)
1-1.17 Provide examples of activities that constitute appropriate professional behavior for a paramedic. (C-2)
1-1.18 Describe the importance of quality EMS research to the future of EMS. (C-3)
1-1.19 Identify the benefits of paramedics teaching in their community. (C-1)
1-1.20 Describe what is meant by "citizen involvement in the EMS system." (C-1)
1-1.21 Analyze how the paramedic can benefit the health care system by supporting primary care to patients in the out-of-hospital setting. (C-3)
1-1.22 List the primary and additional responsibilities of paramedics. (C-1)

1-1.23 Describe the role of the EMS physician in providing medical direction. (C-1)
1-1.24 Describe the benefits of medical direction, both on-line and off-line. (C-1)
1-1.25 Describe the process for the development of local policies and protocols. (C-2)
1-1.26 Provide examples of local protocols. (C-1)
1-1.27 Discuss prehospital and out-of-hospital care as an extension of the physician. (C-1)
1-1.28 Describe the relationship between a physician on the scene, the paramedic on the scene, and the EMS physician providing on-line medical direction. (C-1)
1-1.29 Describe the components of continuous quality improvement. (C-1)
1-1.30 Analyze the role of continuous quality improvement with respect to continuing medical education and research. (C-3)
1-1.31 Define the role of the paramedic relative to the safety of the crew, the patient, and bystanders. (C-1)
1-1.32 Identify local health care agencies and transportation resources for patients with special needs. (C-1)
1-1.33 Describe the role of the paramedic in health education activities related to illness and injury prevention. (C-1)
1-1.34 Describe the importance and benefits of research. (C-2)
1-1.35 Explain the EMS provider's role in data collection. (C-1)
1-1.36 Explain the basic principles of research. (C-1)
1-1.37 Describe a process of evaluating and interpreting research. (C-3)

AFFECTIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-1.38 Assess personal practices relative to the responsibility for personal safety, the safety of the crew, the patient, and bystanders. (A-3)
1-1.39 Serve as a role model for others relative to professionalism in EMS. (A-3)
1-1.40 Value the need to serve as the patient advocate inclusive of those with special needs, alternate life styles and cultural diversity. (A-3)
1-1.41 Defend the importance of continuing medical education and skills retention. (A-3)
1-1.42 Advocate the need for supporting and participating in research efforts aimed at improving EMS systems. (A-3)
1-1.43 Assess personal attitudes and demeanor that may distract from professionalism. (A-3)
1-1.44 Value the role that family dynamics plays in the total care of patients. (A-3)
1-1.45 Advocate the need for injury prevention, including abusive situations. (A-1)
1-1.46 Exhibit professional behaviors in the following areas: integrity, empathy, self-motivation, appearance and personal hygiene, self-confidence, communications, time management, teamwork and diplomacy, respect, patient advocacy, and careful delivery of service. (A-2)

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

DECLARATIVE

I. Introduction
- A. Role of the paramedic quite different today from the "ambulance driver" of yesterday
- B. Paramedics engage in a variety of professional activities
  1. Enhance their ability to provide quality service

II. EMS system development
- A. Pre-20th century
  1. Biblical
  2. Edwin Smith papyrus (1500 B.C.)
  3. Code of Hammurabi
  4. Jean Larrey, physician - Napoleonic Wars - ambulances volantes (1790s)
  5. American Civil War
     a. Clara Barton, nurse
     b. Coordinated service for wounded
  6. New York City Health Department Ambulance Service - 1869
- B. 20th Century
  1. WWI and WWII developments
     a. Battlefield ambulance corps developed
  2. 1950s and 1960s
     a. Urban, hospital-based systems develop into municipal services
     b. Rural funeral homes develop into volunteer fire and freestanding services
     c. 1966 National Academy of Sciences - National Research Council report
        (1) "Accidental Death and Disability: The Neglected Disease of Modern Society" (the White Paper)
        (2) Defined 10 critical points
     d. Highway Safety Act of 1966
        (1) Created USDOT as a cabinet-level department
        (2) Provided legislative authority and finance to improve EMS
        (3) More than $142 million between 1968 and 1979
        (4) Early advanced life support pilot programs
     e. Mortality comparisons - WWI to Vietnam
        (1) Advances in field care emerged for trauma patients
        (2) Reduced deaths from similar trauma
  3. 1970s
     a. 1973 Emergency Medical Service Systems Act
        (1) Defined 15 required components
        (2) Regional approach, trauma focus
     b. Regional system development 1974 - 1981
     c. 1977 national educational standards for paramedics first developed
  4. 1980s-90s
     a. Omnibus Budget Reconciliation Act of 1981
     b. "Preventive Health and Health Services Block Grant" consolidation
     c. National Highway Traffic Safety Administration (NHTSA) effort to sustain the DHHS effort with reduced funding and staff
     d. NHTSA's "10 System Elements"
     e. Responsibility for system development, funding, etc., returned to states

(1) Funding reduced, efforts diminish, and momentum lost

f. Health care reform

(1) Managed care, expanded scope of practice, etc.

III. Current EMS system

A. Network of coordinated services that provide aid and medical care to the community

B. Work as a unified whole, to meet the emergency care needs of a community

C. Standards (components) of an EMS System

1. Defined by the National Highway Traffic Safety Administration

a. Regulation and policy
b. Resource management
c. Human resources and training
d. Transportation
e. Facilities
f. Communications
g. Trauma systems
h. Public information and education
i. Medical direction
j. Evaluation

D. EMS system operation

1. Citizen activation
2. Dispatch
3. Out-of-hospital care
4. Hospital care
5. Rehabilitation

E. EMS provider levels

1. Dispatchers
2. First Responder
3. EMT-Basic
4. EMT-Intermediate
5. Paramedic

IV. National EMS group involvement

A. Involved in the development, education, and implementation of EMS

1. National organizations
2. State organizations
3. Regional organizations
4. Local organizations

B. Benefits of involvement

1. National associations

a. Information sharing
b. Promotes the profession
c. Enhances the status of the profession
d. Provides a means for a unified voice

2. Joint Review Committee on Educational Programs for the EMT-Paramedic
3. National Registry of EMTs

a. Contributes to the development of professional standards
b. Verifies competency by preparing and conducting examinations

c. Vehicle for simplifying the process of state-to-state mobility (reciprocity)
d. Spreads costs of exam development, validation, across large user base

C. Roles of various EMS standard setting groups
1. Establishes standards with input from the profession and the public
2. Ensures public interest is served in standards development and implementation
3. Protects the public
a. Prevents individuals who do not meet professional standards from licensure/ certification

V. Paramedic education
A. Initial education
1. National standard curriculum
a. Competencies
b. Pre- or co-requisites
c. Provided minimum content for a standardized program of study
d. Includes cognitive, psychomotor, affective objectives
e. Clinical requirements
f. Length
(1) Minimum hours commitment
2. Educational resources
a. Facilities
b. Instructors
c. Equipment
d. Clinical experiences
e. References
f. Texts
g. Other instructional materials
3. Enhancement
a. Meets additional state or local needs
b. Needs to change to reflect current practice

B. Continuing education
1. Benefits
a. Maintenance of core or minimal levels of knowledge
b. Maintenance of fundamental technical/ professional skills
c. Expansion of skills and knowledge
d. Cognizance of advances in the profession

VI. Licensure/ certification/ registration
A. Licensure
1. Granting of a license to practice a profession
2. A process of occupational regulation
3. Permission granted by competent authority to engage in a business, profession, or activity otherwise unlawful
4. Involves governmental activity
5. May be required by state or local authorities to practice as a paramedic

B. Certification
1. Grants authority to an individual who has met predetermined qualifications to participate in an activity

2. A document certifying fulfillment of requirements for practice in a field
3. Usually refers to action of a non-governmental entity
4. May be required by state or local authorities to practice as a paramedic
5. Unfounded general belief that "licensed professionals" have greater status than those that are "certified"or "registered"
6. A "certification" granted by a state, conferring a right to engage in a trade or profession, is in fact a "license"

C. Registration
1. The act of registering
2. To enroll one's name in a "register" or book of record

D. State and national certification/ recertification requirements

VII. Professionalism

A. Education should help produce a paramedic professional

B. Profession
1. The existence of a specialized body of knowledge or expertise
2. Generally, self regulating through licensure or certification verifying competence
3. Maintains standards including initial and continuing educational requirements

C. Professionalism
1. Professionals follow standards of conduct and performance for the profession
2. Adherence to a code of ethics approved by the profession

D. Health care professional
1. Conforms to the standards of health care professions
2. Provides quality patient care
3. Instills pride in the profession
4. Strives for high standards
5. Earns respect of others
6. There are high societal expectations of professionals while on and off duty
7. EMS personnel occupy positions of public trust
8. Unprofessional conduct hurts the image of the profession
9. Commitment to excellence is a daily activity
10. Image and behavior
    a. How you appear to others and to yourself is important
    b. Vital to establishing credibility and instilling confidence
    c. Highly visible role model
    d. Paramedics represent a variety of persons
        (1) Self
        (2) EMS agency
        (3) State/ county/ city/ district EMS office
        (4) Peers

E. Attributes of professionalism applied to the role of the paramedic
1. Integrity
    a. Single, most important behavior
    b. Honesty in all actions
    c. Assumed by public in the role of a paramedic
    d. Examples of behavior demonstrating integrity
        (1) Tells the truth
        (2) Does not steal

(3) Complete and accurate documentation

2. Empathy
   a. Identification with and understanding of the feelings, situations, and motives of others
   b. Empathy must be demonstrated to patients, families, and other health care professionals
   c. Examples of behavior demonstrating empathy
      (1) Showing caring and compassion for others
      (2) Demonstrating an understanding of patient and family feelings
      (3) Demonstrating respect for others
      (4) Exhibiting a calm, compassionate and helpful demeanor toward those in need
      (5) Being supportive and reassuring of others
3. Self - motivation
   a. Internal drive for excellence
   b. Demonstrating self direction
   c. Examples of behavior demonstrating motivation
      (1) Taking initiative to complete assignments
      (2) Taking initiative to improve and/ or correct behavior
      (3) Taking on and following through on tasks without constant supervision
      (4) Showing enthusiasm for learning and improvement
      (5) Demonstrating a commitment to continuous quality improvement
      (6) Accepting constructive feedback in a positive manner
      (7) Taking advantage of learning opportunities
4. Appearance and personal hygiene
   a. A person's manner of carrying and presenting oneself
   b. Examples of behavior demonstrating good appearance and personal hygiene
      (1) Clothing and uniform is neat, clean and in good repair
      (2) Demonstrates good personal grooming
5. Self confidence
   a. Trust or reliance on yourself
   b. Having an accurate assessment of your personal and professional strengths and limitations
   c. Examples of behavior demonstrating self confidence
      (1) Demonstrates the ability to trust personal judgement
      (2) Demonstrates an awareness of strengths and limitations
6. Communications
   a. The exchange of thoughts, messages and information
   b. Ability to convey information to others verbally and in writing
   c. The ability to understand and interpret verbal and written messages
   d. Examples of behavior demonstrating good communications
      (1) Speaking clearly
      (2) Writing legibly
      (3) Listening actively
      (4) Adjusting communication strategies to various situations
7. Time management
   a. Organizing tasks to make maximum use of time
   b. Prioritizing tasks

c. Examples of behavior demonstrating good time management
(1) Is punctual
(2) Completes tasks and assignments on time

8. Teamwork and diplomacy
a. Teamwork is the ability to work with others to achieve a common goal
b. Diplomacy is tact and skill in dealing with people
c. Examples of behavior demonstrating teamwork and diplomacy
(1) Places the success of the team above self interest
(2) Does not undermine the team
(3) Helps and supports other team members
(4) Shows respect for all team members
(5) Remains flexible and open to change
(6) Communicates with co-workers in an effort to resolve problems

9. Respect
a. To feel and show deferential regard for others
b. Showing consideration and appreciation
c. Examples of behavior demonstrating respect
(1) Being polite to others
(2) Not using derogatory or demeaning terms
(3) Behavior in a manner to bring credit to yourself, your associations, and your profession

10. Patient advocacy
a. Acting in the best interest of the patient
b. Accepting other's right to differ
c. Not imposing your beliefs on others
d. Examples of behavior demonstrating patient advocacy
(1) Not allowing personal (religious, ethical, political, social, legal) biases to impact patient care
(2) Placing the needs of patients above own self interest
(3) Protecting patient confidentiality

11. Careful delivery of service
a. Delivers the highest quality of patient care with careful attention to detail
b. Critically evaluates performance and attitude
c. Examples of behavior demonstrating a careful deliver of service
(1) Mastering and refreshing skills
(2) Performing complete equipment checks
(3) Careful and safe ambulance operations
(4) Following policies, procedures, and protocols
(5) Following orders of superiors

VIII. The roles and responsibilities of the paramedic
A. Primary responsibilities
1. Preparation
a. Physical, mental, emotional
(1) Positive health practices
b. Appropriate equipment and supplies
c. Adequate knowledge and skill maintenance
2. Response

a. Safety
b. Timeliness

3. Scene assessment
   a. Safety
   b. Mechanism
4. Patient assessment
5. Recognition of injury or illness
   a. Prioritization
6. Management
   a. Following protocols
   b. Interacting with medical direction physician, as needed
7. Appropriate disposition
   a. Treat and transport
      (1) Ground
      (2) Air
   b. Selection of the proper receiving facility
      (1) Requires knowledge of the receiving facilities
      (2) Hospital designation/ categorization
      (3) Based on hospital resource capabilities with regard to optimal patient care
      (4) Clinical capabilities and specialty availability
         (a) Emergency department
         (b) Operating suite
         (c) Post-anesthesia recovery room or surgical intensive care unit
         (d) Intensive care units for trauma patients
         (e) Cardiac
         (f) Neurology
         (g) Acute hemodialysis capability
         (h) Burn specialization
         (i) Acute spinal cord/ head injury management capability
         (j) Radiological special capability
         (k) Rehabilitation
         (l) Clinical laboratory service
         (m) Toxicology
            i) Hazmat/ decontamination
         (n) Hyperbarics
         (o) Reperfusion
         (p) Pediatrics
         (q) Psychiatric facilities
         (r) Trauma centers
         (s) High risk delivery
         (t) Other
      (5) Transfer agreements
      (6) Payers and insurance systems
   c. Treat and transfer with medical direction
   d. Treat and refer with medical direction
8. Patient transfer
   a. Acting as patient advocate

b. Briefing hospital staff

9. Documentation
   a. Thorough, accurate patient care reports
   b. Completed in timely manner
10. Returning to service
   a. Preparation of equipment and supplies
   b. Preparing crew
      (1) Debriefing

B. Additional responsibilities
1. Community involvement
   a. Role modeling
   b. Leader activities
   c. Community activities
   d. Prevention activities
   e. Teaching in the community
      (1) Helps improve health of the community
         (a) Injury and illness prevention
         (b) Enhances compliance with treatment regimes, etc.
      (2) Ensures appropriate utilization of resources through public education
         (a) When, where, how to use EMS
      (3) Improves integration of EMS with other health care and public safety agencies
         (a) Creates cooperative public education efforts
      (4) Enhances visibility and positive image of EMS providers
2. Supporting primary care efforts
   a. Some systems may find it beneficial to utilize paramedics in a limited role
   b. Can help improve the health of the community
   c. Prevent injuries and illnesses
   d. Enhance compliance with treatment regimes
   e. Ensure more appropriate utilization of resources through public education
      (1) When, where, how to use EMS, or need hospitalization
   f. Reduce costs of overall system operation
      (1) Ensure appropriate utilization of out-of-hospital and other non-EMS health care resources
         (a) Less expensive transportation alternatives
         (b) Non-hospital ED clinical providers, free standing emergency clinics, etc.
3. Advocating citizen involvement in the EMS system
   a. Improves EMS system
      (1) Involvement in establishing needs, parameters
      (2) Outside, objective view into quality improvement and problem resolution
      (3) Creates informed, independent advocates for the EMS system
4. Participate in leadership activities
   a. Advocate/ conduct primary illness and injury prevention initiatives
   b. Advocate media campaigns to promote EMS issues
   c. Identify, develop as necessary, and distribute informational materials
   d. Assist agency with sponsoring prevention activities
   e. Organize formal and informal illness and injury risk surveys

5. Personal professional development
    a. Explore alternative career paths
    b. Continuing education
    c. Mentoring
    d. Professional organization involvement
    e. Work-related issues impacting career growth
    f. Conducting/ supporting research initiatives

IX. Medical direction
- A. Many services provided by paramedics are derived from medical practices
- B. Paramedics operate as "physician extension"
- C. Physicians regarded as the authorities on issues of medical care
- D. Physicians, properly educated and motivated, are a vital component of EMS
- E. Role of the EMS physician in providing medical direction
    1. Education and training of personnel
    2. Participation in personnel selection process
    3. Participation in equipment selection
    4. Development of clinical protocols, in cooperation with expert EMS personnel
    5. Participation in quality improvement and problem resolution
    6. Provides direct input into patient care
    7. Interfaces between EMS systems and other health care agencies
    8. Advocacy within the medical community
    9. Serve as the "medical conscience" of the EMS system
        a. Advocate for quality patient care
    10. Types of medical direction
        a. On-line/ direct
        b. Off-line/ indirect
- F. Benefits of medical direction
    1. On-line
        a. Immediate and patient specific care
        b. Telemetry
        c. Continuous quality improvement
        d. On-scene
    2. Off-line
        a. Prospective
            (1) Development of protocols/ standing orders, training
            (2) Selection of equipment, supplies and personnel
        b. Retrospective
            (1) Patient care report review, continuous quality improvement
- G. Interacting with a physician on the scene
    1. Origins of medical direction
    2. Use of standing orders
    3. Direct field supervision
    4. The non affiliated on-scene physician

X. Improving system quality
- A. Develop a system for continually evaluating and improving care
    1. Continuous quality improvement (CQI)

a. Focus on the system and not an individual
b. Fix system problems in areas such as
(1) Medical direction
(2) Financing
(3) Training
(4) Communication
(5) Prehospital treatment and transport
(6) Inter-facility transport
(7) Receiving facilities
(8) Specialty care units
(9) Dispatch
(10) Public information and education
(11) Audit and quality assurance
(12) Disaster planning
(13) Mutual aid

2. Dynamic process
a. Delineate system-wide problems identified
b. Elaborate on the cause(s) of the problem
c. Aid the problem and develop remedy(ies)
d. Lay out plan to correct the problem
e. Enforce the plan of correction
f. Reexamine the problem

3. Appropriate EMS research can help enhance quality improvement efforts

XI. EMS research

A. Benefits of research

1. Quality EMS research is beneficial to the future of EMS
a. Changes in professional standards, training, equipment, procedures
b. Based on empirical data, rather than "great ideas" or "new gadget" models

2. EMS funding dependent on scientifically proving the value of EMS services
a. Anecdotes will not suffice
b. Reduced spending by managed care and governmental bodies
c. Outcome studies are needed to assure the continued funding for EMS

3. Enhances recognition and respect for EMS professionals

B. Basic principles

1. Peer review and publication of research
2. Finding research
3. Types of research
a. Descriptive
b. Experimental
c. Prospective
d. Retrospective
e. Cross sectional
4. Population
5. Randomization and control
a. Sample
(1) Systematic sampling
(2) Alternative time sampling

(3) Convenience sampling
b. Sampling error
c. Selection bias
6. Parameter
a. Nuisance variables
7. Blinding
a. Unblinded
b. Single blinded
c. Double blinded
d. Triple blinded
8. Basic statistics
a. Descriptive
(1) Qualitative
(2) Quantitative
(a) Mean
(b) Median
(c) Mode
(d) Standard deviation
b. Inferential
(1) Null hypothesis
(2) Research hypothesis
9. Research ethics
a. Consent
10. Research format
a. Introduction
b. Methods
c. Results
d. Discussion
e. Conclusion

C. Conducting research
1. Prepare a question
2. Write a hypothesis
3. Decide what to measure and the best method to measure it
4. Define the population
5. Identify study limitations
6. Seek study approval
7. Obtain informed consent
8. Gather data
a. Conduct pilot trials first
9. Analyze the data
a. Understand the pitfalls of interpreting data
10. Determine what to do with the research product
a. Publish
b. Present
c. Follow-up studies

D. Examples of research
1. Conclusions based on scientifically sound procedures, techniques, and equipment
2. Answering a clinically important question

3. Results leading to system improvements

E. EMS providers role in data collection

F. Evaluating and interpreting research

1. Was the research peer reviewed?
2. What was the research hypothesis?
3. Was the study approved by an institutional review board and conducted ethically?
4. What was the population being studies?
5. What were the entry/ exclusion criteria for the study?
6. What method was used to draw a sample of patients?
7. How many groups were the patients divided into?
8. How were patients assigned into the groups?
9. What type of data were gathered?
10. Does it appear that the study had enough patients enrolled?
11. Do there appear to be any potential confounding variables that are not accounted for?
12. Were the data properly analyzed?
13. Is the author's conclusion logical based on the data?
14. Does it apply in local EMS systems?
15. Are patients in the study similar to those in the local EMS system?

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UNIT TERMINAL OBJECTIVE

1-2 At the completion of this unit, the paramedic student will understand and value the importance of personal wellness in EMS and serve as a healthy role model for peers.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-2.1 Discuss the concept of wellness and its benefits. (C-1)
1-2.2 Define the components of wellness. (C-1)
1-2.3 Describe the role of the paramedic in promoting wellness. (C-1)
1-2.4 Discuss the components of wellness associated with proper nutrition. (C-1)
1-2.5 List principles of weight control. (C-1)
1-2.6 Discuss how cardiovascular endurance, muscle strength, and flexibility contribute to physical fitness. (C-2)
1-2.7 Describe the impact of shift work on circadian rhythms. (C-1)
1-2.8 Discuss how periodic risk assessments and knowledge of warning signs contribute to cancer and cardiovascular disease prevention. (C-1)
1-2.9 Differentiate proper from improper body mechanics for lifting and moving patients in emergency and non-emergency situations. (C-3)
1-2.10 Describe the problems that a paramedic might encounter in a hostile situation and the techniques used to manage the situation. (C-1)
1-2.11 Given a scenario involving arrival at the scene of a motor vehicle collision, assess the safety of the scene and propose ways to make the scene safer. (C-3)
1-2.12 List factors that contribute to safe vehicle operations. (C-1)
1-2.13 Describe the considerations that should be given to: (C-1)
- a. Using escorts
- b. Adverse environmental conditions
- c. Using lights and siren
- d. Proceeding through intersections
- e. Parking at an emergency scene

1-2.14 Discuss the concept of "due regard for the safety of all others" while operating an emergency vehicle. (C-1)
1-2.15 Describe the equipment available for self-protection when confronted with a variety of adverse situations. (C-1)
1-2.16 Describe the benefits and methods of smoking cessation. (C-1)
1-2.17 Describe the three phases of the stress response. (C-1)
1-2.18 List factors that trigger the stress response. (C-1)
1-2.19 Differentiate between normal/ healthy and detrimental reactions to anxiety and stress. (C-3)
1-2.20 Describe the common physiological and psychological effects of stress. (C-1)
1-2.21 Identify causes of stress in EMS. (C-1)
1-2.22 Describe behavior that is a manifestation of stress in patients and those close to them and how these relate to paramedic stress. (C-1)
1-2.23 Identify and describe the defense mechanisms and management techniques commonly used to deal with stress. (C-1)
1-2.24 Describe the components of critical incident stress management (CISM). (C-1)
1-2.25 Provide examples of situations in which CISM would likely be beneficial to paramedics. (C-1)
1-2.26 Given a scenario involving a stressful situation, formulate a strategy to help cope with the stress. (C-3)
1-2.27 Describe the stages of the grieving process (Kubler-Ross). (C-1)
1-2.28 Describe the needs of the paramedic when dealing with death and dying. (C-1)
1-2.29 Describe the unique challenges for paramedics in dealing with the needs of children and other special populations related to their understanding or experience of death and dying. (C-1)

1-2.30 Discuss the importance of universal precautions and body substance isolation practices. (C-1)
1-2.31 Describe the steps to take for personal protection from airborne and bloodborne pathogens. (C-1)
1-2.32 Given a scenario in which equipment and supplies have been exposed to body substances, plan for the proper cleaning, disinfection, and disposal of the items. (C-3)
1-2.33 Explain what is meant by an exposure and describe principles for management. (C-1)

AFFECTIVE OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

1-2.34 Advocate the benefits of working toward the goal of total personal wellness. (A-2)
1-2.35 Serve as a role model for other EMS providers in regard to a total wellness lifestyle. (A-3)
1-2.36 Value the need to assess his/ her own lifestyle. (A-2)
1-2.37 Challenge his/ herself to each wellness concept in his/ her role as a paramedic. (A-3)
1-2.38 Defend the need to treat each patient as an individual, with respect and dignity. (A-2)
1-2.39 Assess his/ her own prejudices related to the various aspects of cultural diversity. (A-3)
1-2.40 Improve personal physical well-being through achieving and maintaining proper body weight, regular exercise and proper nutrition. (A-3)
1-2.41 Promote and practice stress management techniques. (A-3)
1-2.42 Defend the need to respect the emotional needs of dying patients and their families. (A-3)
1-2.43 Advocate and practice the use of personal safety precautions in all scene situations. (A-3)
1-2.44 Advocate and serve as a role model for other EMS providers relative to body substance isolation practices. (A-3)

PSYCHOMOTOR OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

1-2.45 Demonstrate safe methods for lifting and moving patients in emergency and non-emergency situations. (P-2)
1-2.46 Demonstrate the proper procedures to take for personal protection from disease. (P-2)

DECLARATIVE

I. Introduction
  A. Wellness has three components
    1. Physical well-being
    2. Mental and emotional well-being
  B. Implementing lifestyle changes can enhance personal wellness
  C. Enhancing personal wellness can serve as a role model/ coach for others

II. Wellness components
  A. Physical well-being
    1. Nutrition
      a. Nutrients
        (1) Carbohydrates
        (2) Fats
        (3) Proteins
        (4) Vitamins
        (5) Minerals
        (6) Water
      b. Food groups
        (1) Sugar
        (2) Fats
        (3) Proteins
        (4) Dairy products
        (5) Vegetables
        (6) Fruits
        (7) Grains
      c. Principles of weight control
        (1) Eat in moderation
        (2) Limit fat consumption
        (3) Exercise
      d. Tips to change behavior
        (1) Realistic goal
        (2) Commitment to change
        (3) Exercise
        (4) Healthy eating
        (5) Analyzing progress
    2. Physical fitness
      a. Benefits
        (1) Decrease in resting heart rate and blood pressure
        (2) Increase oxygen carrying capacity
        (3) Enhanced quality of life
        (4) Increase muscle mass and metabolism
        (5) Increased resistance to injury
        (6) Improved personal appearance and self image
        (7) Facilitate maintenance of motor skills throughout life
      b. Cardiovascular endurance
        (1) Fitness assessment

(2) Heart rate target zone
c. Muscular strength
(1) Strength & endurance assessment
(2) Principles of training
(a) Isometric versus isotonic
(b) Resistance
(c) Sets
(d) Frequency
d. Muscular flexibility
(1) Flexibility assessment
(2) Principles of muscular flexibility
(a) Intensity of exercise
(b) Repetitions
(c) Frequency
(3) Prevention and rehabilitation of low back pain

3. Sleep
a. Sleep deprivation
b. Disruption of circadian timing system

4. Disease prevention
a. Cardiovascular disease
(1) Cardiovascular endurance
(2) Blood pressure
(3) Body composition
(4) Total cholesterol/ HDL ratio
(5) Triglycerides
(6) Estrogen use
(7) Stress
(8) Periodic risk assessment
b. Cancer
(1) Dietary changes
(2) Sun exposure
(3) Regular examinations
(4) Warning signs
(5) Periodic risk assessment
c. Infectious disease
(1) Hygiene
(2) Utilize engineering and work practices
(3) Report exposure promptly
(4) Periodic risk assessment

5. Injury prevention
a. Body mechanics during lifting and moving
(1) Only move a patient you can safely handle
(2) Look where you're walking/ crawling
(3) Move forward rather than backward when possible
(4) Take short steps, if walking
(5) Bend at hips and knees
(6) Lift with legs, not back
(7) Keep load close to body

(8) Keep patient's body in-line when moving
b. Hostile environments
(1) Avoidance
(2) Management
c. Rescue situations
(1) Use protective gear
(2) Appropriate training
(3) Safe rescue practices
d. Safe vehicle operation
(1) Factors in safe driving
(2) Using escorts
(3) Adverse environmental conditions
(4) Using lights and sirens
(5) Proceeding through intersections
(6) Parking at an emergency scene
(7) "Due regard for the safety of all others"
e. Safety equipment and supplies
(1) Body substance isolation equipment
(2) Head protection
(3) Eye protection
(4) Hearing protection
(5) Respiratory protection
(6) Gloves
(7) Boots
(8) Coveralls
(9) Turnout coat/ pants
(10) Specialty equipment

B. Mental and emotional health
1. Substance misuse/ abuse control
a. Addiction
(1) Addictive behaviors
(2) Methods of management
b. Smoking cessation
(1) Health ramifications of smoking
(2) Why people smoke
(3) Techniques
2. Anxiety and stress
a. Stress results from the interaction of events (environmental stimuli) and the adjustive capabilities of the individual
(1) Usually seen as generating negative affect (fear, depression, guilt, etc.)
(2) Also experienced with positive events
b. Anxiety is uneasiness or dread about future uncertainties
c. Eustress is "good stress"--response to positive stimuli
d. Distress is "bad stress"--a negative response to an environmental stimulus
3. Personal time/ meditation/ contemplation
4. Family, peer, community connections
5. Freedom from prejudice
a. Acceptance of cultural differences

(1) Learn about other cultures
(2) Recognize most variations among cultures as positive
(3) Affirm the value of differences

b. Acceptance of individual differences
(1) Recognize existence of differences
(2) Listen until you can tell the other person's story
(3) Work toward win-win solution

III. Stress

A. Three phases of the stress response

1. Alarm reaction
a. Fight or flight phenomenon
b. Considered to be positive; takes only seconds
c. Prepares individual for action/ self-defense
d. Mediated by the autonomic nervous system, coordinated by hypothalamus
e. Pituitary gland releases adrenocorticotropic (stress) hormones
f. Stimulates glucose production
g. Sympathetic response
(1) Adrenal gland releases epinephrine and norepinephrine
h. Physiological response
(1) Increased heart rate
(2) Increased blood pressure
(3) Dilated pupils
(4) Relaxation of bronchial tree
(5) Increased blood sugar
(6) Slowed digestion
i. The reaction ends when the body realizes the event is not dangerous

2. Resistance
a. Increased level of resistance to stressor
b. Reaction to stressor may change with time

3. Exhaustion
a. As stress continues, coping mechanisms are exhausted
b. Adaptive resources utilized
c. Resistance to all stressors declines
d. Increased susceptibility to physical and psychological ailments
e. Rest and recovery are needed

B. Factors that trigger the stress response
1. Loss of something that is of value to the individual
2. Injury or threat of injury to the body
3. Poor health, nutrition
4. Frustration of drives
5. Ineffective coping

C. Physiological and psychological effects of stress
1. Normal/ healthy responses to stress
2. Detrimental/ unhealthy responses to stress
3. Signs and symptoms of stress
a. Physical
(1) Chest tightness/ pain, heart palpitations, cardiac rhythm disturbances

(2) Difficult/ rapid breathing
(3) Nausea, vomiting
(4) Profuse sweating, flushed skin, diaphoresis
(5) Sleep disturbances
(6) Aching muscles and joints
(7) Headache

b. Emotional
(1) Panic reactions
(2) Fear
(3) Anger
(4) Denial
(5) Feeling overwhelmed

c. Cognitive
(1) Difficulty making decisions
(2) Disorientation, decreased level of awareness
(3) Memory problems, poor concentration
(4) Distressing dreams

d. Behavioral
(1) Crying spells
(2) Hyperactivity
(3) Withdrawal
(4) Changes in eating habits
(5) Increased smoking
(6) Increased alcohol consumption

D. Causes of stress in EMS
1. Environmental stress
a. Siren noise
b. Inclement weather
c. Confined work spaces
d. Rapid scene response
e. Life and death decision making
2. Psychosocial stress
a. Family relationships
b. Conflicts with supervisors, coworkers
c. Abusive patients
3. Personality stress
a. Need to be liked
b. Personal expectations
c. Feelings of guilt and anxiety

E. Reactions to stress
1. Reactions are individual and affected by
a. Previous exposure to the stressor
b. Perception of the event
c. Experience
d. Personal coping skills
2. Adaptation
a. Dynamic evolving process
b. Defense

(1) Adaptive function of personality
(2) Assists in adjusting to stressful situations that confront us
(3) Help to avoid dealing with problems, through denial or distortion

c. Coping
(1) Active, confronting process
(2) Information gathered/ used to change or adjust to a new situation

d. Problem solving
(1) Viewed as a healthy approach to everyday concerns
(2) Involves
(a) Problem analysis
(b) Generation of options for action
(c) Determination of course of action

e. Mastery
(1) Ability to see multiple options/ potential solutions for challenging situations
(2) Results from extensive experience with similar situations

F. Stress management techniques
1. Reframing
2. Controlled breathing
3. Progressive relaxation
4. Guided imagery

G. Critical incident stress management (CISM)
1. Organized, formal, peer and mental health support network and process
a. Enables emergency personnel to vent feelings
b. Facilitates understanding of stressful situations
2. Components of CISM
a. Pre-incident stress training
b. On-scene support to distressed personnel
c. Individual consults
d. Defusing services immediately after a large scale incident
e. Mobilization services after large scale incident
f. Critical incident stress debriefing 24 to 72 hours after an event
g. Follow-up services
h. Specialty debriefings to non-emergency groups in the community
i. Support during routine discussions of an incident
j. Advice to command staff during large scale incident
3. Situations in which CISM should be considered
a. Line of duty injury or death
b. Disaster
c. Emergency worker suicide
d. Infant/ child death
e. Extreme threat to emergency worker
f. Prolonged incident which ends in loss or success
g. Victims known to operations personnel
h. Death/ injury of civilian caused by operations
i. Other significant event
4. Techniques for reducing crisis-induced stress
a. Rest
b. Replace food and fluids

c. Limiting exposure to incident
d. Change assignments
e. Provide post event defusing/ debriefing

IV. Dealing with death, dying, grief and loss
A. Patient and family needs
1. Stages of the grieving process (Kubler-Ross)
a. Denial
(1) Inability/ refusal to believe the reality of the event
(2) Defense mechanism
b. Anger
(1) Frustration related to inability to control situation
(2) May focus on anyone or anything
c. Bargaining
(1) Attempt to "buy additional time"
(2) Make deals to put off or change expected outcome
d. Depression
(1) Sadness and despair
(2) Withdraw/ retreat
e. Acceptance
(1) Realization of fate
(2) Reasonable level of comfort with anticipated outcome
B. Common needs of the paramedic when dealing with death and dying
1. Support from friends and family following the incident
2. Opportunity to process specific incident
3. Opportunities to process cumulative stress
C. Developmental considerations when dealing with death and dying
1. Newborn to age three
a. Children will sense that something has happened in the family
b. Children will realize that people are crying and are sad all the time
c. Children will realize that there is much activity in their household
d. Watch for changes in
(1) Eating or sleeping patterns
(2) Irritability
e. Suggestions
(1) Be sensitive to the child's needs
(2) Try to maintain consistency in routines
(3) Maintain consistency with significant people in the child's life
2. Three to six years of age
a. Child does not have concept of the finality of death
b. Believes that the person will return and will continually ask when the person will return
c. Believes in magical thinking (child may feel he was responsible for the death)
d. Child may believe that everyone else he loves will die also
e. Watch for changes in
(1) Behavior patterns with friends and at school
(2) Difficulty sleeping
(3) Changes in eating habits

f. Suggestions
(1) Emphasize to the child that he was not responsible for the death
(2) Reinforce that when people are sad they cry; crying is normal and natural
(3) Encourage the child to draw pictures of his feelings, or talk about his feelings

3. Six to nine years of age
a. Beginning to understand the finality of death
b. Will seek out detailed explanations for the death; differentiate fatal illness from "just being sick"
c. Will be afraid other significant people in their lives will die as well
d. Be uncomfortable in expressing feelings; may act silly or embarrassed when talking about death
e. Suggest
(1) Talk about the normal feelings of anger, sadness and guilt
(2) Share your own feelings about death; do not be afraid to cry in front of the child - this gives the child permission to express their feelings

4. Nine to twelve years of age
a. Aware of the finality of death
b. Concerned with practical matters concerning the child's lifestyle
c. May want to know all the details surrounding the death
d. May try to "act like an adult", but then show regression to an earlier stage of emotional response
e. Suggestions
(1) Set aside time to talk about feelings
(2) Encourage sharing of memories to facilitate grief response

5. Elderly
a. Concern about other family members
b. Concern about further loss of independence
c. Concern about cost

V. Preventing disease transmission
A. Terminology
1. Air/ blood borne pathogens
2. Exposure
a. Contact with a potentially infectious body fluid substance
b. Contact with other infectious agent
3. Cleaning, disinfection, sterilization
4. Body substance isolation, universal precautions
a. Practices designed to prevent contact with body substances
b. Practices designed to reduce contact with other agents

B. Common sources of exposure
1. Needle stick
2. Broken or scraped skin
3. Mucous membranes of the eyes, nose or mouth

C. Protection from air/ blood borne pathogens
1. Follow engineering and work practices
a. Puncture resistant containers
b. Laundry

c. Labeling

2. Maintain good personal health and hygiene habits
   a. Hand washing
   b. General cleanliness
3. Maintain immunizations
   a. Tetanus
   b. Polio
   c. Hepatitis B
   d. MMR (measles, mumps and rubella)
   e. Influenza
4. Periodic tuberculosis screening
5. Body substance isolation/ universal precautions
   a. Gloves
   b. Mask, gown, eye wear
   c. Other equipment
6. Cleaning, disinfecting, and disposing of used materials/ equipment

D. Periodic risk assessment

E. Documenting and managing an exposure
1. Wash the area of contact thoroughly and immediately
2. Document the situation in which the exposure occurred
3. Describe actions taken to reduce chances of infection
4. Comply with all required reporting responsibilities and time frames
5. Cooperate with incident investigation
6. Check tuberculosis/ other screening for exposure
7. Proper immunization boosters
8. Complete medical follow-up

UNIT TERMINAL OBJECTIVE

1-3 At the completion of this unit, the paramedic student will be able to integrate the implementation of primary injury prevention activities as an effective way to reduce death, disabilities and health care costs.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1.3-1 Describe the incidence, morbidity and mortality of unintentional and alleged unintentional events. (C-1)
1.3-2 Identify the human, environmental, and socioeconomic impact of unintentional and alleged unintentional events. (C-1)
1.3-3 Identify health hazards and potential crime areas within the community. (C-1)
1.3-4 Identify local municipal and community resources available for physical, socioeconomic crises. (C-1)
1.3-5 List the general and specific environmental parameters that should be inspected to assess a patient's need for preventative information and direction. (C-1)
1.3-6 Identify the role of EMS in local municipal and community prevention programs. (C-1)
1.3-7 Identify the local prevention programs that promote safety for all age populations. (C-2)
1.3-8 Identify patient situations where the paramedic can intervene in a preventative manner. (C-1)
1.3-9 Document primary and secondary injury prevention data. (C-1)

AFFECTIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1.3-10 Value and defend tenets of prevention in terms of personal safety and wellness. (A-3)
1.3-11 Value and defend tenets of prevention for patients and communities being served. (A-3)
1.3-12 Value the contribution of effective documentation as one justification for funding of prevention programs. (A-3)
1.3-13 Value personal commitment to success of prevention programs. (A-3)

PSYCHOMOTOR OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1.3-14 Demonstrate the use of protective equipment appropriate to the environment and scene. (P-3)

DECLARATIVE

I. Epidemiology
- A. Incidence, morbidity, mortality
  1. Injury surpassed stroke as third leading cause of death
  2. Estimated lifetime cost of injuries >$114 billion
  3. Estimated 19 hospitalizations and 254 emergency department visits for each injury death
- B. Effects of early release from hospital on EMS services
  1. Implications are increased access on EMS services for supportive care and intervention
- C. Related terminology
  1. Injury
     a. Defined as intentional or unintentional damage to the person resulting from acute exposure to thermal, mechanical, electrical or chemical energy or from the absence of such essentials as heat or oxygen
  2. Injury risk
     a. Defined as real or potential hazardous situations that put individuals at risk for sustaining an injury
  3. Injury surveillance
     a. Defined as ongoing systematic collection, analysis and interpretation of injury data essential to the planning, implementation and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know
     b. The final link in the surveillance chain is the application of these data to prevention and control
  4. Primary injury prevention
     a. Defined as keeping an injury from ever occurring
  5. Secondary and tertiary prevention
     a. Defined as care and rehabilitation activities (respectively) that are preventing further problems from an event that has already occurred
  6. Teachable moment
     a. Defined as the time after an injury has occurred when the patient and observers remain acutely aware of what has happened and may be more receptive to teaching about how the event or illness could be prevented
  7. Years of productive life
     a. Defined as the calculation by subtracting age of death from 65

II. Feasibility of EMS involvement
- A. EMS providers are widely distributed amid the population
- B. EMS providers often reflect the composition of the community
- C. In a rural setting, the EMS provider may be the most medically educated individual
- D. More than 600,000 EMS providers in the United States
- E. EMS providers are high-profile role models
- F. EMS providers are often considered as champion of the health care consumer
- G. EMS providers are welcome in schools and other environments
- H. EMS providers are considered authorities on injury and prevention

III. Essential leadership activities
- A. Protection of individual EMS providers from injury

1. Policies promoting response, scene and transport safety
2. Appropriate equipment to providers for eye, back, skin safety
3. Appropriate equipment to providers for prevention from communicable and chemical exposure
4. Implementation of safety program
5. Establish a wellness program for EMS providers

B. Provide education to EMS providers
1. Fundamentals of primary injury prevention
2. Incorporation into EMS primary and continuing education programs
3. Establish liaison with public and private sector specialty groups for specific education and training

C. Support and promote collection and use of injury data
1. Develop policies that promote documentation of injuries by EMS providers
2. Modify data collection tools so prompt recording of data is feasible and realistic
3. Contribute to local, statewide and national surveillance systems

D. Obtain support and resources for primary injury prevention activities
1. Establish internal budgetary support
2. Seek financial resource to sponsor injury prevention programs
   a. "In-kind" services
   b. Fees and equipment
   c. Publicity
   d. Network with other injury prevention organizations
   e. Initiate and attend meetings of local organizations involved or requesting involvement in injury prevention

E. Empower individual EMS providers to conduct primary injury prevention activities
1. Identify and encourage interest and support
2. Establish internal budgetary support, where possible
   a. Provide rotational assignment to prevention programs
   b. Provide salary for off-duty injury prevention activities
   c. Reward and/ or remunerate participation

IV. Essential provider activities
A. Education
1. Implementation of primary personal injury prevention strategies
   a. Wellness
      (1) Exercise and conditioning
      (2) Management of stress
         (a) Personal
         (b) Family
         (c) Work environment
   b. Safe driving
      (1) Fundamental driving techniques
      (2) Restraints
         (a) Self
         (b) Patient
         (c) Riders
      (3) Use of personal protective equipment
         (a) Reflective clothing

(b) Helmets
(4) Use of lights, sirens
(5) Approach to, parking at and leaving the scene
(6) Driving without drinking
c. Scene safety precautions
(1) Availability and use of law enforcement
(2) Traffic control
(a) Vehicles
(b) Bystanders
d. Lifting and moving techniques
e. Recognition of health hazards and potential high profile crime areas
f. Practice on-scene survival techniques
g. Use on-scene survival resources
2. Review the maladies and injuries common to
a. Infancy
(1) Low birth weight
(2) Mortality and morbidity
b. Childhood
(1) Intentional events
(2) Unintentional events
(3) Alleged unintentional events
c. Childhood violence
(1) To self
(2) To others
d. Adult
e. Geriatrics
f. Recreation
g. Work hazards
h. Day care center
(1) Licensed
(2) Non-licensed
i. Early release from hospital
j. Discharge from urgent care, or other out-patient facilities
k. Signs of emotional stress that may lead to intentional and unintentional and alleged unintentional events
l. Self medication
(1) Dangers of non-compliance
(a) Borrowing
(b) Taking medications on time and finishing the regimen
(2) Storage
(3) Over-medication

V. Implementation of prevention strategies
A. Preservation of safety of the response team
1. As in IV A. 1, 2 above
B. Patient care considerations
1. Recognize signs/ symptoms of suspected abuse
a. Recognition of abusive situations

b. Resolving conflict without violence

C. Recognize signs/ symptoms of exposure to
1. Hazardous materials
2. Temperature extremes
3. Vector
4. Communicable disease
5. Assault, battery
6. Structural risks

D. Recognizing need for outside resource
a. Municipal
b. Community
c. Religious

E. Documentation
1. Record primary care
2. Record primary injury data
a. Scene conditions
b. Mechanism of injury
c. Use of protective devices
d. Absence of protective devices
e. Risks overcome
f. Other as noted by the EMS agency

F. On-scene education
1. Recognize/ sense possible recurrence
2. Effective communications
a. Recognizing the teachable moment
b. Non-judgmental
c. Objective
d. Sense of timing
e. Consideration of ethnic, religious and social diversity considerations
3. Informing individuals how they can prevent recurrence
4. Informing individuals on use of protective devices

G. Resources identified for
1. Devices
2. Child protective services
3. Sexual abuse
4. Spousal abuse
5. Elder abuse
6. Food, shelter, clothing
7. Employment
8. Counseling
9. Alternative health care
a. Free clinic
10. Alternative means of transportation
11. After-care services
12. Rehabilitation
13. Grief support
14. Immunization programs
15. Vector control

16. Disabled
17. Day care
18. Alternative modes of education
19. Work-study programs
20. Mental health resources and counseling

VI. Participation in prevention programs
  A. Education and training
    1. Population served
      a. Ethnic
      b. Cultural
      c. Religious
      d. Language
      e. Learning disabled
      f. Physically challenged

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UNIT TERMINAL OBJECTIVE

1-4 At the completion of this unit, the paramedic student will understand the legal issues that impact decisions made in the out-of-hospital environment.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-4.1 Differentiate between legal and ethical responsibilities. (C-2)
1-4.2 Describe the basic structure of the legal system in the United States. (C-1)
1-4.3 Differentiate between civil and criminal law as it pertains to the paramedic. (C-1)
1-4.4 Identify and explain the importance of laws pertinent to the paramedic. (C-1)
1-4.5 Differentiate between licensure and certification as they apply to the paramedic. (C-1)
1-4.6 List the specific problems or conditions encountered while providing care that a paramedic is required to report, and identify in each instance to whom the report is to be made. (C-1)
1-4.7 Define the following terms: (C-1)
- a. Abandonment
- b. Advance directives
- c. Assault
- d. Battery
- e. Breach of duty
- f. Confidentiality
- g. Consent (expressed, implied, informed, involuntary)
- h. Do not resuscitate (DNR) orders
- I. Duty to act
- j. Emancipated minor
- k. False imprisonment
- l. Immunity
- m. Liability
- n. Libel
- o. Minor
- p. Negligence
- q. Proximate cause
- r. Scope of practice
- s. Slander
- t. Standard of care
- u. Tort

1-4.8 Differentiate between the scope of practice and the standard of care for paramedic practice. (C-3)
1-4.9 Discuss the concept of medical direction, including off-line medical direction and on-line medical direction, and its relationship to the standard of care of a paramedic. (C-1)
1-4.10 Describe the four elements that must be present in order to prove negligence. (C-1)
1-4.11 Given a scenario in which a patient is injured while a paramedic is providing care, determine whether the four components of negligence are present. (C-2)
1-4.12 Given a scenario, demonstrate patient care behaviors that would protect the paramedic from claims of negligence. (C-3)
1-4.13 Explain the concept of liability as it might apply to paramedic practice, including physicians providing medical direction and paramedic supervision of other care providers. (C-2)
1-4.14 Discuss the legal concept of immunity, including Good Samaritan statutes and governmental immunity, as it applies to the paramedic. (C-1)

1-4.15 Explain the importance and necessity of patient confidentiality and the standards for maintaining patient confidentiality that apply to the paramedic. (C-1)
1-4.16 Differentiate among expressed, informed, implied, and involuntary consent. (C-2)
1-4.17 Given a scenario in which a paramedic is presented with a conscious patient in need of care, describe the process used to obtain consent. (C-2)
1-4.18 Identify the steps to take if a patient refuses care. (C-1)
1-4.19 Given a scenario, demonstrate appropriate patient management and care techniques in a refusal of care situation. (C-3)
1-4.20 Describe what constitutes abandonment. (C-1)
1-4.21 Identify the legal issues involved in the decision not to transport a patient, or to reduce the level of care being provided during transportation. (C-1)
1-4.22 Describe how hospitals are selected to receive patients based on patient need and hospital capability and the role of the paramedic in such selection. (C-1)
1-4.23 Differentiate between assault and battery and describe how to avoid each. (C-2)
1-4.24 Describe the conditions under which the use of force, including restraint, is acceptable. (C-1)
1-4.25 Explain the purpose of advance directives relative to patient care and how the paramedic should care for a patient who is covered by an advance directive. (C-1)
1-4.26 Discuss the responsibilities of the paramedic relative to resuscitation efforts for patients who are potential organ donors. (C-1)
1-4.27 Describe the actions that the paramedic should take to preserve evidence at a crime or accident scene. (C-1)
1-4.28 Describe the importance of providing accurate documentation (oral and written) in substantiating an incident. (C-1)
1-4.29 Describe the characteristics of a patient care report required to make it an effective legal document. (C-1)
1-4.30 Given a scenario, prepare a patient care report, including an appropriately detailed narrative. (C-2)

AFFECTIVE OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

1-4.31 Advocate the need to show respect for the rights and feelings of patients. (A-3)
1-4.32 Assess his/ her personal commitment to protecting patient confidentiality. (A-3)
1-4.33 Given a scenario involving a new employee, explain the importance of obtaining consent for adults and minors. (A-2)
1-4.34 Defend personal beliefs about withholding or stopping patient care. (A-3)
1-4.35 Defend the value of advance medical directives. (A-3)

PSYCHOMOTOR OBJECTIVES
None identified for this unit.

DECLARATIVE

I. Introduction
- A. Legal duties and ethical responsibilities
  - 1. Legal duties are to the patient, medical director, and public
    - a. Set by statutes and regulations
    - b. Based on generally accepted standards
  - 2. Ethical responsibilities as a professional
    - a. Principles that identify conduct deemed morally desirable
    - b. Ethical responsibilities include
      - (1) Responding to the physical and emotional needs of every patient with respect
      - (2) Maintaining mastery of skills
      - (3) Participating in continuing education/ refresher training
      - (4) Critically reviewing performance and seeking improvement
      - (5) Reporting honestly and respecting confidentiality
      - (6) Working cooperatively and with respect for other emergency professionals
    - c. NAEMT Code of Ethics exemplifies ethical guidelines for the paramedic
- B. Failing to perform the job appropriately can result in civil or criminal liability
- C. The best legal protection is provision of appropriate assessment and care coupled with accurate and complete documentation
- D. Laws differ from state to state and area to area - get competent legal advice

II. The legal system
- A. Types of law
  - 1. Legislative law
    - a. Enacted at federal, state and local levels by legislative branches of government
    - b. Product of Congress, city councils, district boards, and general assemblies
  - 2. Administrative law
    - a. Regulations developed by a governmental agency
    - b. Agency has the authority to enforce rules, regulations, and statutes
  - 3. Common law
    - a. "Case" or "judge-made" law
    - b. Derived from society's acceptance of customs or norms over time
  - 4. Criminal law
    - a. Area of law in which the federal, state, or local government prosecutes individuals on behalf of society for violating laws designed to safeguard society
    - b. Violation punished by fine, imprisonment or both
  - 5. Civil (tort) law
    - a. Area of law dealing with private complaints brought by a plaintiff against a defendant for an illegal act or wrongdoing (tort)
    - b. Enforced by bringing a civil lawsuit in which the plaintiff requests the court to award damages
- B. How laws affect the paramedic
  - 1. Scope of practice
    - a. Range of duties and skills a paramedic is allowed and expected to perform when necessary

b. Usually set by state law or regulation and by local medical direction

2. Medical direction
   a. Required for paramedic practice
   b. May be off-line or on-line, depending on state and local requirements
   c. Each system should have a policy to guide paramedics in dealing with on-scene physician
3. Medical practice act
   a. Legislation that governs the practice of medicine; varies from state to state
   b. May prescribe how and to what extent a physician may delegate authority to a paramedic to perform medical acts
4. Licensure and/ or certification
   a. Certification
      (1) Grants recognition to an individual who has met predetermined qualifications to participate in an activity
      (2) Usually granted by a certifying agency or professional association, not necessarily a government agency
   b. Licensure
      (1) A process of occupational regulation
      (2) Governmental agency, such as state medical board, grants permission to an individual who meets established qualifications to engage in the profession or occupation
   c. Either or both may be required by state or local authorities to practice as a paramedic
5. Motor vehicle laws
   a. Motor vehicle code varies from state to state
   b. Set standards for equipping and operating an emergency vehicle
6. Mandatory reporting requirements
   a. Vary from state to state, but often include
      (1) Child abuse and neglect; elder abuse; spouse abuse
      (2) Sexual assault
      (3) Gunshot and stab wounds
      (4) Animal bites
      (5) Communicable diseases
   b. Content of report and to whom it must be made is set by law, regulation or policy
7. Protection for the paramedic
   a. Infectious disease exposure notification
   b. Immunity statutes
      (1) Governmental immunity
      (2) Good Samaritan laws
   c. Special crimes against a paramedic
      (1) Assault or battery to paramedic while performing duties
      (2) Obstruction of paramedic activity

C. The legal process
   1. The role of the courts
      a. Trial court
         (1) Determines outcomes of individual cases
         (2) Cases may be determined by judge or jury
      b. Appellate court

(1) Hears appeals of decisions by trial courts or other appeals courts
(2) Decisions may set precedent for later cases

2. Anatomy of a lawsuit
   a. Incident occurs
   b. Investigation is conducted by plaintiff's representative
   c. Complaint is filed in court and served on defendant
   d. Complaint is answered by defendant
   e. Discovery occurs
      (1) Depositions (oral) or interrogatives (written) are taken
      (2) Documents are gathered (e.g., patient records, patient care reports, etc.)
   f. Trial is conducted
   g. Decision is handed down by judge or jury
      (1) Determines guilt or liability
      (2) Determines damages and award, if any, to the plaintiff
   h. Decision may be appealed
      (1) Either side may appeal
      (2) Usually can only be based on errors in law made by the court
   i. Settlement occurs
      (1) May occur at any stage of the lawsuit
      (2) Plaintiff agrees to accept settlement in exchange for promise not to pursue case

III. Legal accountability of the paramedic
   A. Responsible to act in a reasonable and prudent manner
   B. Responsible to provide a level of care and transportation consistent with education/ training
   C. Negligence can result in legal accountability and liability
      1. Components of negligence
         a. Duty to act
            (1) May be a formal contractual or an informal duty
            (2) Duty may be undertaken voluntarily by beginning to care for a patient
            (3) Duties include
               (a) Duty to respond and render care
               (b) Duty to obey laws and regulations
               (c) Duty to operate emergency vehicle reasonably and prudently
               (d) Duty to provide care and transportation to the expected standard
               (e) Duty to provide care and transportation consistent with the scope of practice and local medical protocols
               (f) Duty to continue care and transportation through to its appropriate conclusion
         b. Breach of duty
            (1) Standard of care
               (a) Exercising the degree of care, skill, and judgement which would be expected under like or similar circumstances by a similarly trained, reasonable paramedic in the location involved
               (b) Standard of care is established by court testimony and reference to published codes, standards, criteria and guidelines applicable to the situation
            (2) Breach of duty may occur by

(a) Malfeasance - performing a wrongful or unlawful act
(b) Misfeasance - performing a legal act in a manner which is harmful or injurious
(c) Non-feasance - failure to perform a required act or duty

(3) In some cases, negligence may be so obvious that it does not require extensive proof
(a) Res ipsa loquitur - the injury could only have been caused by negligence
(b) Negligence per se - negligence is shown by the fact that a statute was violated and injury resulted

c. Damage to patient or other individual (i.e., the plaintiff)
(1) Proof that the plaintiff suffered compensable physical or psychological damages, such as
(a) Medical expenses
(b) Lost earnings
(c) Conscious pain and suffering
(d) Wrongful death
(2) Punitive (punishing) damages could be awarded
(a) Awarded to punish gross negligence or willful and wanton misconduct
(b) Punitive damages are usually not covered by malpractice insurance

d. Proximate cause
(1) The action or inaction of the paramedic was the cause of or worsened the damage
(2) The fact that the paramedic's act or inaction would result in the damage must have been reasonably foreseeable by the paramedic
(3) Usually established by expert testimony

2. Defenses to negligence
a. Good Samaritan laws
(1) Do not generally protect providers from acts of gross negligence, reckless disregard, or willful or wanton conduct
(2) Do not generally prohibit the filing of a lawsuit
(3) May provide coverage for paid or volunteer providers
(4) Varies from state to state

b. Governmental immunity
(1) Trend is toward limiting protection
(2) May only protect governmental agency, not provider
(3) Varies from state to state

c. Statute of limitations
(1) Limit the number of years after an incident during which a lawsuit can be filed
(2) Set by law and may differ for cases involving adults and children
(3) Varies from state to state

d. Contributory negligence
(1) Plaintiff may be found to have contributed to his or her own injury
(2) Damages awarded may be reduced or eliminated based on the plaintiff's contribution to his or her injury

e. Liability insurance

D. Special liability concerns
1. Liability of the paramedic medical director
a. On-line - direct supervision regarding patient care
b. Off-line
(1) Provided by use of protocols, including standing orders
(2) Indirect supervision
2. Liability for "borrowed servants"
a. Liability for actions of EMT-Basic supervised by the paramedic
b. Depends on degree of supervision and control given to the paramedic
3. Civil rights
a. May not discriminate in providing service to a patient by reason of race, color, sex, national origin, or, in some cases, ability to pay
b. Patients should be provided with appropriate care regardless of disease condition (e.g., AIDS/ HIV, other communicable disease, etc.)
4. Off-duty paramedic
a. May not have authority to perform paramedic procedures which require delegation from a physician
b. Varies from state to state

E. Protection against negligence claims
1. Appropriate education/ training and continuing education
2. Appropriate medical direction -- on- and off-line
3. Accurate, thorough documentation
4. Professional attitude and demeanor

IV. Paramedic - patient relationships
A. Confidentiality
1. Confidential information
a. Patient history
b. Assessment findings
c. Treatment rendered
2. Release of information
a. Requires written permission from patient or legal guardian
b. Permission not required for release of select information
(1) To other providers with a need to know in order to provide care
(2) When required by law
(3) When required for third party billing
(4) In response to a proper subpoena
3. Improper release of information or release of inaccurate information can result in liability
a. Invasion of privacy
(1) Release, without legal justification, of information on a patient's private life which might reasonably expose the individual to ridicule, notoriety or embarrassment
(2) The fact that the information is true is not a defense
b. Defamation - making an untrue statement about someone's character or reputation without legal privilege or consent of the individual
(1) Libel
(a) False statements about a person made in writing or through the

mass media
(b) Made with malicious intent or reckless disregard for the falsity of the statements
(2) Slander
(a) False verbal statements about a person
(b) Made with malicious intent or reckless disregard for the falsity of the statements

B. Consent
1. Conscious, competent patients have the right to decide what medical care and transportation to accept
a. Patient must be of legal age and able to make a reasoned decision
b. Patient must be properly informed
(1) Nature of the illness or injury
(2) Treatment recommended
(3) Risks and dangers of treatment
(4) Alternative treatment possible and the risks
(5) Dangers of refusing treatment (including transport)
c. Conscious, competent patient can revoke consent at any time during care and transport
2. Types of consent
a. Expressed consent
(1) Patient directly agrees to treatment and gives permission to proceed
(2) Consent can be expressed non-verbally by action or allowing care to be rendered
b. Informed consent - consent given based on full disclosure of information
c. Implied consent
(1) Consent assumed from a patient requiring emergency intervention who is mentally, physically or emotionally unable to provide expressed consent; sometimes called emergency doctrine
(2) Is effective only until patient no longer requires emergency care or regains competence to make decisions
d. Involuntary consent
(1) Treatment allowed in certain situations granted by authority of law
(2) Patients held for mental health evaluation or as directed by law enforcement personnel who have the patient under arrest
3. Special consent situations
a. Minors
(1) In most states, a person is a minor until age 18, unless emancipated
(2) Emancipation may include
(a) Minors who are married, parents, or in the armed services
(b) Individual living independently and self-supporting (e.g., college student not living at home or receiving financial aid from parents)
(3) Unemancipated minors are not able to give or withhold consent - consent of parent, legal guardian or court-appointed custodian is usually required
(4) Emergency doctrine applies to minors when parent or guardian cannot be contacted
b. Mentally incompetent adults
(1) If there is a legal guardian, consent may be given or withheld by the

guardian
(2) Emergency doctrine applies if no one legally able to give consent can be contacted
c. Prisoners or arrestees
(1) Court or police who have custody may authorize emergency treatment
(2) Usually limited to care needed to save life or limb
d. Refusal of care or transport
(1) Patient must be conscious and able to make a reasonable decision
(2) Make multiple attempts to convince the patient to accept care
(3) Enlist the help of others to convince the patient
(4) Assure that the patient is informed about the implication of the decision and potential for harm
(5) Consult medical direction
(6) Request patient and a disinterested witness to sign a "release from liability" form
(7) Advise the patient that he or she may call again for help if needed
(8) Attempt to get family or friends to stay with the patient
(9) Document situation and actions thoroughly on patient care report
e. Decisions not to transport
(1) Involve medical direction
(2) Thoroughly document reasons for decision
4. Legal complications related to consent
a. Abandonment
(1) Terminating care when it is still needed and desired by the patient, and without assuring that appropriate care continues to be provided by another qualified provider
(2) May occur in the field or when a patient is delivered to the emergency department
b. False imprisonment
(1) May be charged by a patient who is transported without consent or who is restrained without proper cause or authority
(2) May be a civil or criminal violation
c. Assault
(1) Threatening, attempting or causing fear of offensive physical contact with a patient or other individual (for example, threatening to restrain a patient unless he or she quiets down)
(2) May be a civil or criminal violation
d. Battery
(1) Unlawful touching of another person without consent (for example, drawing a patient's blood without permission)
(2) May be a civil or criminal violation

C. Use of force
1. Unruly or violent patients
2. Use of restraints
3. Involve law enforcement, if possible
4. Use only force considered to be "reasonable" to prevent harm to the patient or others
5. Must never be punitive

D. Transportation of patients

1. Level of care during transportation
   a. Level of personnel attending the patient
   b. Complications resulting from changing the level of care delivered
2. Use of emergency vehicle operating privileges
   a. Must operate in conformity to laws, regulations and policies
   b. Must operate in a manner which safeguards the patient, crew and public
3. Choice of patient destination
   a. Hospitals selected based on patient need and hospital capability
   b. Protocols, the paramedic, medical direction, and patient play a role
   c. Patients choice should be honored unless situation or patient's condition dictates otherwise
4. Payor protocols

V. Resuscitation issues
   A. Withholding or stopping resuscitation
      1. Procedure should be established by local protocols
      2. Role of medical direction should be clearly delineated
   B. Advance directives
      1. Status depends on state laws and local protocols
      2. Written patient statements of preference for future medical treatment
         a. Living will
         b. Durable power of attorney for health care
         c. Do not resuscitate (DNR) orders
      3. Authority granted in part by the Patient Self-Determination Act of 1990
      4. Medical direction must establish and implement policies for dealing with advance directives
         a. Policy should specify paramedic care for the patient with an advance directive
         b. Must provide for reasonable measures of comfort to the patient and emotional support to family and loved ones
   C. Potential organ donation
      1. Identify the patient as a potential donor
      2. Establish communication with medical direction
      3. Provide emergency care that will help maintain viable organs
   D. Death in the field
      1. Follow state or local protocols
      2. Consult medical direction for guidance

VI. Crime and accident scene responsibilities
   A. Crime scene
      1. Protect self and other EMS personnel
      2. Care for the patient(s) as necessary
      3. Notify law enforcement if not already involved
      4. Observe and document any items moved or anything unusual at the scene
      5. Protect potential evidence
         a. Leave holes in clothing from bullet or stab wounds intact, if possible
         b. Do not touch or move items at scene unless necessary in delivery of care
   B. Accident scene
      1. Protect self and other EMS personnel

2. Care for the patient(s) as necessary
3. Summon additional personnel if needed

VII. Documentation
- A. Importance
  1. If it is not written down, it was not done.
  2. Memory is fallible - claims may not be filed until years after an event
- B. Characteristics of an effective patient care report
  1. Completed promptly
     - a. A report made "in the course of business", not long after the event
     - b. Prompt completion essential to the patient care report becoming part of the hospital record
  2. Completed thoroughly
     - a. Coverage of assessment, treatment and other relevant facts
     - b. Should paint a complete, clear picture of patient condition and care
  3. Completed objectively
     - a. Observations rather than assumptions or conclusions
     - b. Avoid use of emotionally and value-loaded words or phrases
  4. Completed accurately
     - a. Descriptions should be as precise as possible
     - b. Avoid using abbreviations or jargon not commonly understood
  5. Confidentiality maintained
     - a. Should have a standard policy on release of information
     - b. Whenever possible, patient consent should be obtained prior to release of information
- C. Copy to become part of patient's hospital record
- D. Maintained at least for extent of statute of limitations

UNIT TERMINAL OBJECTIVE

1-5 At the completion of this unit, the paramedic student will understand the role that ethics plays in decision making in the out-of-hospital environment.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-5.1 Define ethics. (C-1)
1-5.2 Distinguish between ethical and moral decisions. (C-3)
1-5.3 Identify the premise that should underlie the paramedic's ethical decisions in out-of hospital care. (C-1)
1-5.4 Analyze the relationship between the law and ethics in EMS. (C-3)
1-5.5 Compare and contrast the criteria that may be used in allocating scarce EMS resources. (C-3)
1-5.6 Identify the issues surrounding the use of advance directives, in making a prehospital resuscitation decision. (C-1)
1-5.7 Describe the criteria necessary to honor an advance directive in your state. (C-1)

AFFECTIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-5.8 Value the patient's autonomy in the decision-making process. (A-2)
1-5.9 Defend the following ethical positions: (A-3)
- a. The paramedic is accountable to the patient.
- b. The paramedic is accountable to the medical director.
- c. The paramedic is accountable to the EMS system.
- d. The paramedic is accountable for fulfilling the standard of care.

1-5.10 Given a scenario, defend or challenge a paramedic's actions concerning a patient who is treated against his/ her wishes. (A-3)
1-5.11 Given a scenario, defend a paramedic's actions in a situation where a physician orders therapy the paramedic feels to be detrimental to the patient's best interests. (A-3)

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

DECLARATIVE

I. Introduction
- A. Ethical dilemmas are present in out-of-hospital care
- B. Ethical dilemma today may be decided by law tomorrow

II. Ethics overview
- A. Ethics defined
  1. Socrates: "How should one live?"
  2. Larger issue than paramedic practice
  3. Morals relate to social standards
  4. Ethics relate to personal standards
- B. Answering ethical questions
  1. Emotion should not be a factor
  2. The question should be answered with reason
  3. Answer must not be based on what people think is wrong or right
     a) The individual must answer the question for him/ her self
  4. Never do what is morally wrong
- C. The need for an out-of-hospital ethical code
- D. How ethics impact individual practice
  1. A personal code
  2. The importance of reflecting on one's own practice.
     a) "An unexamined life is not worth living"
- E. How ethics impact institutional practice

III. Ethical tests in healthcare
- A. Fundamental question
  1. What is in the patient's best interest?
  2. Determining what the patient wants
     a) Patient statement
     b) Written statement
     c) Family input
  3. The role of "good faith" in making ethical decisions
- B. Global concepts
  1. Provide patient benefit
  2. Avoid harm
  3. Recognize patient autonomy
- C. Resolving ethical dilemmas when global concepts are in conflict
  1. Within healthcare community
     a) Establishment of norms (standards of care)
     b) Research and treatment protocols
     c) Prospective and retrospective reviews of decisions
  2. Within the public
     a) Creation of laws protecting patient rights
     b) Use of advance directives, etc. to make patient wishes known

IV. Ethical issues in contemporary paramedic practice
- A. Allocation of resources
  1. True parity

2. Need
3. Earned

B. Decisions surrounding resuscitation
1. What the patient really wants
2. When in doubt, resuscitate
3. Resuscitation after an advance directive is found

C. Confidentiality
1. A fundamental right
2. Ethics and confidential information
a) Legally required
(1) Does this supersede ethical considerations?
(2) What if the public health would benefit?

D. Consent
1. Patient right to make decisions regarding health care
a) "Fundamental element of the patient-physician relationship"
b) AMA code of medical ethics
2. Ethics of implied consent
a) Does the patient understand the issues at hand?
b) Can the patient make an informed decision in his/ her best interest

E. Applications of ethical principles to patient care situations
1. Care in futile situations
a) Defining futile
b) Who makes the decision?
2. Obligation to provide care
a) Good Samaritan
b) Inability to pay
c) Isn't in the "health plan"
d) Patient "dumping"
e) Economic triage
3. Advocacy
4. Paramedic accountability
a) Patient
b) Physician medical director
c) System/ HMO protocols
5. Role as physician extender
a) The physician orders something which
(1) The paramedic believes is contraindicated
(2) The paramedic believes is medically acceptable but not in the patient's best interests
(3) The paramedic believes is medically acceptable but morally wrong

UNIT TERMINAL OBJECTIVE

1-6 At the completion of this unit, the paramedic student will be able to apply the general concepts of pathophysiology for the assessment and management of emergency patients.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-6.1 Discuss cellular adaptation. (C-1)
1-6.2 Describe cellular injury and cellular death. (C-1)
1-6.3 Describe the factors that precipitate disease in the human body. (C-1)
1-6.4 Describe the cellular environment. (C-1)
1-6.5 Discuss analyzing disease risk. (C-1)
1-6.6 Describe environmental risk factors. (C-1)
1-6.7 Discuss combined effects and interaction among risk factors. (C-1)
1-6.8 Describe aging as a risk factor for disease. (C-1)
1-6.9 Discuss familial diseases and associated risk factors. (C-1)
1-6.10 Discuss hypoperfusion. (C-1)
1-6.11 Define cardiogenic, hypovolemic, neurogenic, anaphylactic and septic shock. (C-1)
1-6.12 Describe multiple organ dysfunction syndrome. (C-1)
1-6.13 Define the characteristics of the immune response. (C-1)
1-6.14 Discuss induction of the immune system. (C-1)
1-6.15 Discuss fetal and neonatal immune function. (C-1)
1-6.16 Discuss aging and the immune function in the elderly. (C-1)
1-6.17 Describe the inflammation response. (C-1)
1-6.18 Discuss the role of mast cells as part of the inflammation response. (C-1)
1-6.19 Describe the plasma protein system. (C-1)
1-6.20 Discuss the cellular components of inflammation. (C-1)
1-6.21 Describe the systemic manifestations of the inflammation response. (C-1)
1-6.22 Describe the resolution and repair from inflammation. (C-1)
1-6.23 Discuss the effect of aging on the mechanisms of self-defense. (C-1)
1-6.24 Discuss hypersensitivity. (C-1)
1-6.25 Describe deficiencies in immunity and inflammation. (C-1)
1-6.26 Describe homeostasis as a dynamic steady state. (C-1)
1-6.27 List types of tissue. (C-1)
1-6.28 Describe the systemic manifestations that result from cellular injury. (C-1)
1-6.29 Describe neuroendocrine regulation. (C-1)
1-6.30 Discuss the inter-relationships between stress, coping, and illness. (C-1)

AFFECTIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-6.31 Advocate the need to understand and apply the knowledge of pathophysiology to patient assessment and treatment. (A-2)

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

DECLARATIVE

I. Introduction
  A. Correlation of pathophysiology with disease process
    1. Cells appear similar to multicellular "social" organism
    2. Cells communicate electrochemically - when interrupted disease processes can initiate and advance
    3. Knowledge of coordination of specific bodily functions leads to better understanding of the disease process
      a. Endocrine
      b. Exocrine
      c. Other coordinating receptors
        (1) Chemoreceptors
        (2) Baroreceptors
        (3) Adrenergic
        (4) Others
  B. Correlation of disease process with care provided to patients by paramedics
    1. Understanding disease process is important for paramedics to better understand, anticipate, correct, and provide appropriate care
      a. Once knowledge of physical laws and principles have been gained paramedics can apply these to the mechanisms and complications of disease
      b. Cells of the immune system and inflammatory responses are found with every type of trauma or disease process

II. Basic cellular review
  A. Major classes of cells - living cells divided into two major divisions
  B. Chief cellular functions
    1. Cells become specialized through process of differentiation, or maturation
    2. Eventually perform one function or act in concert with other cells to perform a more complex task
  C. Cellular components
    1. Structure & function
    2. Three main components
  D. Tissue types
    1. Epithelial tissue
    2. Connective tissue
    3. Muscle tissue
    4. Nervous tissue

III. Alterations in cells and tissues
  A. Cellular adaptation - cells adapt to their environment to avoid and protect themselves from injury; adapted cells are neither normal or injured (they are somewhere between these two states)
    1. Cellular adaptations are common and a central part of many disease states
      a. Early stages of a successful adaptation response may enhance the cell's function
      b. Difficult to determine pathological responses versus an extreme adaptation to an excessive functional demand
    2. Atrophy

3. Hypertrophy
4. Hyperplasia
5. Dysplasia
6. Metaplasia

B. Cellular injury
   1. Hypoxic injury
      a. Most common cause of cellular injury
      b. May result from
         (1) Decreased amounts of oxygen in the air
         (2) Loss of hemoglobin or hemoglobin function
         (3) Decreased number of red blood cells
         (4) Disease in respiratory or cardiovascular system
         (5) Loss of cytochromes
   2. Chemical injury
      a. Chemical agents causing cellular injury
         (1) Poisons
         (2) Lead
         (3) Carbon monoxide
         (4) Ethanol
         (5) Pharmacological
   3. Infectious injury
      a. Virulence or pathogenicity of microorganisms depends on their ability to survive and reproduce in the human body, where they injure cells and tissues
         (1) Disease producing potential depends upon its ability to
            (a) Invade and destroy cells
            (b) Produce toxins
            (c) Produce hypersensitivity reactions
      b. Bacteria
         (1) Survival and growth depend upon the effectiveness of the body's defense mechanisms and the bacteria's ability to resist the mechanisms
            (a) Coating protects the bacterium from ingestion and destruction by phagocytes and capsules may also function as exotoxins
            (b) Not all virulent extracellular pathogens are encapsulated - mycobacterium tuberculosis can survive and be transported by phagocytes
         (2) Bacteria also produce substances such as enzymes or toxins which can injure or destroy cells
            (a) Toxins are produced by many microorganisms
               i) Exotoxins
               ii) Endotoxins
            (b) Fever is caused by the release of endogenous pyrogens from macrophages or circulating white blood cells that are attracted to the injury site
            (c) Inflammation is one of the body's responses to the presence of bacteria
            (d) Ability to produce hypersensitivity reactions is an important pathogenic mechanism of bacteria toxins
            (e) Bacteremia or septicemia is proliferation of microorganisms in the

blood

c. Viruses
(1) Viral disease are among the most common afflictions seen in humans
(2) Intracellular parasites that take over the control of metabolic machinery of host cells for use to replicate the virus
(3) Protein coat (capsid) encapsulating most viruses allows them to resist phagocytosis
(4) Viral replication occurs within the host cell
(5) Having no organelles, viruses are incapable of metabolism
(6) Causes decreased synthesis of macromolecules vital to the host cell
(7) Viruses do not produce exotoxins or endotoxins
(8) There may be a symbiotic relationships between viruses and normal cells resulting in a persistent unapparent infection
(9) Viruses can evoke a strong immune response but can rapidly produce irreversible and lethal injury in highly susceptible cells (as in AIDS)

4. Immunologic and inflammatory injury
a. Cellular membranes are injured by direct contact with cellular and chemical components of the immune or inflammatory process as in phagocytes (lymphocytes and macrophages) and others such as histamine, antibodies, lymphokines
b. Membrane alterations are associated with rapid leakage of potassium out of the cell and an influx of water
5. Injurious genetic factors
6. Injurious nutritional imbalances
7. Injurious physical agents

C. Manifestations of cellular injury
1. Cellular manifestations
2. Systemic manifestations

D. Cellular death/ necrosis

IV. The cellular environment
A. Distribution of body fluids
1. Intracellular fluid (ICF)
2. Extracellular fluid (ECF)
a. Interstitial fluid
b. Intravascular fluid
c. Other
3. Total body water (TBW)

B. Aging and distribution of body fluids
1. Birth
2. Infancy
3. Childhood
4. Adulthood
5. Elderly

C. Water movement between ICF and ECF
1. Osmotic forces
2. Role of sodium and potassium

D. Water movement between plasma and interstitial fluid
1. Osmotic forces within capillary bed

2. Starling's hypothesis
3. Role of capillary and membrane permeability

E. Alterations in water movement
1. Edema
   a. Pathophysiology
      (1) Increased capillary permeability
      (2) Decreased oncotic pressure
      (3) Increased capillary hydrostatic pressure
      (4) Hydrostatic pressure
      (5) Lymphatic vessel obstruction
   b. Clinical manifestations
      (1) Local
      (2) Generalized
   c. Evaluation and treatment

F. Water balance and the role of electrolytes
1. Water balance
   a. Role of antidiuretic hormone (ADH)
   b. Receptors
      (1) Osmoreceptors
      (2) Volume sensitive receptors
      (3) Baroreceptors
2. Sodium and chloride balance
   a. Role and function of sodium as a cation
   b. Role and function of chloride as an anion
   c. Hormone regulation by aldosterone and natriuretic hormone
   d. Role of renin-angiotensin system
3. Alterations in sodium, chloride, and water balance
   a. Isotonic alterations
      (1) Isotonic volume depletions
      (2) Isotonic volume excesses
   b. Hypertonic alterations
      (1) Hypernatremia
      (2) Water deficit
      (3) Hyperchloremia
   c. Hypotonic alterations
      (1) Hyponatremia
      (2) Water excess
      (3) Hypochloremia
4. Alterations in potassium, calcium, phosphate, and magnesium balance
   a. Potassium
      (1) Hypokalemia
      (2) Hyperkalemia
   b. Calcium and phosphate
      (1) Hypocalcemia
      (2) Hypercalcemia
      (3) Hypophosphatemia
      (4) Hyperphosphatemia
   c. Magnesium

(1) Hypomagnesemia
(2) Hypermagnesemia

G. Acid - base balances
1. Hydrogen ion and pH
2. Buffer systems
a. Carbonic acid-bicarbonate buffering
b. Protein buffering
c. Renal buffering
d. Other buffers
3. Acid-base imbalances
a. Metabolic acidosis
(1) Pathophysiology
(2) Clinical presentation
(3) Evaluation and treatment
b. Metabolic alkalosis (rare)
(1) Pathophysiology
(2) Clinical presentation
(3) Evaluation and treatment
c. Respiratory acidosis
(1) Pathophysiology
(2) Clinical presentation
(3) Evaluation and treatment
d. Respiratory alkalosis
(1) Pathophysiology
(2) Clinical presentation
(3) Evaluation and treatment

V. Genetics and familial diseases
A. Factors causing disease
1. Genetic
2. Environmental
a. Microoganisms and immunologic exposures
b. Personal habits and life-style
c. Chemical substances
d. Physical environment
e. Psychosocial environment
3. Age and gender
a. Accumulative affects of both genetic and environmental factors
b. Life-style, anatomic, or hormonal differences
B. Analyzing disease risk
1. Disease rates
a. Incidence rate
b. Prevalence rate
c. Mortality rate
2. Risk factor analysis
a. Causal risk factors
b. Noncausal risk factors
C. Combined effects and interaction among risk factors

1. Familial disease tendency
2. Aging and age-related disorders

D. Common familial disease and associated risk factors
   1. Immunologic disorders
      a. Allergies
      b. Asthma
      c. Rheumatic fever
   2. Cancer
      a. Breast cancer
      b. Colorectal cancer
      c. Lung cancer
   3. Endocrine disorders
      a. Diabetes mellitus
         (1) Insulin-dependent diabetes mellitus
         (2) Non-insulin dependent diabetes mellitus
   4. Hematologic disorders
      a. Drug-induced hemolytic anemia
      b. Hemophilia
      c. Hematochromatosis
   5. Cardiovascular disorders
      a. Long QT syndrome (autosomal dominant disorder)
      b. Cardiac myopathies
      c. Mitral valve prolapse
      d. Coronary heart disease
         (1) Family history and CHD risk
         (2) Genetic factors and predisposition
      e. Hypertension and stroke
   6. Renal disorders
      a. Gout (uric acid accumulation)
      b. Kidney stones
   7. Gastrointestinal disorders
      a. Malabsorption disorders
         (1) Lactose intolerance
         (2) Ulcerative colitis
         (3) Crohn's disease
      b. Peptic ulcers
      c. Gallstones
      d. Obesity
         (1) Associated disease processes
         (2) Causal risk factors
   8. Neuromuscular disorders
      a. Huntington disease
      b. Muscular dystrophy
      c. Multiple sclerosis
      d. Alzheimer disease
   9. Psychiatric disorders
      a. Schizophrenia
      b. Manic-depressive

VI. Hypoperfusion
- A. Pathogenesis
  - 1. Decreased cardiac output
  - 2. Compensatory mechanisms
    - a. Catecholamine release
      - (1) Epinephrine and norepinephrine
      - (2) Increase in systemic vascular resistance
    - b. Role of aldosterone renin-angiotensin, and ADH
      - (1) Adequate or increased blood volume
      - (2) Vasoconstriction increases systemic blood pressure
    - c. Shift of interstitial fluid
    - d. Splenic discharge
  - 3. Increased preload, stroke volume, and heart rate
    - a. Increased myocardial oxygen demand
    - b. Systemic and pulmonary edema
      - (1) Dyspnea
      - (2) Dusky skin color
      - (3) Low blood pressure
      - (4) Oliguria
      - (5) Impaired mentation
    - c. Decreased cardiac output and ejection fraction
      - (1) Decreased blood pressure
      - (2) Decreased tissue perfusion
      - (3) Impaired cellular metabolism
- B. Types of Shock
  - 1. Cardiogenic shock
    - a. Defined
    - b. Pathophysiology
    - c. Evaluation and treatment
  - 2. Hypovolemic shock
    - a. Defined
    - b. Pathophysiology
    - c. Evaluation and treatment
  - 3. Neurogenic shock
    - a. Defined
    - b. Pathophysiology
    - c. Evaluation and treatment
  - 4. Anaphylactic shock
    - a. Defined
    - b. Pathophysiology
    - c. Evaluation and treatment
  - 5. Septic Shock
    - a. Defined
    - b. Pathophysiology
    - c. Evaluation and treatment
- C. Multiple organ dysfunction syndrome (MODS)
  - 1. Defined

a. Progressive failure of two or more organ systems
b. Occurs after severe illness or injury
c. New diagnosis first described in 1975
d. Mortality rate of 60% - 90%
e. Major cause of death following septic, traumatic, and burn injuries

2. Pathophysiology
a. Injury or endotoxin release
b. Vascular endothelial damage, neuroendocrine response, and release of inflammatory mediators
c. Activation of complement, coagulation, and kallikrein/ kinin systems
d. Massive systemic immune/ inflammatory and coagulation responses
e. Vascular changes
(1) Vasodilation
(2) Increase in capillary permeability
(3) Selective vasoconstriction
(4) Microvascular thrombi
f. Maldistribution of systemic and organ blood flow
g. Hypermetabolism
h. Oxygen supply/ demand imbalance
i. Tissue hypoxia
(1) Tissue hypoperfusion
(2) Exhaustion of fuel supply (i.e. ATP, glucose, etc)
(3) Metabolic failure
(4) Lysosome breakdown
(5) Anaerobic metabolism
(6) Acidosis and impaired cellular function
j. Organ dysfunction
(1) Decreased cardiac function and myocardial depression
(2) Renal failure
(3) Failure of smooth muscle of vascular system
(a) Release of capillary sphincters
(b) Vasodilation

3. Clinical presentation - 24 hours after initial resuscitation
a. Low-grade fever due to inflammatory responses
b. Tachycardia
c. Dyspnea and adult respiratory distress syndrome (ARDS)
d. Altered mental status
e. Hyperdynamic state
f. Hypermetabolic states
g. Renal and liver failure (14 - 21 days)
h. Gastrointestinal and immune collapse (14 - 21 days)
i. Cardiovascular collapse and death (21 - 28 days)

D. Cellular metabolism impairment
1. Oxygen impairment
a. Anaerobic metabolism
b. Increased lactate
c. Metabolic acidosis
d. Decreased oxygen affinity for hemoglobin

e. Decreased ATP
f. Changes in cellular electrolytes
g. Cellular edema
h. Release of lysosomal enzymes

2. Impaired glucose use
   a. Increase serum glucose
   b. Catecholamines, cortisol, growth hormone release
   c. Increased gluconeogenesis, gluconeolysis, and lipolysis

VII. Self-defense mechanisms

A. Introduction - lines of defense
   1. Anatomic barriers
   2. Inflammatory response
   3. Immune response

B. Characteristics of the immune response
   1. Natural versus acquired immunity
      a. Natural or native immunity
      b. Acquired immunity
         (1) Active acquired immunity
         (2) Passive acquired immunity
   2. Primary versus secondary immunity
      a. Primary or initial immune response
      b. Secondary or anamnestic immune response
   3. Humoral versus cell-mediated immunity
      a. B-cell lymphocyte
      b. T-cell lymphocyte

C. Induction of the immune response
   1. Antigens and immunogens
      a. Antigens
      b. Immunogen
      c. Tolerance
      d. Molecular size
         (1) Larger - proteins, polysaccharides, and nucleic acids
         (2) Smaller - amino acids, monosaccharides, and fatty acids
         (3) Haptens - smaller molecules which become immunogenic
   2. Histocompatibility antigens (HLA antigens)
      a. HLA complexes or major histocompatibility complexes (MHC)
      b. Role of HLA antigens
   3. Blood group antigens
      a. Rh system
      b. ABO system

D. Humoral immune response
   1. B-cell lymphocytes
      a. Formation
         (1) Lymphoid stem cell
         (2) Generation of clonal diversity
         (3) Clonal selection
         (4) Activated B-cell

(a) Immunoglobulin-secreting plasma cells found in blood and secondary lymphoid organs
(b) Memory cells - responsible for long term immunity

2. Immunoglobulins
   a. Differences between immunoglobulins and antibodies
   b. Structure of immunoglobulin molecules
   c. Function of antibodies
      (1) Agglutination
      (2) Precipitation
      (3) Neutralization
         (a) Bacterial toxins
         (b) Viruses
         (c) Opsonization of bacteria
         (d) Activation of inflammatory processes
         (e) Classes of immunoglobulins
         (f) Antibodies as antigens
      (4) Isotypic antigens
      (5) Allotypic antigens
      (6) Idiotypic antigenic determinants
   d. Monoclonal antibodies
3. Secretory immune system
   a. Mucosal-associated lymphoid tissue
      (1) Lacrimal glands
      (2) Salivary glands
      (3) Bronchial-associated lymphoid tissue
      (4) Mammary-associated lymphoid tissue
      (5) Gut-associated lymphoid tissue
      (6) Genital-associated lymphoid tissue
   b. Circulates independently of other lymphocytes
      (1) Mucosal-associated lymphoid tissue
      (2) Regional lymph nodes
      (3) Thoracic duct
      (4) Blood
   c. One of body's first lines of defense
   d. Occurs locally rather than systemically

E. Cell-mediated immune response
   1. T-cells
      a. Five types of mature T-cells
         (1) Memory cells
         (2) Td cells or lymphokine-producing cells
         (3) Tc cells or cytotoxic cells
         (4) Th cells or helper T-cells
         (5) Ts cells or suppressor T-cells
      b. Proliferation and differentiation
   2. Major effects of cell-mediated immune response
      a. Cytotoxicity
      b. Delayed hypersensitivity
      c. Memory

d. Control

F. Cellular interactions in the immune response
1. Cytokines
a. Lymphokines
b. Monokines
2. Antigen processing, presentation, and recognition
a. Antigen degradation
b. Classes of histocompatible antigens (HLA)
c. T-cell receptors
d. Interleukin - 1 (IL-1)
3. T-cell and B-cell differentiation
a. T-cell differentiation
b. B-cell differentiation
c. Control of B and T-cell development

G. Fetal and neonatal immune function
1. Fetal immunological capabilities
a. Immunologic responses
b. Antibody capabilities
2. Antibody levels
a. Umbilical cord blood
b. Neonatal circulation
3. Trophoblasts

H. Aging and the immune response in elderly
1. T-cell function
2. Antibody production

VIII. Inflammation
A. The acute inflammatory response
1. Triggers
a. Lethal cellular injury
b. Non-lethal cellular injury
c. Other microorganisms
2. Response
a. Vascular responses to inflammation
b. Cellular responses to inflammation

B. Mast cells
1. Degranulation of vasoactive amines and chemotactic factors
a. Stimulation of degranulation
(1) Physical injury
(2) Chemical agents
(3) Immunological (IgE-mediated hypersensitivity)
b. Vasoactive amines
(1) Histamine
(2) Serotonin
c. Chemotactic factors
(1) Neutrophil
(2) Eosinophil
2. Synthesis of leukotrienes and prostaglandins

a. Leukotrienes or slow-reacting substances of anaphylaxis (SRS-A)
(1) Composition
(2) Function
b. Prostaglandins
(1) Composition
(2) Function

C. Plasma protein systems
1. Complement system
a. Structure and function
b. Activation
(1) Classic pathway
(2) Alternative pathway
2. Clotting system
a. Structure and function
b. Activation
(1) Extrinsic pathway
(2) Intrinsic pathway
3. Kinin system
a. Structure and function
b. Activation
(1) Plasma kinin cascade
4. Control and interaction of the plasma protein system
a. Reason for control
b. Types of control
(1) Antagonists
(2) Histamine control
(3) Interaction of control processes

D. Cellular components of inflammation
1. Functions of phagocytes
a. Margination
b. Diapedesis
c. Exudation into inflamed tissue
d. Process of phagocytosis
2. Polymorphonuclear neutrophils
a. Predominance in early inflammatory response
b. Role
3. Monocytes and macrophages
a. Monocyte - young macrophage
(1) Structure
(2) Role
b. Macrophages
(1) Structure
(2) Role
4. Eosinophils
a. Structure
b. Role

E. Cellular products
1. Interleukins (ILs)

a. Interleukin - 1
b. Interleukin - 2

2. Lymphokines
   a. Production
   b. Types and effects
      (1) Migration-inhibitory factor
      (2) Macrophage-activating factor

3. Interferon
   a. Structure
   b. Actions and effects

F. Systemic responses of acute inflammation
   1. Fever
      a. Activation
      b. Effects
   2. Leukocytosis
      a. Activation
      b. Effects
   3. Increase in circulating plasma proteins or acute-phase reactants
      a. Activation
      b. Effects

G. Chronic inflammation responses
   1. Causes
      a. Unsuccessful acute inflammatory response due to foreign body
      b. Persistence of infection or antigen
   2. Characteristics
      a. Persistence of acute inflammation response
      b. Neutrophil degranulation and death
      c. Lymphocyte activation
      d. Fibroblast activation
      e. Infiltration (pus)
      f. Tissue repair (scar)

H. Local inflammation responses
   1. Vascular changes
      a. Vasodilation
      b. Increased capillary permeability
   2. Exudation
      a. Functions
      b. Compositions

I. Phases of resolution and repair
   1. Definitions
      a. Regeneration
      b. Repair
      c. Debridement
      d. Primary intention
      e. Secondary intention
   2. Reconstruction phase
      a. Initial wound response
      b. Granulation

c. Epithelialization
3. Maturation Phase
a. Completion of contraction, differentiation, and remodeling of scar tissue
b. Disappearance of capillaries from scar tissue
4. Dysfunctional wound healing
a. Dysfunction during the inflammatory response
b. Dysfunction during the reconstruction phase
(1) Impaired collagen synthesis
(2) Impaired epithelialization
(3) Wound disruption
(4) Impaired contraction
J. Aging and self-defense mechanisms
1. Newborn
2. Elderly

IX. Variances in immunity and inflammation
A. Hypersensitivity: allergy, autoimmunity, and isoimmunity
1. Definitions
a. Hypersensitivity
b. Allergy
c. Autoimmunity
d. Isoimmunity
2. Mechanisms of hypersensitivity
a. Immediate versus delayed reactions
b. IgE reactions
(1) Role of IgE
(2) Mechanism of IgE
(3) Clinical indications
(4) Genetic predisposition
(5) IgE-mediated hypersensitivity tests
(6) Desensitization
c. Tissue-specific reactions
(1) Tissue-specific antigens
(2) Mechanisms
d. Immune-complex mediated injury
(1) Mechanisms
(2) Immune-complex disease
e. Cell-mediated tissue destruction
(1) Mechanisms
(2) Clinical instances
3. Targets of hypersensitivity
a. Allergy
(1) Allergens
(2) Neoantigen
b. Autoimmunity
(1) Breakdown of tolerance
(2) Original insult
(3) Genetic factors

c. Isoimmunity
(1) Transient neonatal diseases
(2) Transplant rejections and transfusion reactions
4. Autoimmune and isoimmune diseases
a. Grave's disease
b. Rheumatoid arthritis
c. Myasthenia gravis
d. Immune thrombocytopenic purpura
e. Isoimmune neutropenia
f. Systemic lupus erythematosus (SLE)
g. Rh and ABO isoimmunization

B. Immunity and inflammation deficiencies
1. Congenital immune deficiencies
2. Acquired deficiencies
a. Nutritional deficiencies
b. Iatrogenic deficiencies
c. Deficiencies caused by trauma
d. Deficiencies caused by stress
e. AIDS
3. Replacement therapies for immune deficiencies
a. Gamma globulin therapy
b. Transplantation and transfusion
c. Gene therapy

X. Stress and disease
A. Concepts of stress
1. Triad of manifestations
2. General adaptation syndrome (Selye)
a. Alarm stage
b. Resistance or adaptation stage
c. Exhaustion stage
d. Definition of physiological stress
3. Psychologic mediators and specificity
a. Psychologic factors effects on physiological responses to stress
b. Pituitary gland and adrenal cortex sensitivity to emotional, psychologic and social influences
4. Homeostasis as a dynamic steady state
a. Definitions
(1) Dynamic steady state
(2) Turnover
b. Reaction of body to stressors

B. Stress responses
1. Psychoneuroimmunologic response
a. Interaction of consciousness, brain and central nervous system, and the body's defense mechanisms
b. Stress response
2. Neuroendocrine regulation
a. Catecholamines

(1) Components
  (a) Epinephrine
  (b) Norepinephrine
(2) Physiologic actions of alpha and beta receptors
  (a) $Alpha_1$
  (b) $Alpha_2$
  (c) $Beta_1$
  (d) $Beta_2$
(3) Physiologic effects of catecholamines
  (a) Brain
  (b) Cardiovascular
  (c) Pulmonary
  (d) Muscle
  (e) Liver
  (f) Adipose Tissue
  (g) Skin
  (h) Skeleton
  (i) G.I. and G.U. systems
  (j) Lymphoid tissue

b. Cortisol
(1) Source
(2) Primary effects of cortisol
  (a) Stimulation of glucogenesis
  (b) Formation of glycogen
  (c) Cortisol effects on cell-mediated immunity
(3) Other physiologic effects of cortisol
  (a) Protein metabolism
  (b) Digestive function
  (c) Urinary function
  (d) Connective tissue function
  (e) Muscle function
  (f) Bone function
  (g) Vascular system and myocardial function
  (h) Central nervous system function

c. Other hormones
(1) Endorphins
(2) Growth hormone
(3) Prolactin
(4) Testosterone

d. Role of the immune system
(1) Interaction of immune, nervous, and endocrine systems during a stress response
(2) Influence of stress response on immune system
(3) Relationship between stress and immune-related conditions and diseases
  (a) Cardiovascular
  (b) Muscles
  (c) Connective tissue
  (d) Pulmonary system

(e) Immune system
(f) G.I. system
(g) G.U. system
(h) Skin
(i) Endocrine system
(j) Central nervous system

C. Stress, coping, and illness interrelationships
  1. Stress as interdependent processes
    a. Definition of physiologic stress and psychologic distress
    b. Effects of psychologic distress
    c. Relationship between distress and immune dysfunction
  2. Potential stress effects on
    a. Healthy individuals
      (1) Ineffective coping
      (2) Effective coping
    b. Symptomatic individuals
      (1) Ineffective coping
      (2) Effective coping
    c. Medical interventions
      (1) Ineffective coping
      (2) Effective coping

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UNIT TERMINAL OBJECTIVE

1-7 At the completion of this unit, the paramedic student will be able to integrate pathophysiological principles of pharmacology and the assessment findings to formulate a field impression and implement a pharmacologic management plan.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-7.1 Describe historical trends in pharmacology. (C-1)
1-7.2 Differentiate among the chemical, generic (nonproprietary), and trade (proprietary) names of a drug. (C-3)
1-7.3 List the four main sources of drug products. (C-1)
1-7.4 Describe how drugs are classified. (C-1)
1-7.5 List the authoritative sources for drug information. (C-1)
1-7.6 List legislative acts controlling drug use and abuse in the United States. (C-1)
1-7.7 Differentiate among Schedule I, II, III, IV, and V substances. (C-3)
1-7.8 List examples of substances in each schedule. (C-1)
1-7.9 Discuss standardization of drugs. (C-1)
1-7.10 Discuss investigational drugs, including the Food and Drug Administration (FDA) approval process and the FDA classifications for newly approved drugs. (C-1)
1-7.11 Discuss special consideration in drug treatment with regard to pregnant, pediatric and geriatric patients. (C-1)
1-7.12 Discuss the paramedic's responsibilities and scope of management pertinent to the administration of medications. (C-1)
1-7.13 Review the specific anatomy and physiology pertinent to pharmacology with additional attention to autonomic pharmacology. (C-1)
1-7.14 List and describe general properties of drugs. (C-1)
1-7.15 List and describe liquid and solid drug forms. (C-1)
1-7.16 List and differentiate routes of drug administration. (C-3)
1-7.17 Differentiate between enteral and parenteral routes of drug administration. (C-3)
1-7.18 Describe mechanisms of drug action. (C-1)
1-7.19 List and differentiate the phases of drug activity, including the pharmaceutical, pharmacokinetic, and pharmacodynamic phases. (C-3)
1-7.20 Describe the process called pharmacokinetics, pharmocodynamics, including theories of drug action, drug-response relationship, factors altering drug responses, predictable drug responses, iatrogenic drug responses, and unpredictable adverse drug responses. (C-1)
1-7.21 Differentiate among drug interactions. (C-3)
1-7.22 Discuss considerations for storing and securing medications. (C-1)
1-7.23 List the component of a drug profile by classification. (C-1)
1-7.24 List and describe drugs that the paramedic may administer according to local protocol. (C-1)
1-7.25 Integrate pathophysiological principles of pharmacology with patient assessment. (C-3)
1-7.26 Synthesize patient history information and assessment findings to form a field impression. (C-3)
1-7.27 Synthesize a field impression to implement a pharmacologic management plan. (C-3)
1-7.28 Assess the pathophysiology of a patient's condition by identifying classifications of drugs. (C-3)

AFFECTIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-7.29 Serve as a model for obtaining a history by identifying classifications of drugs. (A-3)

1-7.30 Defend the administration of drugs by a paramedic to affect positive therapeutic affect. (A-3)
1-7.31 Advocate drug education through identification of drug classifications. (A-3)

PSYCHOMOTOR OBJECTIVES
None identified for this unit.

DECLARATIVE

I. Historical trends in pharmacology
- A. Ancient health care
- B. The pre- and post-renaissance period
- C. Modern health care
- D. The present period of change
- E. New trends in health care and pharmaceutics
  1. Expansion of consumer health education results from the consumer's motivation to take responsibility for their health and disease prevention
  2. Research is directed to discover new treatments, cures, or methods to prevent disease processes that limit growth, everyday living, or average life span
  3. Orphan drugs developed to treat rare and chronic diseases

II. Names of drugs
- A. Drugs - chemical agents used in the diagnosis, treatment, or prevention of disease
- B. Pharmacology - the study of drugs and their actions on the body
- C. Chemical name - a precise description of the drug's chemical composition and molecular structure
- D. Generic name or non-proprietary name
  1. Official name approved by the FDA
  2. Usually suggested by the first manufacturer
- E. Trade or proprietary name - the brand name registered to a specific manufacturer or owner
- F. Official name - the name assigned by USP

III. Sources of drugs
- A. Plants
  1. Alkaloids
  2. Glycosides
  3. Gums
  4. Oils
- B. Animals and humans
- C. Minerals or mineral products
- D. Chemical substances made in the laboratory

IV. Drug Classification
- A. Drugs are classified
  1. By body system
  2. Class of agent
  3. Mechanism of action

V. Sources of drug information
- A. AMA Drug Evaluation
- B. Physician's Desk Reference (PDR)
- C. Hospital Formulary (HF)
- D. Drug inserts
- E. Other texts, sources

VI. United States drug legislation

A. Purpose for drug legislation
   1. To protect the public from adulterated or mislabeled drugs
B. History of drug legislation and its effects
   1. Pure Food and Drug Act, 1906
   2. Harrison Narcotic Act, 1914
   3. Federal Food, Drug, and Cosmetic Act, 1938
C. Food and Drug Administration

VII. Schedule of controlled substances
A. Controlled Substances Act, 1970 (Comprehensive Drug Abuse Prevention and Control Act, 1970)
B. Purpose for scheduling controlled substances, based upon abuse potential
C. Classification of drugs into numbered levels or schedules (I to V)
D. Schedules
   1. Schedule I
      a. High abuse potential
      b. No currently accepted medical use
         (1) For research, analysis, or instruction only
         (2) May lead to severe dependence
      c. Examples
         (1) Heroin
         (2) LSD
         (3) Mescaline
   2. Schedule II
      a. High abuse potential
      b. Accepted medical uses; may lead to severe physical and/ or psychological dependence
      c. Examples
         (1) Opium
         (2) Morphine
         (3) Codeine
         (4) Oxycodone
         (5) Methadone
         (6) Cocaine
         (7) Secobarbital
   3. Schedule III
      a. Less abuse potential than drugs in Schedules I and II
      b. Accepted medical uses - may lead to moderate/ low physical dependence or high psychologic dependence
      c. Examples
         (1) Preparations containing limited opioid quantities, or combined with one or more active ingredients that are noncontrolled substances
            (a) Acetaminophen with codeine
            (b) Aspirin with codeine
   4. Schedule IV
      a. Lower abuse potential compared to Schedule III
      b. Accepted medical uses - may lead to limited physical or psychological dependence
      c. Examples

(1) Phenobarbital
(2) Diazepam
(3) Lorazepam

5. Schedule V
   a. Low abuse potential compared to schedule IV
   b. Accepted medical uses - may lead to limited physical or psychologic dependence
   c. Examples
      (1) Medications, generally for relief of coughs or diarrhea, containing limited quantities of certain opioid controlled substances

VIII. Standardization of drugs
- A. Standardization is a necessity
- B. Techniques for measuring a drug's strength and purity
  1. Assay
  2. Bioassay
- C. The Unites States Pharmacopeia (USP)
  1. Official volumes of drug standards
- D. Other reference books and guides

IX. Investigational drugs
- A. Prospective drugs may take years to progress through the FDA testing sequence
  1. Animal studies to ascertain
     a. Toxicity
     b. Therapeutic index
     c. Modes of absorption, distribution, metabolism (biotransformation), and excretion
  2. Human studies
- B. FDA approval process
  1. Phases of investigation
  2. New drug application
  3. Abbreviated new drug application
- C. FDA classifications for newly approved drugs, 1992
  1. Numerical classification
  2. Letter classification

X. Special considerations in drug therapy
- A. Pregnant patients
  1. Before using any drug during pregnancy, the expected benefits should be considered against the possible risks to the fetus
  2. The FDA has established a scale (Categories A, B, C, D, and X) to indicate drugs that may have documented problems in animals and/ or humans during pregnancy
  3. Many drugs are unknown to cause problems in animals and/ or humans during pregnancy
  4. Pregnancy causes a number of anatomical and physiological changes
  5. Drugs may cross the placenta or through lactation
- B. Pediatric patients
  1. Based on the child's weight or body surface area
  2. Special concerns for neonates
  3. Length-based resuscitation tape
- C. Geriatric patients

1. The physiological effects of aging can lead to altered pharmacodynamics and pharmacokinetics

XI. The scope of management
- A. Paramedics are held responsible for safe and therapeutically effective drug administration
- B. Paramedics are personally responsible - legally, morally, and ethically - for each drug they administer
- C. Paramedics
  1. Use correct precautions and techniques
  2. Observe and document the effects of drugs
  3. Keep their knowledge base current to changes and trends in pharmacology
  4. Establish and maintain professional relationships
  5. Understand pharmacology
  6. Perform evaluation to identify drug indications and contraindications
  7. Seek drug reference literature
  8. Take a drug history from their patients including:
     - a. Prescribed medications
       - (1) Name
       - (2) Strength
       - (3) Daily dosage
     - b. Over-the-counter medications
     - c. Vitamins
     - d. Drug reactions
  9. Consult with medical direction

XII. Autonomic pharmacology
- A. Nervous system organization and function
  1. Characteristics of nervous system components
     - a. Central nervous system
     - b. Peripheral nervous system
     - c. Somatic system
     - d. Autonomic nervous system (ANS)
     - e. Sympathetic branch of ANS
     - f. Parasympathetic branch of ANS
- B. Peripheral nervous system characteristics
- C. Autonomic nervous system characteristics
  1. Parasympathetic and sympathetic characteristics
  2. Autonomic antagonists
  3. Physiological antagonism between sympathetic and parasympathetic discharge - organ responses
- D. Direction of sympathetic influences
- E. Neurochemical transmission
  1. Events involved in neurochemical transmission
  2. Activities within the synapse
  3. Synthesis of acetylcholine
- F. Other receptors
  1. Catecholamines and related substances
     - a. Dopamine

b. Norepinephrine
c. Epinephrine
d. Serotonin

2. Agonist-gated ion channel receptors and G-protein-linked receptors
3. Neuroactive peptides
   a. Endorphins

G. Effector cell response
1. Second messenger cellular amplification systems
2. Receptor down-regulation
3. Receptor up-regulation

H. Termination of neurotransmission
I. Altering neurotransmission with drugs
1. Modification of chemical transmission by drugs
J. Receptor location and selective drug action
1. Autonomic neurotransmitters
2. Acetylcholine (cholinergic) receptor locations
3. Norepinephrine (adrenergic) receptor locations
K. Selective drug action - nicotinic and muscarinic receptors
1. Nicotinic receptor locations
2. Muscarinic receptor locations
L. Biological model systems and receptor characterization
M. Receptor structure
N. Synaptic control mechanisms

XIII. General properties of drugs
A. Drugs do not confer any new functions on a tissue or organ in the body, they only modify existing functions
B. Drugs in general exert multiple actions rather than a single effect
C. Drug action results from a physiochemical interaction between the drug and a functionally important molecule in the body
D. Drugs that interact with a receptor to stimulate a response are known as agonists
E. Drugs that attach to a receptor but do not stimulate a response are called antagonists
F. Drugs that interact with a receptor to stimulate a response, but inhibit other responses are called partial agonists
G. Once administered, drugs go through four stages
1. Absorption
2. Distribution
3. Metabolism
4. Excretion

XIV. Drug forms
A. Liquid drugs
1. Solutions
2. Tinctures
3. Suspensions
4. Spirits
5. Emulsions
6. Elixirs

7. Syrups

B. Solid drug forms
1. Pills
2. Powders
3. Tablets
4. Suppositories
5. Capsules

C. Gas forms

XV. Overview of the routes of drug administration
A. The mode of drug administration effects the rate at which onset of action occurs and may effect the therapeutic response that results
B. The choice of the route of administration is crucial in determining the suitability of a drug
C. Drugs are given for either their local or systemic effects
D. The routes of drug administration are categorized as

XVI. Routes of medication administration
A. Inhalation route (nebulized medications)
B. Enteral (drugs administered along any portion of the gastrointestinal tract)
a. Sublingual
b. Buccal
c. Oral
d. Rectal
e. Nasogastric
C. Parenteral (any medication route other than the alimentary canal)
a. Subcutaneous
b. Intramuscular
c. Intravenous
d. Intrathecal
e. Pulmonary
f. Intralingual
g. Intradermal
h. Transdermal
i. Umbilical
j. Intraosseous
k. Nasal
D. Endotracheal

XVII. Mechanisms of drug action
A. To produce optimal desired or therapeutic effects, a drug must reach appropriate concentrations at its site of action
B. Molecules of the chemical compound must proceed from point of entry into the body to the tissues with which they react
C. The magnitude of the response depends on the dosage and the time course of the drug in the body
D. Concentration of the drug at its site of action is influenced by various processes, which are divided into three phases of drug activity
1. Pharmaceutical

a. Disintegration of dosage form
b. Dissolution of drug

2. Pharmacokinetic
   a. Absorption
   b. Distribution
   c. Metabolism
   d. Excretion
3. Pharmacodynamic
   a. Drug-receptor interaction

XVIII. Pharmacokinetics
- A. Passive transport
- B. Active transport
- C. Absorption
  1. Variables that affect drug absorption
     a. Nature of the absorbing surface
     b. Blood flow to the site of administration
     c. Solubility of the drug
     d. pH
     e. Drug concentration
     f. Dosage form
     g. Routes of drug administration
     h. Bioavailability
  2. Mechanisms involved in absorption
     a. Diffusion
     b. Osmosis
     c. Filtration
- D. Distribution
  1. Drug reservoirs
     a. Plasma protein binding
     b. Tissue binding
  2. Barriers to drug distribution
     a. Blood-brain barrier
     b. Placental barrier
- E. Biotransformation
  1. Active metabolites
  2. Inactive metabolites
- F. Excretion
  1. Organs of excretion
     a. Kidneys
     b. Intestine
     c. Lungs
     d. Sweat and salivary glands
     e. Mammary glands

XIX. Pharmacodynamics
- A. Theories of drug action - most drugs produce their effects by one of the following ways
  1. Drug-receptor interaction

a. Agonists
b. Antagonists
c. Affinity
d. Efficacy
e. Types of receptors
(1) $Beta_1$
(2) $Beta_2$
(3) $Alpha_1$
(4) $Alpha_2$
(5) Dopaminergic
(6) Others

2. Drug-enzyme interaction
3. Nonspecific drug interaction

B. Drug-response relationship
1. Plasma level profile of a drug
2. Biologic half-life
3. Therapeutic threshold or minimum effective concentration
4. Therapeutic index

C. Factors altering drug responses
1. Age
2. Body mass
3. Sex
4. Environmental milieu
5. Time of administration
6. Pathologic state
7. Genetic factors
8. Psychologic factors

D. Predictable responses
1. Desired action
2. Side effects

E. Iatrogenic responses (adverse effects produced unintentionally)

F. Unpredictable adverse responses
1. Drug allergy (medications frequently implicated in allergic reactions)
2. Anaphylactic reaction
3. Delayed reaction ("serum sickness")
4. Hypersensitivity
5. Idiosyncracy
6. Tolerance
7. Cross tolerance
8. Tachyphylaxis
9. Cumulative effect
10. Drug dependence
11. Drug interaction
12. Drug antagonism
13. Summation (addition or additive effect)
14. Synergism
15. Potentiation
16. Interference

XX. Drug interactions
- A. Variables influencing drug interaction include
  1. Intestinal absorption
  2. Competition for plasma protein binding
  3. Drug metabolism or biotransformation
  4. Action at the receptor site
  5. Renal excretion
  6. Alteration of electrolyte balance
- B. Drug-drug interactions
- C. Other drug interactions
  1. Drug-induced malabsorption of foods and nutrients
  2. Food-induced malabsorption of drugs
  3. Alteration of enzymes
  4. Alcohol consumption
  5. Cigarette smoking
  6. Food-initiated alteration of drug excretion
- D. Drug incompatibilities - occur when drugs are mixed before administration

XXI. Drug storage
- A. Certain precepts should guide the manner in which drugs are secured, stored, distributed, and accounted for
- B. Refer to local protocol
- C. Drug potency can be affected by
  1. Temperature
  2. Light
  3. Moisture
  4. Shelf life
- D. Applies also to diluents
- E. Security of controlled medications
  1. Procedures and other measures to ensure the security of controlled medications

XXII. Components of a drug profile
- A. Drug names
- B. Classification
- C. Mechanisms of action
- D. Indications
- E. Pharmacokinetics
- F. Side/ adverse effects
- G. Routes of administration
- H. How supplied
- I. Dosages
- J. Contraindications
- K. Considerations for pediatric patients, geriatric patients, pregnant patients, and other special patient groups
- L. Other profile components

XXIII. Drugs by classifications

A. Analgesics and antagonists
   1. Nonprescription analgesic-antipyretics
   2. Opioid analgesics-agonists
   3. Adjuvant medications
   4. Opioid antagonists
   5. Opioid agonist-antagonist agents

B. Anesthetics
   1. Anesthesia
   2. Significant drug interactions
   3. Special anesthesia considerations
   4. Types of anesthetics
      a. Inhalation anesthetics
      b. Intravenous anesthetics
      c. Ultra-short-acting barbiturates
      d. Dissociative anesthetic
      e. Neuroleptanesthesia
   5. Local anesthesia
      a. Surface or topical anesthesia
   6. Anesthesia by injection

C. Antianxiety, sedative, and hypnotic drugs
   1. Physiology of sleep
   2. Benzodiazepines
   3. Benzodiazepine antidote
   4. Barbiturates
   5. Miscellaneous sedatives and hypnotics
      a. Antianxiety agents/ sedatives
      b. Hypnotics

D. Anticonvulsants
   1. Anticonvulsant therapy
   2. Hydantoins
   3. Barbiturates
   4. Succinimides
   5. Diones
   6. Benzodiazepines
   7. Other Anticonvulsants

E. Central nervous system stimulants
   1. Anorexiant drugs
   2. Amphetamines
   3. Other central nervous system stimulants

F. Psychotherapeutic drugs
   1. The central nervous system and emotions
   2. The role of drug therapy in psychiatry
   3. Antipsychotic or neuroleptic agents
      a. Phenothiazine derivatives
      b. Butyrophenone derivatives
      c. Dihydroindolone derivatives
      d. Dibenzoxapine derivatives
   4. Antidepressant therapy

a. Monoamines
b. Tricyclic antidepressants
c. Monoamine oxidase inhibitor antidepressants
d. Antimanic drugs

G. Drugs for specific CNS-peripheral dysfunctions
1. Parkinson's disease
2. Drugs with central anticholinergic activity
a. Anticholinergic agents
b. Drugs affecting brain dopamine
(1) Drugs that increase brain levels of dopamine
(2) Dopamine-releasing drug
(3) Dopaminergic agonists
c. Monoamine oxidase inhibitor

H. Drugs affecting the parasympathetic nervous system
1. Cholinergic drugs
a. Direct-acting cholinergic drugs (choline esters)
b. Indirect-acting cholinergic drugs
c. Drugs used to treat myasthenia gravis
2. Cholinergic blocking drugs
a. Muscarinic blocking drugs
b. Belladonna alkaloids
c. Synthetic substitutes for atropine
3. Ganglionic stimulating drugs
a. Nicotine
4. Ganglionic blocking drugs

I. Drugs affecting the sympathetic (adrenergic) nervous system
1. Adrenergic drugs
a. Direct-acting adrenergic drugs
(1) Catecholamines
b. Drugs used for hypoperfusion
c. Indirect- and dual-acting adrenergic drugs
2. Adrenergic blocking drugs
a. Alpha-adrenergic blocking drugs
b. Noncompetitive, long-acting antagonists
c. Competitive, short-acting antagonists
d. Beta-adrenergic blocking agents

J. Skeletal muscle relaxants
1. Central-acting skeletal muscle relaxants
2. Direct-acting skeletal muscle relaxants

K. Drugs affecting the cardiovascular system
1. Antidysrhythmics
a. Group I-A Drugs
b. Group I-B Drugs
c. Group I-C Drugs
d. Group I Drugs (A, B, C)
e. Group II Drugs
f. Group III Drugs
g. Group IV Drugs (miscellaneous drug group)

2. Antihypertensives
    a. Diuretic drugs
        (1) Thiazides
        (2) Loop diuretics
        (3) Potassium-sparing agents
    b. Adrenergic inhibiting (sympatholytic) agents
        (1) Beta-adrenergic blocking agents
        (2) Centrally-acting adrenergic inhibitors
        (3) Peripheral adrenergic inhibitors
        (4) Rauwolfia derivatives
        (5) Alpha-adrenergic blocking drugs
    c. Angiotensin-converting enzyme inhibitors
    d. Calcium channel blocking agents
    e. Vasodilators
        (1) Arteriolar dilator drugs
        (2) Arterial and venous dilator drugs
    f. Ganglionic blocking drugs
    g. Monoamine oxidase inhibiting drugs
3. Cardiac glycosides
    a. Digitalis glycosides
    b. Miscellaneous agents
4. Calcium channel blockers
5. Vasodilators
    a. Antianginal drugs
    b. Nitrates
    c. Drugs for peripheral occlusive arterial disease
    d. Other vasodilating agents
6. Antihemorrheologic agents

L. Anticoagulants, thrombolytics, and blood components
1. Anticoagulant drugs
    a. Parenteral anticoagulant drugs
    b. Parenteral anticoagulant antagonists
    c. Oral anticoagulant therapy
    d. Oral anticoagulant antagonist - vitamin K
2. Thrombolytic therapy
3. Antihemophilic agents
4. Hemostatic agents
5. Blood and blood components
    a. Replacement therapies

M. Antihyperlipidemic drugs
N. Diuretics
1. Proximal tubule diuretics
2. Diluting segment diuretics (thiazide and thiazide-type drugs)
3. Loop diuretics
4. Distal tube diuretics/ potassium-sparing diuretics
5. Osmotic diuretics
6. Diuretic combinations

O. Drug therapy for renal system dysfunction

P. Mucokinetic and bronchodilator drugs
  1. Mucokinetic drugs
    a. Diluents
    b. Aerosol therapy
    c. Mucolytic drugs
    d. Drugs that antagonize bronchial secretions
  2. Bronchodilator drugs
    a. Sympathomimetic drugs
      (1) Nonselective adrenergic drugs
      (2) Nonselective beta-adrenergic drugs
      (3) Selective $beta_2$ receptor drugs
      (4) Catecholamine $beta_2$ receptor agents
      (5) Noncatecholamine $beta_2$ receptor drugs
  3. Xanthine derivatives
  4. Prophylactic asthmatic drugs
    a. Inhalation corticosteroid therapy

Q. Oxygen and miscellaneous respiratory agents
  1. Drugs that affect the respiratory center
    a. Oxygen therapy
    b. Direct respiratory stimulants
    c. Reflex respiratory stimulants
    d. Respiratory depressants
  2. Cough suppressants
    a. Opioid antitussive drugs
    b. Nonopioid antitussive drugs
  3. Nasal decongestants
  4. Antihistamines
  5. Serotonin
  6. Antiserotonin

R. Drugs affecting the gastrointestinal system
  1. Drugs that affect the stomach
    a. Antacid combinations
    b. Antiflatulents
    c. Digestants
    d. Antiemetics
    e. Cannabinoids
    f. Emetic agents
    g. Cytoprotective agents
    h. H_2 receptor antagonists
  2. Drugs affecting the lower gastrointestinal tract
    a. Laxatives
    b. Antidiarrheals

S. Ophthalmic drugs
  1. Antiglaucoma agents
  2. Mydriatic and cycloplegic agents
  3. Antiinfective/ antiinflammatory agents
  4. Topical anesthetic agents
  5. Other ophthalmic preparations

T. Drugs affecting the ear
   1. Antibiotic ear preparations
   2. Steroid and antibiotic combinations
   3. Miscellaneous preparations

U. Drugs affecting the pituitary
   1. Anterior pituitary hormones
   2. Posterior pituitary hormones

V. Drugs affecting the parathyroid and thyroid
   1. Thyroid preparations
   2. Antithyroid agents
   3. Iodine products
   4. Thiomide derivatives

W. Drugs affecting the adrenal cortex
   1. Glucocorticoids
   2. Mineralocorticoids
   3. Antiadrenals (adrenal steroid inhibitors)

X. Drugs affecting the pancreas
   1. Insulin preparations
   2. Oral hypoglycemic agents
   3. Hyperglycemic agents

Y. Drugs affecting the female reproductive system
   1. Female sex hormones
      a. Estrogens
      b. Progesterone and progestins
   2. Oral contraceptives
   3. Ovulatory stimulants and drugs used for infertility

Z. Drugs for labor and delivery
   1. Drugs affecting the uterus
      a. Oxytocics
      b. Premature labor inhibitors

AA. Drugs affecting the male reproductive system
   1. Testosterone

BB. Drugs affecting sexual behavior
   1. Drugs used to impair libido and sexual gratification
   2. Drugs used to enhance libido and sexual gratification

CC. Antineoplastic agents

DD. Drugs used in infectious disease and inflammation

EE. Antibiotics
   1. Penicillins
   2. Cephalosporins and related products
   3. Macrolide antibiotics
   4. Tetracyclines
   5. Miscellaneous antibiotics

FF. Antifungal and antiviral drugs
   1. Antifungal drugs
   2. Antiviral drugs

GG. Other antimicrobial drugs and antiparasitic drugs
   1. Antimalarial medications

2. Antituberculous agents
3. Antiamebiasis agents
4. Anthelmintic agents
5. Leprostatic agents

HH. Nonsteroidal antiinflammatory drugs
II. Uricosuric drugs
JJ. Serums, vaccines, and other immunizing agents
KK. Drugs affecting the immunologic system
1. Immunosuppressants
2. Immunomodulating agents
LL. Dermatologic drugs
1. General dermatologic preparations
2. Prophylactic agents
MM. Vitamins and minerals
1. Vitamins
a. Fat-soluble vitamins
b. Water-soluble vitamins
2. Minerals
NN. Fluids and electrolytes
1. Parenteral solutions
2. Electrolytes
OO. Antidotes/ overdoses
1. Specific to the type of poison
a. Elimination

UNIT TERMINAL OBJECTIVE

1-8 At the completion of this unit, the paramedic student will be able to safely and precisely access the venous circulation and administer medications.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-8.1 Review the specific anatomy and physiology pertinent to medication administration. (C-1)
1-8.2 Review mathematical principles. (C-1)
1-8.3 Review mathematical equivalents. (C-1)
1-8.4 Differentiate temperature readings between the Centigrade and Fahrenheit scales. (C-3)
1-8.5 Discuss formulas as a basis for performing drug calculations. (C-1)
1-8.6 Discuss applying basic principles of mathematics to the calculation of problems associated with medication dosages. (C-1)
1-8.7 Describe how to perform mathematical conversions from the household system to the metric system. (C-1)
1-8.8 Describe the indications, equipment needed, technique used, precautions, and general principles of peripheral venous or external jugular cannulation. (C-1)
1-8.9 Describe the indications, equipment needed, technique used, precautions, and general principles of intraosseous needle placement and infusion. (C-1)
1-8.10 Discuss legal aspects affecting medication administration. (C-1)
1-8.11 Discuss the "six rights" of drug administration and correlate these with the principles of medication administration. (C-1)
1-8.12 Discuss medical asepsis and the differences between clean and sterile techniques. (C-1)
1-8.13 Describe use of antiseptics and disinfectants. (C-1)
1-8.14 Describe the use of universal precautions and body substance isolation (BSI) procedures when administering a medication. (C-1)
1-8.15 Differentiate among the different dosage forms of oral medications. (C-3)
1-8.16 Describe the equipment needed and general principles of administering oral medications. (C-3)
1-8.17 Describe the indications, equipment needed, techniques used, precautions, and general principles of administering medications by the inhalation route. (C-3)
1-8.18 Describe the indications, equipment needed, techniques used, precautions, and general principles of administering medications by the gastric tube. (C-3)
1-8.19 Describe the indications, equipment needed, techniques used, precautions, and general principles of rectal medication administration. (C-3)
1-8.20 Differentiate among the different parenteral routes of medication administration. (C-3)
1-8.21 Describe the equipment needed, techniques used, complications, and general principles for the preparation and administration of parenteral medications. (C-1)
1-8.22 Differentiate among the different percutaneous routes of medication administration. (C-3)
1-8.23 Describe the purpose, equipment needed, techniques used, complications, and general principles for obtaining a blood sample. (C-1)
1-8.24 Describe disposal of contaminated items and sharps. (C-1)
1-8.25 Synthesize a pharmacologic management plan including medication administration. (C-3)
1-8.26 Integrate pathophysiological principles of medication administration with patient management. (C-3)

AFFECTIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-8.27 Comply with paramedic standards of medication administration. (A-1)

1-8.28 Comply with universal precautions and body substance isolation (BSI). (A-1)
1-8.29 Defend a pharmacologic management plan for medication administration. (A-3)
1-8.30 Serve as a model for medical asepsis. (A-3)
1-8.31 Serve as a model for advocacy while performing medication administration. (A-3)
1-8.32 Serve as a model for disposing contaminated items and sharps. (A-3)

PSYCHOMOTOR OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

1-8.33 Use universal precautions and body substance isolation (BSI) procedures during medication administration. (P-2)
1-8.34 Demonstrate cannulation of peripheral or external jugular veins. (P-2)
1-8.35 Demonstrate intraosseous needle placement and infusion. (P-2)
1-8.36 Demonstrate clean technique during medication administration. (P-3)
1-8.37 Demonstrate administration of oral medications. (P-2)
1-8.38 Demonstrate administration of medications by the inhalation route. (P-2)
1-8.39 Demonstrate administration of medications by the gastric tube. (P-2)
1-8.40 Demonstrate rectal administration of medications. (P-2)
1-8.41 Demonstrate preparation and administration of parenteral medications. (P-2)
1-8.42 Demonstrate preparation and techniques for obtaining a blood sample. (P-2)
1-8.43 Perfect disposal of contaminated items and sharps. (P-3)

DECLARATIVE

I. Review of mathematical principles
- A. Multiplication and division
- B. Roman numerals
- C. Fractions
- D. Decimal fractions
- E. Proportions
- F. Percent

II. Mathematical equivalents used in pharmacology
- A. The metric system
- B. Conversions between the household and metric system
- C. Fahrenheit scale for temperature reading
- D. Celsius (centigrade) scale for temperature reading
- E. Converting between Fahrenheit and Celsius temperatures

III. Calculating drug dosages
- A. Calculation methods
  1. Fraction method
  2. Ratio method
  3. Desired dose over available concentration method
- B. Calculating dosages
  1. Oral medications
     a. Capsules and tablets
     b. Liquids
  2. Parenteral medications
     a. Quantity (typically weight)
     b. Volume
     c. Units (e.g., insulin)
  3. Intravenous infusions
     a. Flow rates
     b. Flow rates for infants and children
     c. Total infusion time
     d. Other factors influencing flow rates
  4. Calculating dosages for infants and children
     a. Body weight
     b. Body surface area (BSA)
     c. Use of tables, charts, and other adjuncts
     d. Length-based resuscitation tapes

IV. Medical direction
- A. Medication administration is bound by the paramedic's on-line or off-line medical direction
- B. Role of the medical director
- C. Patient management protocols
  1. Written standing orders
- D. Legal considerations - policies and procedures which specify regulations of medication administration

V. Principles of medication administration
- A. Local drug distribution system - policies which establish stocking and supply of drugs
- B. Paramedic's responsibility associated with the drug order
  - 1. Verification of the drug order
- C. The "six rights" of medication administration
  - 1. "Right" patient
  - 2. "Right" drug
  - 3. "Right" dose
  - 4. "Right" route
  - 5. "Right" time
  - 6. "Right" documentation

VI. Medical asepsis
- A. Clean technique versus sterile technique
- B. Sterilization
- C. Antiseptics
- D. Disinfectants

VII. Universal precautions and body substance isolation (BSI) in medication administration

VIII. Venous access
- A. Intravenous cannulation
  - 1. General principles
  - 2. Types
    - a. Peripheral
      - (1) General principles
      - (2) Indications
      - (3) Precautions
      - (4) Equipment
      - (5) Technique
        - (a) Extremity
          - i) Indications
          - ii) Precautions
          - iii) Equipment
          - iv) Procedure
        - (b) External jugular
          - i) Indications
          - ii) Precautions
          - iii) Equipment
          - iv) Procedure
    - b. Central
- B. Intraosseous needle placement and infusion
  - 1. General Principles
  - 2. Indications
  - 3. Precautions
  - 4. Equipment
  - 5. Technique

IX. Medication administration by the inhalation route
- A. Bronchdilators (beta agonist) medications
  - 1. Other medications
- B. Equipment
  - 1. Oxygen or compressed air source
  - 2. Small volume nebulizer (SVN)
    - a. Other inhaler equipment
    - b. Other adapter equipment
    - c. Modified inhaler equipment
- C. Administering medications by the inhalation route
  - 1. Indications
  - 2. Techniques
  - 3. Precautions
  - 4. General principles of administering medications by the inhalation route

X. Enteral medication administration
- A. Oral administration of medications
  - 1. Dosage forms of solid-form and liquid-form oral medications
    - a. Capsules
    - b. Time-released capsules
    - c. Lozenges
    - d. Pills
    - e. Tablets
    - f. Elixirs
    - g. Emulsions
    - h. Suspensions
    - i. Syrups
  - 2. Equipment
    - a. Souffle cup
    - b. Medicine cup
    - c. Medicine dropper
    - d. Teaspoons
    - e. Oral syringes
    - f. Nipples
  - 3. General principles for administration of solid-form and liquid-form oral medications
- B. Administration of medications by the gastric tube
  - 1. Indications for administering medications by the gastric tube
    - a. Nasogastric tube
    - b. Orogastric tube
  - 2. Required equipment
  - 3. Techniques used
  - 4. Precautions
  - 5. General principles for administration of medications by the gastric tube
- C. Rectal administration of medications
  - 1. Indications for rectal administration of medications
  - 2. Required equipment
  - 3. Techniques used
  - 4. Precautions

5. General principles for rectal administration of medications

XI. Parenteral administration of medications
- A. Parenteral routes
  1. Intradermal
  2. Subcutaneous
  3. Intramuscular
  4. Intravenous
  5. Intraosseous
  6. Percutaneous
- B. Reasons for parenteral administration of medications
- C. Equipment used in parenteral administration of medications
  1. Syringes
     a. Calibration of the syringe
     b. Prefilled syringes
  2. Needles
     a. Parts of the needle
  3. Selection of the syringe and needle
  4. Packaging of syringes and needles
  5. Packaging of parenteral medications
     a. Ampules
     b. Vials
     c. Prefilled syringes
     d. Other
  6. Intravenous (IV) administration sets
     a. Various types
     b. Macrodrip chamber-type
     c. Microdrip chamber-type
     d. Variety of extensions and other pieces of equipment
     e. Some IV administration sets are manufacturer specific
  7. Intravenous (IV) solutions
     a. Types of containers
     b. Variety of volumes
  8. "Piggyback" administration
     a. Primary IV infusion
     b. Secondary IV infusion
     c. Related equipment to connect secondary infusion to primary infusion
  9. Volume control intravenous set
     a. Various brands
- D. Preparation of parenteral medication
  1. Equipment needed for preparing a parenteral medication
  2. Standard procedures for preparing all parenteral medications
  3. Guidelines for preparing medications
     a. To prepare a medication from an ampule
     b. Reconstitution of a sterile powder
     c. Removal of a volume of liquid from a vial
     d. Preparing a drug from a mix-o-vial
     e. Preparing two medications in one syringe

E. Administration of medication by the intradermal route
   1. Intradermal route: injections are made into the dermal layer of skin just below the epidermis
   2. Equipment needed for administration of a medication by the intradermal route
   3. Locate anatomical sites
   4. Technique for administration of medication by the intradermal route
   5. Documentation

F. Administration of medication by the subcutaneous route
   1. Subcutaneous route: injections are made into the loose connective tissue between the dermis and muscle layer
   2. Equipment needed for administration of a medication by the subcutaneous route
   3. Locate anatomical sites
      a. Upper arms
      b. Anterior thighs
      c. Abdomen
      d. Sublingual
   4. Technique for administration of medication by the subcutaneous route
   5. Precautions

G. Administration of medication by the intramuscular route
   1. Intramuscular route - injections are made by penetrating a needle through the dermis and subcutaneous tissue into the muscle layer
   2. Equipment needed for administration of a medication by the intramuscular route
   3. Locate anatomical sites for adults and children
      a. Vastus lateralis muscle
      b. Rectus femoris muscle
      c. Gluteal area
      d. Deltoid muscle
   4. Technique for administration of medication by the intramuscular route
   5. Precautions

H. Administration of medication by the intravenous route
   1. Intravenous route
      a. Places the drug directly into the bloodstream
      b. Bypasses all barriers to drug absorption
   2. Drugs may be administered by direct injection with a needle and syringe, but more commonly drugs are given intermittently or by continuous infusion through an established peripheral or central line
   3. Purpose for a peripheral IV site
   4. Purpose for a central IV site
   5. Dosage forms for IV administration
   6. Equipment needed for administration of a medication by the peripheral or central IV route
   7. Anatomical sites for adults, children, and infants
      a. Peripheral access
      b. Central access
   8. General principles of IV medication administration
   9. Preparing an IV solution for infusion
      a. Equipment
      b. Technique
      c. Warming or cooling an IV solution, as indicated
   10. Adding medication to an existing IV solution

11. Steps in performing venipuncture
12. Steps in performing administration of medications into an established IV line
13. Steps in performing administration of medication by a heparin lock
14. Steps in adding a medication to an IV bag, bottle, or volume control
15. Steps in adding a medication with a piggyback or secondary set
16. Steps in changing to the next container of IV solution
17. Steps in administering medication by a venous access device
    a. Equipment
    b. Technique
18. Steps to discontinue an intravenous infusion
    a. Equipment
    b. Technique
19. Steps in monitoring IV therapy
    a. Various types of infusion pumps
20. Complications
    a. Phlebitis or infection
    b. Extravasation
    c. Air in tubing
    d. Circulatory overload and pulmonary edema
    e. Allergic reaction
    f. Pulmonary embolism
    g. Failure to infuse properly

I. Administration of percutaneous medications
   1. Percutaneous route - application of a medication for absorption through the mucous membranes or skin
   2. Factors which influence the amount of medication absorbed through the skin or mucous membranes
   3. Methods of percutaneous administration of medications
   4. Steps in preparing percutaneous medications
   5. Topical medications - applied directly to the area of skin requiring treatment
      a. Common forms of topical medications
      b. Steps in administering topical medications
   6. Administering medications to mucous membranes
      a. Places where medications are commonly applied
         (1) Under the tongue (sublingual)
         (2) Against the cheek (buccal)
         (3) In the eye
         (4) In the nose
         (5) In the ear
         (6) Inhaled into the lungs
            (a) Through an aerosol or nebulizer
            (b) Through positive pressure ventilation
      b. Dosage forms
         (1) Tablets
         (2) Drops
         (3) Ointments
         (4) Creams
         (5) Suppositories

(6) Metered-dose inhalers
c. Equipment needed for administration of each type of medication
d. Steps for the administration of the dosage form of medication to the place it is commonly applied

J. Administration of medication by the intraosseous route
1. Any solution or drug that can be administered intermittently or by continuous infusion can be administered by the intraosseous route
2. Purpose for the intraosseous route
a. Shock
b. Status epilepticus
c. Other conditions
3. Equipment needed
4. Anatomical sites
5. General principles of administering solution or medication administration via the intraosseous route
6. Steps in establishing an intraosseous route for an IV solution or medication administration
7. Steps in performing administration of medications by the intraosseous route
a. Need for injection of medication with saline flush
b. Need for administration of fluids
8. Steps to discontinue an intraosseous infusion
a. Equipment
b. Technique
9. Complications
a. Phlebitis or infection
b. Extravasation
c. Compartment syndrom
d. Fracture
e. Air embolism due to air in tubing
f. Pulmonary embolism due to marrow particles (bone and fat)
g. Circulatory overload and pulmonary edema
h. Allergic reaction
i. Failure to flush the intraosseous needle
j. Failure to infuse properly

XII. Obtaining a blood sample
A. Purposes for obtaining a blood sample
B. Equipment needed for obtaining a blood sample
C. Locations from which to obtain a blood sample
1. Anatomical sites
2. From the established intravenous catheter
3. Other locations
D. Steps to preparing equipment for obtaining a blood sample
E. Techniques for obtaining a blood sample
F. Complications

XIII. Disposal of contaminated items and sharps
A. Follow local protocol for disposal of contaminated items and sharps

UNIT TERMINAL OBJECTIVE

1-9 At the completion of this unit, the paramedic student will be able to integrate the principles of therapeutic communication to effectively communicate with any patient while providing care.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-9.1 Define communication. (C-1)
1-9.2 Identify internal and external factors that affect a patient/ bystander interview conducted by a paramedic. (C-1)
1-9.3 Restate the strategies for developing patient rapport. (C-1)
1-9.4 Provide examples of open-ended and closed or direct questions. (C-1)
1-9.5 Discuss common errors made by paramedics when interviewing patients. (C-1)
1-9.6 Identify the nonverbal skills that are used in patient interviewing. (C-1)
1-9.7 Restate the strategies to obtain information from the patient. (C-1)
1-9.8 Summarize the methods to assess mental status based on interview techniques. (C-1)
1-9.9 Discuss the strategies for interviewing a patient who is unmotivated to talk. (C-1)
1-9.10 Differentiate the strategies a paramedic uses when interviewing a patient who is hostile compared to one who is cooperative. (C-3)
1-9.11 Summarize developmental considerations of various age groups that influence patient interviewing. (C-1)
1-9.12 Restate unique interviewing techniques necessary to employ with patients who have special needs. (C-1)
1-9.13 Discuss interviewing considerations used by paramedics in cross-cultural communications. (C-1)

AFFECTIVE OBJECTIVES

1-9.14 Serve as a model for an effective communication process. (A-3)
1-9.15 Advocate the importance of external factors of communication. (A-2)
1-9.16 Promote proper responses to patient communication. (A-2)
1-9.17 Exhibit professional non-verbal behaviors. (A-2)
1-9.18 Advocate development of proper patient rapport. (A-2)
1-9.19 Value strategies to obtain patient information. (A-2)
1-9.20 Exhibit professional behaviors in communicating with patients in special situations. (A-3)
1-9.21 Exhibit professional behaviors in communication with patient form different cultures. (A-3)

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

DECLARATIVE

I. Communication
  A. Communication process
    1. Source
      a. Common symbols
      b. Clear format
      c. Medium
        (1) Written
        (2) Verbal
        (3) Other symbols
    2. Encoding
      a. The act of placing a message in an understandable format
      b. Procedure of translating a message into a code that is understood by sender and receiver
    3. Message
      a. Code and format intended to deliver idea
    4. Decoding
      a. Act of interpreting symbols and format
      b. The decoding process can have many flaws
        (1) Symbols or words sent in the message are not common to both parties
        (2) Interpretation of message is based on different understandings of symbols or format
    5. Receiver
      a. Person intended to understand message
      b. In order for a message to be successful, the source must try to encode in a way the receiver understands
    6. Feedback
      a. The response to a message

II. Internal factors for effective communication
  A. Liking others
    1. Helping profession
    2. Genuine liking of people is necessary
    3. Understanding of human strengths and weaknesses
  B. Empathy is viewing the world from another inner frame of reference while remaining yourself
  C. Ability to listen
    1. Not passive role, but active
    2. Requires complete attention
    3. Requires practice

III. External factors for effective communication
  A. Privacy
    1. Strive for privacy when interviewing
    2. Helps to eliminate inhibitions and distractions
  B. Interruptions
    1. Attempt to avoid except when patient care information is being received from partners and is of a critical nature

C. Physical environment
   1. Lighting
   2. Noise/ interference
   3. Distracting equipment
   4. Distance
      a. Comfortable distance is 4 to 5 feet
      b. Twice the patient's arms length away
      c. "Personal space"
   5. Equal seating - eye level

D. Dress
   1. Appearance and clothing should be clean and meet conventional professional standards
   2. Easily identified as a paramedic

E. Note taking
   1. Look at the patient frequently
   2. Eyes should be on the patient as much as possible during an interview

IV. Introducing the interview - the paramedic should remain calm and begin the interview with open-ended questions

A. Open-ended questions
   1. Asked in a narrative form
   2. Encourages the patient to talk
   3. Doesn't restrict area of response

B. Closed or direct questions
   1. Ask for specific information
   2. One or two words and may be answered as "yes" or "no"
   3. Fill-in information left out in the narrative interview
   4. May provide specific facts

C. One question at a time
   1. The patient may not know which question to answer
   2. May leave out portions of the information or become confused
   3. Allow complete answers

D. Choose language the patient understands

V. Responses

A. Facilitation - encourages patient to provide more information
B. Silence - gives the patient more time to gather their thoughts
C. Reflection - echoing the patient's words back to them using slightly different words
D. Empathy - patient feels accepted and more open to talking
E. Clarification - used when the patient uses a word which is confusing to the paramedic
F. Confrontation - focusing patient's attention on one specific factor of interview
G. Interpretation
   1. Based upon observation or conclusion
   2. It links events, makes associations or implies a cause
H. Explanation - informing the patient and sharing factual or objective information
I. Summary
   1. Review of interview and interpretation of situation
   2. Open-ended to allow patient to clarify details

VI. Traps of interviewing
- A. Providing false assurance or reassurance
- B. Giving advice
- C. Authority
- D. Using avoidance language
- E. Distancing
- F. Professional jargon
- G. Leading or biased questions
- H. Talking too much
- I. Interrupting
- J. Using "why" questions

VII. Non-verbal skills
- A. Physical appearance
  - 1. Interviewer
    - a. Professional appearance, physically fit, and well groomed are important characteristics
    - b. Help gain patient's trust
  - 2. Patient
    - a. Note the patient's appearance, clothing, jewelry, and other physical signs
    - b. Will give you some indication of their condition
- B. Posture and gestures
  - 1. Interviewer
    - a. Relaxed
    - b. Calm, slow motion
  - 2. Patient
    - a. Open position - arms extended and large muscles relaxed
    - b. Closed position - flexed arms and legs
  - 3. Gestures
    - a. Acceptance
      - (1) Nodding
      - (2) Open hands
    - b. Defensive or angry
      - (1) Shaking head
      - (2) Pointing
      - (3) Closed hands
  - 4. Facial expressions
    - a. Reflects a wide variety of relevant emotions and conditions
    - b. Indicate relaxation, relief, pain, fear, anger, sorrow, etc.
  - 5. Eye contact - lack of eye contact suggests the patient is shy, withdrawn, confused, bored, intimidated, apathetic or depressed
  - 6. Voice - intensity, rate of speech, pitch and tone of voice have meaning in communication
  - 7. Touch - the meaning of touch is influenced by the person's age, sex, cultural background, past experience and current setting

VIII. Developing patient rapport
- A. Put the patient and yourself at ease - let the patient know you are on their side, that you respect their comments, and you are there to help them

1. Ask the patient their name and assure you can pronounce it correctly
2. Recognize signs
3. Respond to signs
4. Find the suffering and show compassion
5. Assess insight and become an ally
6. Show expertise

IX. Strategies to get information
- A. Patients generally communicate in three ways
  1. Pouring out the information (complaints)
  2. By revealing some problems but concealing embarrassing items
  3. Hiding the most embarrassing parts to both the paramedic and himself
- B. Obtaining information on complaints is accomplished based upon techniques of open-ended and closed or direct questions
  1. Resistance
     - a. Two main reasons for resistance
       - (1) The patient wishes to maintain an image
       - (2) The patient is uncertain about the paramedic's response and fear of rejection or ridicule
     - b. The paramedic must be non-judgmental if they expect to obtain information from the patient
     - c. Paramedics must be willing to talk with patients about any condition the patient may have
  2. Shifting focus
     - a. Approach a problem the patient does not want to talk about by shifting the focus away from the problem
     - b. Return focus to it from a different angle
  3. Defense mechanisms
     - a. Be aware of the patient's defense mechanisms
     - b. Anticipate them in advance
     - c. Confront them if necessary to obtain necessary medical information
  4. Distraction
     - a. When the patient is acting-out and hostile
     - b. Point out their behavior to them
     - c. Ask them if their behavior is their intention, and let them know this behavior is self-defeating

X. Methods to assess mental status during the interview
- A. Observation
  1. Appearance
  2. Consciousness
  3. Psychomotor movements
  4. Abnormal complex movements
- B. Conversation
  1. Orientation
     - a. Person
     - b. Place
     - c. Time

2. Speech
   a. Note the speed of speech
   b. Note the flow of speech
3. Thinking
4. Attention
5. Concentration
6. Comprehension
7. Remote, recent and immediate memory
   a. Memory of event
   b. Long and short term memory
8. Affect
   a. Patient's emotional response to external and internal events
9. Autonomic responses - sweating, trembling, etc.
10. Facial movements - muscles around mouth, nose and eyes
11. Reactive movements - made in response to novel movements such as looks at you when you are talking
12. Grooming movements
    a. Fixing hair
    b. Straightening clothes
    c. Indicate patient is uncomfortable

C. Exploration - offers a method to review the patient's internal experiences
   1. Mood
   2. Energy level
   3. Content of thinking

XI. Special interview situations
   A. Patients unmotivated to talk
      1. Most patients are more than willing to talk
         a. Some will require more time and varying techniques to communicate with during an interview
      2. Difficult interviews stem from four sources
         a. Patient's signs and symptoms may impact the ability to talk
         b. The patient may fear talking with you due to psychological disorders, cultural differences or age
         c. A cognitive impairment may be developing in the patient
         d. The patient may intentionally want to deceive you
      3. Techniques to use - many are already known but they must be used in a special way with the patient who does not talk
         a. Start the interview in the normal manner. When the patient does not talk, review the reason why you were called according to dispatch and take time to develop rapport with the patient.
         b. Attempt to use open-ended questions
         c. If unsuccessful, try direct questions
         d. Provide some positive feedback to any responses by the patient
         e. Make sure the patient understands the questions
            (1) Language barriers
            (2) Hearing difficulty
         f. Continue to ask questions about the critical information you need to know to

progress with treatment

g. You may not be able to obtain information about non-essential information
h. Ask family members or others at the scene if the patient has been non-communicative for a long time, attempt to rule out a pathology
i. Use summary and interpretation of events or conditions and ask the patient if your summary or interpretation is correct
j. See if you can get the patient to ask questions about your care, equipment, profession or any topic which will create conversation. If the patient does ask you questions make sure you answer them fully, not one word answers.
k. Don't be discouraged. You may not obtain all the information you are seeking. Observe affect and record information to establish a mental status baseline for later evaluations.
l. You may desire to ask questions that you already know the answer to establish the patient's credibility

B. Interviewing a hostile patient
1. Closely monitor with overpowering force
2. Be sure to stay far enough away from the patient, close to an exit
3. Personal safety
4. Never leave the patient alone without adequate assistance
5. Use the same interviewing techniques
6. Set limits and establish boundaries
7. Tell the patient of the advantages of cooperation
8. Be aware of local protocol for hostile patients, use of restraints, and psychological medications

C. Developmental considerations when interviewing patients
1. Children - you must build rapport with two persons, the child and the parent
a. Begin conversations with both the child and parent
b. With younger children, 1 to 6 years old, focus most of your conversation with the parent
c. Offer the child toys or something to keep them occupied while you interview the parent
(1) Be aware you are collecting the child's history from a parent's point of view
(2) Your interview can put the parent on the defensive
(3) Be cautious not to be judgmental if the parents have not provided proper care or safety for the child before your arrival
(4) Be observant but not confrontational
d. Make contact with the child in a gradual approach as you are interviewing the parent
e. Speak to children at eye level
f. Use a quiet, calm voice
g. Be aware of your non-verbal communication
h. Be knowledgeable of communication with children according to their age group
(1) Infants
(a) Respond best to firm, gentle handling and a quiet calm voice
(b) Older infants may have stranger anxiety so keep the parent within their view
(2) Preschoolers

(a) See the world only from their perspective
(b) Use short sentences with concrete explanations

(3) School aged children
(a) More objective and realistic

(4) Adolescents
(a) Want to be adults
(b) Should not be communicated with as children

D. The older adult- they are seeking the meaning of older age, dealing with disease and the inevitability of their death
1. Address older adults always by their last name with Mr., Mrs., or Ms.
2. Interviews usually take longer
3. Fatigue
4. Older patients may have physical disabilities that cause the interview to take longer
5. Touch is a non-verbal skill that is important to older persons

E. Hearing impaired patients
1. Ask a deaf person their preferred method to communicate, either lip reading, signing, or writing
2. Using writing is the best out-of-hospital method to communicate with the patient
3. If they are lip reading be sure to face the patient squarely and have good lighting on your face
4. Be aware that many hearing impaired patients will nod "yes" even if they do not understand what was asked

F. Patients under the influence of street drugs or alcohol
1. Ask simple or direct questions
2. Do not be threatening, avoid confrontation

G. Sexually aggressive patients
1. Confront the patient so they are sure to understand your professional position and that you are a care giver
2. Document any unusual occurrences with patients and have a witness to any of your actions or the incident and document their observations
3. May want to consider "same sex" witness or tape recording all interaction in the back of the ambulance

H. Transcultural considerations in communicating with patients
1. Introduce yourself and the way in which you want to be called
a. By first name, last name, or title
b. Ask the patient to do the same
2. Both the paramedic and the patient will bring cultural stereotypes to a professional relationship. The role of a family member in providing care must be understood and explained.
3. Ethnocentrism - viewing your own life as the most desirable, acceptable or best and to act in a superior manner to another culture's way of life
4. Cultural imposition - tendency to impose your beliefs, values, and patterns of behavior on individuals from another culture
5. Space between the paramedic and the patient is important and varies among different cultures
a. Intimate zone
(1) 0 to 1.5 feet
(2) Visual distortion occurs

(3) Best for assessing breath and other body odors

b. Personal distance
   (1) 1.5 to 4 feet
   (2) Perceived as extension of self, voice is moderate, body odors are not apparent, no visual distortion
   (3) Much of the physical assessment occurs at this distance

c. Social distance
   (1) 4 to 12 feet
   (2) Used for impersonal business transactions, perceptual information much less detailed
   (3) Much of a patient interview will occur at this distance

d. Public distance
   (1) 12+ feet
   (2) Interaction with others is impersonal, speakers voice must be projected, subtle facial expressions imperceptible

6. Some cultures are more comfortable at a variety of spaces when communicating
7. Some cultures expect health care workers to have all the answers to their illness
8. Some cultures during illness or injury accept the sick role in different ways
9. Nonverbal communication such as handshaking and touching may be perceived differently in different cultures
10. Asian, Native Americans, Indochinese, and Arabs may consider direct eye contact impolite or aggressive and they may avert their eyes during an interview
11. Touch, especially between members of different culture groups may be of concern
12. Language - paramedics may encounter patients who do not speak the same language

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UNIT TERMINAL OBJECTIVE

1-10 At the completion of this unit, the paramedic student will be able to integrate the physiological, psychological, and sociological changes throughout human development with assessment and communication strategies for patients of all ages.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

1-10.1 Compare the physiological and psychosocial characteristics of an infant with those of an early adult. (C-3)
1-10.2 Compare the physiological and psychosocial characteristics of a toddler with those of an early adult. (C-3)
1-10.3 Compare the physiological and psychosocial characteristics of a pre-school child with those of an early adult. (C-3)
1-10.4 Compare the physiological and psychosocial characteristics of a school-aged child with those of an early adult. (C-3)
1-10.5 Compare the physiological and psychosocial characteristics of an adolescent with those of an early adult. (C-3)
1-10.6 Summarize the physiological and psychosocial characteristics of an early adult. (C-3)
1-10.7 Compare the physiological and psychosocial characteristics of a middle aged adult with those of an early adult. (C-3)
1-10.8 Compare the physiological and psychosocial characteristics of a person in late adulthood with those of an early adult. (C-3)

AFFECTIVE OBJECTIVES

1-10.9 Value the uniqueness of infants, toddlers, pre-school, school aged, adolescent, early adulthood, middle aged, and late adulthood physiological and psychosocial characteristics. (A-3)

PSYCHOMOTOR OBJECTIVES

None identified for this unit.

DECLARATIVE

I. Infancy (birth to 1 year)
- A. Physiological
  - 1. Vital signs
    - a) Heart rate
      - (1) 100 to 160 beats per minute during first 30 minutes
      - (2) Settling around 120 beats per minute
    - b) Respiratory
      - (1) Rate
        - (a) Initially 40 - 60
        - (b) Dropping to 30 - 40 after first few minutes of life
        - (c) Slowing to 20 - 30 by one year
      - (2) Tidal volume
        - (a) 6 - 8 ml/ kg initially
        - (b) Increasing to 10 - 15 ml/ kg by 1 year
    - c) Blood pressure
      - (1) Average systolic blood pressure increases from 70 at birth to 90 at 1 year
    - d) Temperature ranges
      - (1) 98 to 100 degrees Fahrenheit is the thermoneutral range
  - 2. Weight
    - a) Normally 3.0-3.5 kg. at birth
    - b) Normally drops 5-10% in the first week of life due to excretion of extracellular fluid
    - c) Exceed birth weight by second week
    - d) Grows at approximately 30 gm/day during the first month
    - e) Should double weight by 4-6 months
    - f) Should triple weight at 9-12 months
    - g) Infants head equal to 25% of the total body weight
  - 3. Cardiovascular system
    - a) Circulatory changes soon after birth
      - (1) Closing of the ductus arteriosus
      - (2) Closing of the ductus venosus
      - (3) Closing of the foramen ovale
      - (4) Immediate increase in systemic vascular resistance
      - (5) Decrease in pulmonary vascular resistance
    - b) Left ventricle strengthens throughout first year
  - 4. Pulmonary system
    - a) Airways, shorter, narrower, less stable, more easily obstructed
    - b) Infants primarily nose breathers until 4 weeks
    - c) Lung tissue is fragile and prone to barotrauma
    - d) Fewer alveoli with decreased collateral ventilation
    - e) Accessory muscles immature, susceptible to early fatigue
    - f) Chest wall less rigid
    - g) Ribs positioned horizontally, causing diaphragmatic breathing
    - h) Higher metabolic and oxygen consumption rates than adults
    - i) Rapid respiratory rates lead to rapid heat, and fluid loss
  - 5. Renal system
    - a) Kidneys unable to concentrate urine
    - b) Specific gravity rarely exceeds 1.020

6. Immune system
   a) Passive immunity retained through the first 6 months of life
   b) Based on maternal antibodies
7. Nervous system
   a) Movements
      (1) Strong, coordinated suck and gag
      (2) Well flexed extremities
      (3) Extremities move equally when infant is stimulated
   b) Reflexes
      (1) Moro reflex
      (2) Palmar grasp
      (3) Sucking reflex
      (4) Rooting reflex
   c) Fontanelles
      (1) Posterior fontanelle closes at 3 months
      (2) Anterior fontanelle closes between 9 to 18 months
      (3) Fontanelles may provide an indirect estimate of hydration
   d) Sleep
      (1) Initially sleeps 16-18 hours per day with sleep and wakefulness evenly distributed over 24 hours.
      (2) Gradually decreases to 14-16 hours per day with 9-10 hour concentration at night
      (3) Sleeps through the night at 2-4 months
      (4) Normal infant is easily arousable
8. Musculoskeletal system
   a) Bone growth
      (1) Epiphyseal plate - length
      (2) Growth in thickness occurs by deposition of new bone on existing bone
      (3) Is influenced by
         (a) Growth hormone
         (b) Genetic factors
         (c) Thyroid hormone
         (d) General health
   b) Muscle weight is about 25% in infants
9. Dental system
   a) Teeth begin to erupt at 5-7 months
10. Growth and development in infants
   a) Rapid changes over first year
      (1) 2 months
         (a) Tracks objects with eyes
         (b) Recognizes familiar faces
      (2) 3 months
         (a) Moves objects to mouth with hands
         (b) Displays primary emotions with distinct facial expressions
      (3) 4 months
         (a) Drools without swallowing
         (b) Reaches out to people
      (4) 5 months
         (a) Sleeps throughout night without food
         (b) Discriminates between family and strangers

(5) 6 months
(a) Sits upright in a highchair
(b) Makes one syllable sounds; e.g., ma, mu, da, di
(6) 7 months
(a) Fear of strangers
(b) Quickly changes from crying to laughing
(7) 8 months
(a) Responds to "no"
(b) Sits alone
(c) Plays "peek-a-boo"
(8) 9 months
(a) Respond to adult anger
(b) Pulls self to standing position
(c) Explores objects by mouthing, sucking, chewing, and biting
(9) 10 months
(a) Pays attention to own name
(b) Crawls well
(10) 11 months
(a) Attempts to walk without assistance
(b) Shows frustration to restrictions
(11) 12 months
(a) Walks with help
(b) Knows own name

B. Psychosocial development
1. Family processes - reciprocal socialization
a) Scaffolding
b) Attachment
c) Trust versus mistrust
d) Secure attachment
2. Temperament - infants may be
a) Easy child
b) Difficult child
c) Slow to warm-up child
3. Crying
a) Basic cry
b) Anger cry
c) Pain cry
4. Trust - based on consistent parental care
5. Situational crisis - parental separation reactions
a) Protest
b) Despair
c) Withdrawal
6. Growth charts
a) Good for comparing physical development to norm

II. Toddler (12 to 36 months) and pre-school age (3 to 5 years)
A. Physiological
1. Vital signs
a) Heart rate
(1) Toddlers - 80 to 130 beats per minute

(2) Preschoolers - 80 to 120 beats per minute
b) Respiratory rate
(1) Toddlers - 20 to 30
(2) Preschoolers- 20 to 30
c) Systolic blood pressure
(1) Toddlers - 70 to 100 mmHg
(2) Preschools - 80 to 110 mmHg
d) Temperature - 96.8 to 99.6 F degrees Fahrenheit

2. Weight
a) Rate of gain slows dramatically
b) Average child gains 2 kg per year
3. Cardiovascular system
a) Capillary beds better developed to assist in thermoregulation
b) Hemoglobin levels approach normal adult levels
4. Pulmonary system
a) Terminal airways continue to branch
b) Alveoli increase in number
5. Renal system
a) Kidneys are well developed in toddler years
b) Specific gravity and other urine findings similar to adults
6. Immune system
a) Passive immunity lost, more susceptible to minor respiratory and gastrointestinal infections
b) Develops immunity to common pathogens as exposure occurs
7. Nervous system
a) Brain 90% of adult weight
b) Myelination increases cognitive development
c) Development allows effortless walking and other basic motor skills
d) Fine motor skills developing
8. Musculoskeletal system
a) Muscle mass increases
b) Bone density increases
9. Dental system
a) All primary teeth have erupted by 36 months
10. Elimination patterns
a) Toilet training
(1) Physiologically capable by 12 to 15 months
(2) Psychologically ready between 18 and 30 months
(3) Average age for completion - 28 months
11. Sensory
a) Visual acuity - 20/ 30 during the toddler years
b) Hearing - essential maturity at 3 to 4 years

B. Psychosocial
1. Cognitive
a) Basics of language mastered by approximately 36 months, with continued refinement throughout childhood
b) Understands cause and effect between 18-24 months
c) Develops separation anxiety - approximately 18 months
d) Develops magical thinking - between 24 and 36 months
2. Play

a) Exploratory behavior accelerates
b) Able to play simple games and follow basic rules
c) Begin to display competitiveness
d) Observation of play may uncover frustrations otherwise unexpressed

3. Sibling relationships
   a) Sibling rivalry
   b) First born children
      (1) Usually maintain special relationship with parents
      (2) Expected to exercise self-control and show responsibility in interacting with younger siblings
4. Peer group functions
   a) Children about the same age and maturity levels
   b) Provide a source of information about the outside world and other families
   c) Become more important to the child throughout childhood
5. Parenting styles and its effect on children
   a) Authoritarian parenting
   b) Authoritative parenting
   c) Permissive-indifferent parenting
   d) Permissive-indulgent parenting
6. Divorce effects on child development
   a) Mediated by
      (1) Age
      (2) Cognitive and social competencies
      (3) Amount of dependency on parents
      (4) Type of day care
      (5) Parents' ability to respond to the child's needs
7. Television
   a) May be a cause in aggression at this age
   b) Careful screening of television exposure may be effective
8. Modeling
   a) Children begin to recognize the differences of sex
   b) Begin to model themselves based on sex

III. School age children (6 to 12 years)
   A. Physiological
      1. Vital signs
         a) Heart rate - 70 to 110 beats per minute
         b) Respiratory rate - 20 to 30
         c) Systolic blood pressure - 80 to 120 mmHg
         d) Temperature - 98.6 degrees Fahrenheit
      2. Growth rate
         a) Average child gains 3 kg per year and 6 cm per year
      3. Bodily functions
         a) Most reach adult levels during this period
         b) Lymph tissues proportionately larger than adult
         c) Brain function increases in both hemispheres
         d) Loss of primary teeth and replacement with permanent teeth begins
   B. Psychosocial
      1. Families
         a) Children allowed more self regulation

b) Parents still provide general supervision
c) Parents spend less time with children in this age group

2. Develop self-concept
   a) More interaction with adults and children
      (1) Begin comparing themselves with others
      (2) Develop self-esteem
         (a) Tends to be higher during early years of school than later years
         (b) Often based on external characteristics
         (c) Effected by peer popularity, rejection, emotional support, and neglect
         (d) Negative self-esteem can be damaging to further development

3. Moral development
   a) Pre-conventional reasoning
      (1) Punishment and obedience
      (2) Individualism and purpose
   b) Conventional reasoning
      (1) Interpersonal norms
      (2) Social system morality
   c) Post-conventional reasoning
      (1) Community rights versus individual rights
      (2) Universal ethical principles
   d) Individuals move through development throughout school age and young adulthood at different paces

IV. Adolescence - (13 to 18 years)
   A. Physiological
      1. Vital signs
         a) Heart rate - 55 to 105 beats per minute
         b) Respiratory rate - 12 to 20 breaths per minute
         c) Blood pressure - 100 to 120
         d) Temperature- 98.6 degrees Fahrenheit
      2. Growth rate
         a) Most experience a rapid 2-3 year growth spurt
            (1) Begins distally with enlargement of feet and hands
            (2) Enlargement of the arms and legs follows
            (3) Chest and trunk enlarge in final stage
         b) Girls are mostly done growing by age 16, boys are mostly done growing by age 18
         c) Secondary sexual development occurs
            (1) Noticeable development of the external sexual organs
            (2) Pubic and axillary hair develops
            (3) Vocal quality changes occur (mostly in males)
            (4) Menstruation initiates (in females)
         d) Endocrine changes
            (1) Female
               (a) FSH and LH release
               (b) Gonadotropin promote estrogen and progesterone production
               (c) Other biologic changes
            (2) Male
               (a) Gonadotropin promote testosterone production

e) Reproductive maturity
f) Muscle mass and bone growth nearly complete
g) Body fat decreases early in adolescence, and begins to increase later
(1) Females require 18-20% body fat percentage for menarche to occur
h) Blood chemistry nearly equal to adult levels
i) Skin toughens through sebaceous gland activity

B. Psychosocial
1. Family
a) Conflicts arise
(1) Adolescents strive for autonomy
(2) Biological changes associated with puberty
(3) Increased idealism
(4) Independence and identity changes
2. Develop identity
a) Self-consciousness increases
b) Peer pressure increases
c) Interest in the opposite sex increases
d) Want to be treated like adults
e) Progress through various stages based on how they handle crisis, etc.
f) Anti-social behavior peaks around eighth or ninth grade
g) Minority adolescents tend to have more identity crisis than non-minority
h) Body image of great concern
(1) Continual comparison amongst peers
(2) Eating disorders are common
i) Self-destructive behaviors begin
(1) Tobacco
(2) Alcohol
(3) Illicit drugs
j) Depression and suicide more common than any other age group
3. Ethical development
a) Develop capability for logical, analytical, and abstract thinking
b) Develop a personal code of ethics

V. Early adulthood (20 to 40 years)
A. Physiological
1. Vital signs
a) Heart rate - average 70 beats per minute
b) Respiratory rate - average 16 to 20
c) Blood pressure - average 120/ 80 mmHg
d) Temperature - 98.6 degrees Fahrenheit
2. Peak physical conditioning between 19 and 26 years of age
3. Adults develop lifelong habits and routines during this time
4. All body systems at optimal performance
5. Accidents are a leading cause of death in this age group
B. Psychosocial
1. Experience highest levels of job stress during this time
2. Love develops
a) Romantic love
b) Affectionate love
3. Childbirth most common in this age group

a) New families provide new challenges and stress
4. This period is less associated with psychological problems related to well-being

VI. Middle adulthood (41 to 60 years)
A. Physiological
1. Vital signs
a) Heart rate - average 70 beats per minute
b) Respiratory rate - average 16 - 20
c) Blood pressure - average 120/ 80 mmHg
d) Temperature - 98.6 degrees Fahrenheit
2. Body still functioning at high level with varying degrees of degradation
3. Vision changes
4. Hearing less effective
5. Cardiovascular health becomes a concern
a) Cardiac output decreases throughout this period
b) Cholesterol levels increased
6. Cancer strikes in this age group often
7. Weight control more difficult
8. Menopause in women in late 40s early 50s
B. Psychosocial
1. Adults in this group more concerned with "social clock"
a) Task oriented
b) Pressed for time to accomplish lifelong goals
2. Approach problems more as challenges than threats
3. Empty-nest syndrome
4. Often burdened by financial commitments for elderly parents as well as young adult children

VII. Late adulthood (61 years and older)
A. Physiological
1. Vital signs
a) Heart rate - depends on patient's physical and health status
b) Respiratory rate - depends on patient's physical and health status
c) Blood pressure - depends on patient's physical and health status
d) Temperature - 98.6 degrees Fahrenheit
2. Life span - maximum approximately 120 years.
3. Life expectancy - average length based on year of birth
4. Cardiovascular function changes
a) Blood vessels
(1) Thickening
(2) Increased peripheral vascular resistance
(3) Reduced blood flow to organs
(4) Decreased baroreceptor sensitivity
(5) By 80 years of age, there is approximately 50% decrease in vessel elasticity
b) Heart
(1) Increased workload causes
(a) Cardiomegaly
(b) Mitral and aortic valve changes
(c) Decreased myocardial elasticity

(2) Myocardium is less able to respond to exercise
(3) Fibrous tissues in SA node
(4) Pacemaker cells diminish resulting in arrhythmia
(5) Tachycardia not well tolerated

c) Blood cells
(1) Functional blood volume decreased
(2) Decrease in platelet count
(3) RBCs diminished
(4) Poor iron levels

5. Respiratory system
a) Changes in mouth, nose, and lungs
b) Metabolic changes lead to decreased lung function
c) Muscular changes
(a) Diaphragm elasticity diminished
(b) Chest wall weakens
d) Diffusion through alveoli diminished
(a) Life long exposure to pollutants, etc.
e) Lung capacity diminished
f) Coughing ineffective
(1) Weakened chest wall
(2) Weakened bone structure

6. Endocrine system changes
a) Decreased glucose metabolism
b) Decreased insulin production
c) Thyroid shows some diminished T3 production
d) Cortisol diminished by 25 %
e) Pituitary gland 20% less effective
f) Reproductive organs atrophy in women

7. Gastrointestinal system
a) Mouth, teeth, and saliva changes
b) Peristalsis decreased
c) Esophageal sphincter less effective
d) GI secretions decreased
e) Vitamin and mineral deficiencies
f) Internal intestinal sphincters lose tone

8. Renal system
a) 50% nephrons lost
b) Abnormal glomeruli more common
c) Decreased elimination

9. Sensory changes
a) Loss of taste buds
b) Olfactory diminished
c) Diminished pain perception
d) Diminished kinesthetic sense
e) Visual acuity diminished
f) Reaction time diminished
g) Presbycusis problems with hearing

10. Nervous system
a) Neuron loss
b) Neurotransmitters diminish

c) Sleep - wake cycle disrupted

B. Psychosocial
   1. Terminal drop hypothesis
      a) Death preceded by a decrease in cognitive functioning over a five year period prior to death
   2. Wisdom attributed to age in some cultures
   3. 95% of older adults live in communities
   4. Challenges
      a) Self worth
      b) Declining well being
      c) Financial burdens
      d) Death or dying of companions

UNIT TERMINAL OBJECTIVE

2-1 At the completion of this unit, the paramedic student will be able to establish and/ or maintain a patent airway, oxygenate, and ventilate a patient.

COGNITIVE OBJECTIVES

At the completion of this unit, the paramedic student will be able to:

2-1.1 Explain the primary objective of airway maintenance. (C-1)
2-1.2 Identify commonly neglected prehospital skills related to airway. (C-1)
2-1.3 Identify the anatomy of the upper and lower airway. (C-1)
2-1.4 Describe the functions of the upper and lower airway. (C-1)
2-1.5 Explain the differences between adult and pediatric airway anatomy. (C-1)
2-1.6 Define gag reflex. (C-1)
2-1.7 Explain the relationship between pulmonary circulation and respiration. (C-3)
2-1.8 List the concentration of gases that comprise atmospheric air. (C-1)
2-1.9 Describe the measurement of oxygen in the blood. (C-1)
2-1.10 Describe the measurement of carbon dioxide in the blood. (C-1)
2-1.11 Describe peak expiratory flow. (C-1)
2-1.12 List factors that cause decreased oxygen concentrations in the blood. (C-1)
2-1.13 List the factors that increase and decrease carbon dioxide production in the body. (C-1)
2-1.14 Define atelectasis. (C-1)
2-1.15 Define FiO_2. (C-1)
2-1.16 Define and differentiate between hypoxia and hypoxemia. (C-1)
2-1.17 Describe the voluntary and involuntary regulation of respiration. (C-1)
2-1.18 Describe the modified forms of respiration. (C-1)
2-1.19 Define normal respiratory rates and tidal volumes for the adult, child, and infant. (C-1)
2-1.20 List the factors that affect respiratory rate and depth. (C-1)
2-1.21 Explain the risk of infection to EMS providers associated with ventilation. (C-3)
2-1.22 Define pulsus paradoxes. (C-1)
2-1.23 Define and explain the implications of partial airway obstruction with good and poor air exchange. (C-1)
2-1.24 Define complete airway obstruction. (C-1)
2-1.25 Describe causes of upper airway obstruction. (C-1)
2-1.26 Describe causes of respiratory distress. (C-1)
2-1.27 Describe manual airway maneuvers. (C-1)
2-1.28 Describe the Sellick (cricoid pressure) maneuver. (C-1)
2-1.29 Describe complete airway obstruction maneuvers. (C-1)
2-1.30 Explain the purpose for suctioning the upper airway. (C-1)
2-1.31 Identify types of suction equipment. (C-1)
2-1.32 Describe the indications for suctioning the upper airway. (C-3)
2-1.33 Identify types of suction catheters, including hard or rigid catheters and soft catheters. (C-1)
2-1.34 Identify techniques of suctioning the upper airway. (C-1)
2-1.35 Identify special considerations of suctioning the upper airway. (C-1)
2-1.36 Describe the indications, contraindications, advantages, disadvantages, complications, equipment and technique of tracheobronchial suctioning in the intubated patient. (C-3)
2-1.37 Describe the use of an oral and nasal airway. (C-1)
2-1.38 Identify special considerations of tracheobronchial suctioning in the intubated patient. (C-1)
2-1.39 Define gastric distention. (C-1)
2-1.40 Describe the indications, contraindications, advantages, disadvantages, complications, equipment and

technique for inserting a nasogastric tube and orogastric tube. (C-1)

2-1.41 Identify special considerations of gastric decompression. (C-1)

2-1.42 Describe the indications, contraindications, advantages, disadvantages, complications, and technique for inserting an oropharyngeal and nasopharyngeal airway (C-1)

2-1.43 Describe the indications, contraindications, advantages, disadvantages, complications, and technique for ventilating a patient by: (C-1)

1. Mouth-to-mouth
2. Mouth-to-nose
3. Mouth-to-mask
4. One person bag-valve-mask
5. Two person bag-valve-mask
6. Three person bag-valve-mask
7. Flow-restricted, oxygen-powered ventilation device

2-1.44 Explain the advantage of the two person method when ventilating with the bag-valve-mask. (C-1)

2-1.45 Compare the ventilation techniques used for an adult patient to those used for pediatric patients. (C-3)

2-1.46 Describe indications, contraindications, advantages, disadvantages, complications, and technique for ventilating a patient with an automatic transport ventilator (ATV). (C-1)

2-1.47 Explain safety considerations of oxygen storage and delivery. (C-1)

2-1.48 Identify types of oxygen cylinders and pressure regulators (including a high-pressure regulator and a therapy regulator). (C-1)

2-1.49 List the steps for delivering oxygen from a cylinder and regulator. (C-1)

2-1.50 Describe the use, advantages and disadvantages of an oxygen humidifier. (C-1)

2-1.51 Describe the indications, contraindications, advantages, disadvantages, complications, liter flow range, and concentration of delivered oxygen for supplemental oxygen delivery devices. (C-3)

2-1.52 Define, identify and describe a tracheostomy, stoma, and tracheostomy tube. (C-1)

2-1.53 Define, identify, and describe a laryngectomy. (C-1)

2-1.54 Define how to ventilate with a patient with a stoma, including mouth-to-stoma and bag-valve-mask-to-stoma ventilation. (C-1)

2-1.55 Describe the special considerations in airway management and ventilation for patients with facial injuries. (C-1)

2-1.56 Describe the special considerations in airway management and ventilation for the pediatric patient. (C-1)

2-1.57 Differentiate endotracheal intubation from other methods of advanced airway management. (C-3)

2-1.58 Describe the indications, contraindications, advantages, disadvantages and complications of endotracheal intubation. (C-1)

2-1.59 Describe laryngoscopy for the removal of a foreign body airway obstruction. (C-1)

2-1.60 Describe the indications, contraindications, advantages, disadvantages, complications, equipment, and technique for direct laryngoscopy. (C-1)

2-1.61 Describe visual landmarks for direct laryngoscopy. (C-1)

2-1.62 Describe use of cricoid pressure during intubation. (C-1)

2-1.63 Describe indications, contraindications, advantages, disadvantages, complications, equipment and technique for digital endotracheal intubation. (C-1)

2-1.64 Describe the indications, contraindications, advantages, disadvantages, complications, equipment and technique for using a dual lumen airway. (C-3)

2-1.65 Describe the indications, contraindications, advantages, disadvantages, complications and equipment for

rapid sequence intubation with neuromuscular blockade. (C-1)
2-1.66 Identify neuromuscular blocking drugs and other agents used in rapid sequence intubation. (C-1)
2-1.67 Describe the indications, contraindications, advantages, disadvantages, complications and equipment for sedation during intubation. (C-1)
2-1.68 Identify sedative agents used in airway management. (C-1)
2-1.69 Describe the indications, contraindications, advantages, disadvantages, complications, equipment and technique for nasotracheal intubation. (C-1)
2-1.70 Describe the indications, contraindications, advantages, disadvantages and complications for performing an open crichothyrotomy. (C-3)
2-1.71 Describe the equipment and technique for performing an open cricothyrotomy. (C-1)
2-1.72 Describe the indications, contraindications, advantages, disadvantages, complications, equipment and technique for transtlaryngeal catheter ventilation (needle cricothyrotomy). (C-3)
2-1.73 Describe methods of assessment for confirming correct placement of an endotracheal tube. (C-1)
2-1.74 Describe methods for securing an endotracheal tube. (C-1)
2-1.75 Describe the indications, contraindications, advantages, disadvantages, complications, equipment and technique for extubation. (C-1)
2-1.76 Describe methods of endotracheal intubation in the pediatric patient. (C-1)

AFFECTIVE OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

2-1.77 Defend the need to oxygenate and ventilate a patient. (A-1)
2-1.78 Defend the necessity of establishing and/ or maintaining patency of a patient's airway. (A-1)
2-1.79 Comply with standard precautions to defend against infectious and communicable diseases. (A-1)

PSYCHOMOTOR OBJECTIVES
At the completion of this unit, the paramedic student will be able to:

2-1.80 Perform body substance isolation (BSI) procedures during basic airway management, advanced airway management, and ventilation. (P-2)
2-1.81 Perform pulse oximetry. (P-2)
2-1.82 Perform end-tidal CO_2 detection. (P-2)
2-1.83 Perform peak expiratory flow testing. (P-2)
2-1.84 Perform manual airway maneuvers, including: (P-2)
- a. Opening the mouth
- b. Head-tilt/ chin-lift maneuver
- c. Jaw-thrust without head-tilt maneuver
- d. Modified jaw-thrust maneuver

2-1.85 Perform manual airway maneuvers for pediatric patients, including: (P-2)
- a. Opening the mouth
- b. Head-tilt/ chin-lift maneuver
- c. Jaw-thrust without head-tilt maneuver
- d. Modified jaw-thrust maneuver

2-1.86 Perform the Sellick maneuver (cricoid pressure). (P-2)
2-1.87 Perform complete airway obstruction maneuvers, including: (P-2)
- a. Heimlich maneuver
- 2. Finger sweep
- 3. Chest thrusts

4. Removal with Magill forceps

2-1.88 Demonstrate suctioning the upper airway by selecting a suction device, catheter and technique. (P-2)
2-1.89 Perform tracheobronchial suctioning in the intubated patient by selecting a suction device, catheter and technique. (P-2)
2-1.90 Demonstrate insertion of a nasogastric tube. (P-2)
2-1.91 Demonstrate insertion of an orogastric tube. (P-2)
2-1.92 Perform gastric decompression by selecting a suction device, catheter and technique. (P-2)
2-1.93 Demonstrate insertion of an oropharyngeal airway. (P-2)
2-1.94 Demonstrate insertion of a nasopharyngeal airway. (P-2)
2-1.95 Demonstrate ventilating a patient by the following techniques: (P-2)
   a. Mouth-to-mask ventilation
   2. One person bag-valve-mask
   3. Two person bag-valve-mask
   4. Three person bag-valve-mask
   5. Flow-restricted, oxygen-powered ventilation device
   6. Automatic transport ventilator
   7. Mouth-to-stoma
   8. Bag-valve-mask-to-stoma ventilation
2-1.96 Ventilate a pediatric patient using the one and two person techniques. (P-2)
2-1.97 Perform ventilation with a bag-valve-mask with an in-line small-volume nebulizer. (P-2)
2-1.98 Perform oxygen delivery from a cylinder and regulator with an oxygen delivery device. (P-2)
2-1.99 Perform oxygen delivery with an oxygen humidifier. (P-2)
2-1.100 Deliver supplemental oxygen to a breathing patient using the following devices: nasal cannula, simple face mask, partial rebreather mask, non-rebreather mask, and venturi mask (P-2)
2-1.101 Perform stoma suctioning. (P-2)
2-1.102 Perform retrieval of foreign bodies from the upper airway. (P-2)
2-1.103 Perform assessment to confirm correct placement of the endotracheal tube. (P-2)
2-1.104 Intubate the trachea by the following methods: (P-2)
   a. Orotracheal intubation
   b. Nasotracheal intubation
   c. Multi-lumen airways
   9. Digital intubation
   d. Transillumination
   e. Open cricothyrotomy
2-1.105 Adequately secure an endotracheal tube. (P-1)
2-1.106 Perform endotracheal intubation in the pediatric patient. (P-2)
2-1.107 Perform transtracheal catheter ventilation (needle cricothyrotomy). (P-2)
2-1.108 Perform extubation. (P-2)
2-1.109 Perform replacement of a tracheostomy tube through a stoma. (P-2)

DECLARATIVE

I. Introduction
1. The body's need for oxygen
2. Primary objective of emergency care
   a. Ensure optimal ventilation
      (1) Delivery of oxygen
      (2) Elimination of CO_2
3. Brain death occurs within 6 to 10 minutes
4. Major prehospital causes of preventable death
   a. Early detection
   b. Early intervention
   c. Lay-person BLS education
5. Most often neglected of prehospital skills
   a. Basics taken for granted
   b. Poor techniques
      (1) BVM seal
      (2) Improper positioning
      (3) Failure to reassess

II. Anatomy of upper airway
1. Function of the upper airway
   a. Warm
   b. Filter
   c. Humidify
2. Pharynx
   a. Nasopharynx
      (1) Formed by the union of facial bones
      (2) Orientation of nasal floor is towards the ear not the eye
      (3) Separated by septum
      (4) Lined with
         (a) Mucous membranes
         (b) Cilia
      (5) Turbinate
         (a) Parallel to nasal floor
         (b) Provide increased surface area for air
            i) Filtration
            ii) Humidifying
            iii) Warming
      (6) Sinuses
         (a) Cavities formed by cranial bones
         (b) Appear to further trap bacteria and act as tributaries for fluid to and from Eustachian tubes and tear ducts
            i) Commonly become infected
            ii) Fracture of certain sinus bones may cause cerebrospinal fluid (CSF) leak
      (7) Tissues extremely delicate and vascular
         (a) Improper or overly aggressive placement of tubes or airways will cause significant bleeding which may not be controlled by direct pressure

b. Oropharynx
  (1) Teeth
    (a) 32 adult
    (b) Requires significant force to dislodge
    (c) May fracture or avulse causing obstruction
  (2) Tongue
    (a) Large muscle attached at the mandible and hyoid bones
    (b) Most common airway obstruction
  (3) Palate
    (a) Roof of mouth separates oro/ nasopharynx
      i) Anterior is hard palate
      ii) Posterior (beyond the teeth) is soft palate
  (4) Adenoids
    (a) Lymph tissue located in the mouth and nose that filters bacteria
    (b) Frequently infected and swollen
  (5) Posterior tongue
  (6) Epiglottis
  (7) Vallecula
    (a) "Pocket" formed by the base of the tongue and epiglottis
    (b) Important landmark for endotracheal intubation

3. Larynx
  a. Attached to hyoid bone
    (1) "Horseshoe-shaped" bone between the chin and mandibular angle
    (2) Supports trachea
    (3) Made of cartilage
  b. Thyroid cartilage
    (1) First tracheal cartilage
    (2) "Shield-shaped"
      (a) Cartilage anterior
      (b) Smooth muscle posterior
    (3) Laryngeal prominence
      (a) "Adam's Apple" anterior prominence of thyroid cartilage
      (b) Glottic opening directly behind
  c. Glottic opening
    (1) Narrowest part of adult trachea
    (2) Patency heavily dependent on muscle tone
    (3) Contain vocal bands
      (a) White bands of cartilage
      (b) Produce voice
  d. Arytenoid cartilage
    (1) "Pyramid-like" posterior attachment of vocal bands
    (2) Important landmark for endotracheal intubation
  e. Pyriform fossae
    (1) "Hollow pockets" along the lateral borders of the larynx
  f. Cricoid ring
    (1) First tracheal ring
    (2) Completely cartilaginous
    (3) Compression occludes esophagus (Sellick maneuver)
  g. Cricothyroid membrane

(1) Fibrous membrane between cricoid and thyroid cartilage
(2) Site for surgical and alternative airway placement

h. Associated structures
(1) Thyroid gland
(a) Located below cricoid cartilage
(b) Lies across trachea and up both sides
(2) Carotid arteries
(a) Branches cross and lie closely alongside trachea
(3) Jugular veins
(a) Branch across and lie close to trachea

III. Anatomy of lower airway
1. Function of the lower airway
a. Exchange of O_2 and CO_2
2. Location of the lower airway
a. From fourth cervical vertebrae to xiphoid process
b. From glottic opening to pulmonary capillary membrane
3. Structures of the lower airway
a. Trachea
(1) Trachea bifurcates at carina into
(a) Right and left mainstem bronchi
(b) Right mainstem has lesser angle
i) Foreign bodies, ET tubes commonly displace here
(2) Lined with
(a) Mucous cells
(b) Beta 2 receptors - dilate bronchioles
b. Bronchi
(1) Mainstem bronchi enter lungs at hilum
(2) Branch into narrowing secondary and tertiary bronchi that branch into bronchioles
c. Bronchioles
(1) Branch into alveolar ducts that end at alveolar sacs
d. Alveoli
(1) "Balloon-like" clusters
(2) Site of gas exchange
(3) Lined with surfactant
(a) Decreases surface tension of alveoli which facilitates ease of expansion
(b) Alveoli become thinner as they expand which makes diffusion of O_2/ CO_2 easier
(c) If surfactant is decreased or alveoli are not inflated, alveoli collapse (atelectasis)
e. Lungs
(1) Right lung
(a) 3 lobes
(2) Left lung
(a) 2 lobes
(3) Lobes made of parenchymal tissue
(4) Membranous outer lining called pleura
(5) Lung capacity

IV. Differences in pediatric airway
1. Pharynx

a. A proportionately smaller jaw causes the tongue to encroach upon the airway
b. Omega shaped, floppy epiglottis
c. Absent or very delicate dentition

2. Trachea
   a. Airway is smaller and narrower at all levels
   b. Larynx lies more superior
   c. Larynx is "funnel-shaped" due to narrow, undeveloped cricoid cartilage
   d. Narrowest point is at cricoid ring before 10 years of age
   e. Further narrowing of the airway by tissue swelling of foreign body results in major increase in airway resistance
3. Chest wall
   a. Ribs and cartilage are softer
   b. Cannot optimally contribute to lung expansion
   c. Infants and children tend to depend more heavily on the diaphragm for breathing

V. Lung/ respiratory volumes

1. Total lung volume
   a. Adult male, 6 liters
   b. Not all inspired air enters alveoli
   c. Minor diffusion of O_2 takes place in alveolar ducts and terminal bronchioles
2. Tidal volume
   a. Volume of gas inhaled or exhaled during a single respiratory cycle
   b. 5-7cc/ kg (500 cc normally)
3. Dead space air
   a. Air remaining in air passageways, unavailable for gas exchange (approximately 150cc)
   b. Anatomic dead space
      (1) Trachea
      (2) Bronchi
   c. Physiologic dead space
      (1) Dead space formed by factors like disease or obstruction
         (a) COPD
         (b) Atelectasis
4. Minute volume
   a. Amount of gas moved in and out of the respiratory tract per minute
   b. Determined by
      (1) Tidal volume - dead space volume times respiratory rate
5. Functional reserve capacity
   a. After optimal inspiration: optimum amount of air that can be forced from the lungs in a single exhalation
6. Residual volume
   a. Volume of air remaining in lungs at the end of maximal expiration
7. Alveolar air
   a. Air reaching the alveoli for gas exchange (alveolar volume)
   b. Approximately 350 cc
8. Inspiratory reserve
   a. Amount of gas that can be inspired in addition to tidal volume
9. Expiratory reserve
   a. Amount of gas that can be expired after a passive (relaxed) expiration
10. FiO_2

a. Percentage of oxygen in inspired air (increases with supplemental oxygen)
   (1) Commonly documented as a decimal (e.g., FiO_2 = .85)

VI. Ventilation
1. Definition - movement of air into and out of the lungs
2. Phases
   a. Inspiration
      (1) Stimulus to breathe from respiratory center
      (2) Impulse transmitted to diaphragm via phrenic nerve
         (a) Diaphragm - "muscle of respiration"
         (b) Separates thoracic from abdominal cavity
      (3) Diaphragm contracts - "flattens"
         (a) Causes intrapulmonic pressure to fall slightly below atmospheric pressure
      (4) Intercostal muscles contract
      (5) Ribs elevate and expand
      (6) Air is drawn into lungs like a vacuum
      (7) Alveoli Inflate
      (8) O_2/ CO_2 are able to diffuse across membrane
   b. Expiration
      (1) Stretch receptors in lungs signal respiratory center via vagus nerve to inhibit inspiration (Hering-Breuer Reflex)
      (2) Natural elasticity (recoil) of the lungs passively expires air

VII. Respiration
1. Definition
   a. Exchange of gases between a living organism and its environment
   b. The major gases of respiration are oxygen and carbon dioxide
2. Types
   a. External respiration - exchange of gasses between the lungs and the blood cells
   b. Internal respiration - exchange of gases between the blood cells and tissues
3. The transportation of oxygen and carbon dioxide in the human body
   a. Diffusion - passage of solution from area of higher concentration to lower concentration
      (1) O_2/ CO_2 dissolve in water and pass through alveolar membrane by diffusion
   b. Oxygen content of blood
      (1) Dissolved O_2 crosses pulmonary capillary membrane and binds to hemoglobin (Hgb) of red blood cell
      (2) Oxygen is carried
         (a) Bound to hemoglobin
         (b) Dissolved in plasma
      (3) Approximately 97% of total O_2 is bound to hemoglobin
      (4) O_2 saturation
         (a) % of hemoglobin saturated
         (b) Normally greater than 98%
   c. Oxygen in the blood
      (1) Bound to hemoglobin
         (a) SaO_2
      (2) Dissolved in plasma
         (a) PaO_2
   d. Carbon dioxide content of the blood

(1) CO_2 is a byproduct of cellular work (cellular respiration)
(2) CO_2 is transported in blood as bicarbonate ion
(3) About 33% is bound to hemoglobin
(4) As O_2 crosses into blood, CO_2 diffuses into alveoli
(5) Carbon dioxide in the blood
(a) $PaCO_2$

e. Diagnostic testing
(1) Pulse oximetry
(2) Peak expiratory flow testing
(3) End-tidal CO_2 monitoring
(4) Other equipment

VIII. Causes of decreased oxygen concentrations in the blood
1. Lower partial pressure of atmospheric O_2
2. Lower hemoglobin levels in blood
3. Trauma
a. Less surface area for gas exchange
(1) Pneumothorax
(2) Hemothorax
(3) Combination of pneumothorax and hemothorax
b. Decreased mechanical effort
(1) Pain
(2) Traumatic suffocation
(3) Hypoventilation
4. Medical
a. Physiological barriers
(1) Pneumonia
(2) Pulmonary edema
(3) COPD

IX. Carbon dioxide in blood
1. Increases
a. Hypoventilation
2. Decreases
a. Hyperventilation

X. The measurement of gases
1. Total pressure
a. The combined pressure of all atmospheric gases
b. 100% or 760 torr at sea level
2. Partial pressure
a. The pressure exerted by a specific atmospheric gas
3. Concentration of gases in the atmosphere
a. Nitrogen 597.0 torr (78.62%)
b. Oxygen 159.0 torr (20.84%)
c. CO_2 0.3 torr (0.04%)
d. Water 3.7 torr (0.5%)
4. Water vapor pressure
5. Alveolar gas concentration

a. Nitrogen 569.0 torr (74.9%)
b. Oxygen 104.0 torr (13.7%)
c. CO_2 40.0 torr (5.2%)
d. Water 47.0 torr (6.2%)

XI. Respiratory rate
1. Definition - the number of times a person breathes in one minute
2. Neural control
   a. Primary control from the medulla and pons
   b. Medulla
      (1) Primary involuntary respiratory center
      (2) Connected to respiratory muscles by vagus nerve
   c. Pons
      (1) Apneustic center - secondary control center if medulla fails to initiate respiration
      (2) Pneumotaxic center - controls expiration
3. Chemical stimuli
   a. Receptors for O_2/ CO_2 balance
      (1) Cerebrospinal fluid pH
      (2) Carotid bodies (sinus)
      (3) Aortic arch
   b. Hypoxic drive - respiratory stimulus dependent on O_2 rather than CO_2 in the blood
4. Control of respiration by other factors
   a. Body temperature - respirations increase with fever
   b. Drug and medications - may increase or decrease respirations depending on their physiologic action
   c. Pain - increases respirations
   d. Emotion - increases respirations
   e. Hypoxia - increases respirations
   f. Acidosis - respirations increase as compensatory response to increased CO_2 production
   g. Sleep - respirations decrease

XII. Pathophysiology
1. Obstruction
   a. Tongue
      (1) Most common airway obstruction
      (2) Snoring respirations
      (3) Corrected with positioning
   b. Foreign body
      (1) May cause partial or full obstruction
      (2) Symptoms include
         (a) Choking
         (b) Gagging
         (c) Stridor
         (d) Dyspnea
         (e) Aphonia (unable to speak)
         (f) Dysphonia (difficulty speaking)
   c. Laryngeal spasm and edema
      (1) Spasm
         (a) Spasmotic closure of vocal cords

(b) Most frequently caused by
i) Trauma from over aggressive technique during intubation
ii) Immediately upon extubation especially when patient is semiconscious
(2) Edema
(a) Glottic opening becomes extremely narrow or totally obstructed
(b) Most frequently caused by
i) Epiglottitis (a bacterial infection of the epiglottis)
ii) Anaphylaxis (severe allergic reaction)
iii) Relieved by
(c) Aggressive ventilation
(d) Forceful upward pull of the jaw
(e) Muscle relaxants
d. Fractured larynx
(1) Airway patency dependent upon muscle tone
(2) Fractured laryngeal tissue
(a) Increases airway resistance by decreasing airway size through
i) Decreasing muscle tone
ii) Laryngeal edema
iii) Ventilatory effort
e. Aspiration
(1) Significantly increases mortality
(a) Obstructs airway
(b) Destroys delicate bronchiolar tissue
(c) Introduces pathogens
(d) Decreases ability to ventilate

XIII. Airway evaluation
1. Essential parameters
a. Rate
(1) Normal resting rate in adults - 12-24
b. Regularity
(1) Steady pattern
(2) Irregular respiratory patterns are significant until proven otherwise
c. Effort
(1) Breathing at rest should be effortless
(2) Effort changes may be subtle in rate or regularity
(3) Patients often compensate by preferential positioning
i) Upright sniffing
ii) Semifowlers
iii) Frequently avoid supine
2. Recognition of airway problems
a. Respiratory distress
(1) Upper and lower airway obstruction
(2) Inadequate ventilation
(3) Impairment of the respiratory muscles
(4) Impairment of the nervous system
b. Difficulty in rate, regularity, or effort is defined as dyspnea
c. Dyspnea may be result of or result in hypoxia
(1) Hypoxia - lack of oxygen

(2) Hypoxia - lack of oxygen to tissues
(3) Anoxia - total absence of oxygen

d. Recognition and treatment of dyspnea is crucial to patient survival
(1) Expert assessment and management is essential
(a) The brain can survive only a few minutes of anoxia
(b) All therapies fail if airway is inadequate

e. Visual techniques
(1) Position
(a) Tripod positioning
(b) Orthopnea
(2) Rise and fall of chest
(3) Gasping
(4) Color of skin
(5) Flaring of nares
(6) Pursed lips
(7) Retraction
(a) Intercostal
(b) Suprasternal notch
(c) Supraclavicular fossa
(d) Subcostal

f. Auscultation techniques
(1) Air movement at mouth and nose
(2) Bilateral lung fields equal

g. Palpation Techniques
(1) Air movement at mouth and nose
(2) Chest wall
(a) Paradoxical motion
(b) Retractions

h. Bag-valve-mask
(1) Resistance or changing compliance with bag-valve-mask ventilations

i. Pulsus paradoxus
(1) Systolic blood pressure drops greater than 10mm Hg with inspiration
(a) Change in pulse quality maybe detected
(b) Seen in COPD, pericardial tamponade
(c) Possible increase in intrathoracic pressure

j. History
(1) Evolution
(a) Sudden
(b) Gradual over time
(c) Known cause or "trigger"
(2) Duration
(a) Constant
(b) Recurrent
(3) Ease - what makes it better?
(4) Exacerbate - what makes it worse?
(5) Associate
(a) Other symptoms (productive cough, chest pain, fever, etc...)
(6) Interventions
(a) Evaluations/ admissions to hospital

(b) Medications (include compliance)
(c) Ever intubated

k. Modified forms of respiration
(1) Protective reflexes
(a) Cough
i) Forceful, spastic exhalation
ii) Aids in clearing bronchi and bronchioles
(b) Sneeze - clears nasopharynx
(c) Gag reflex - spastic pharyngeal and esophageal reflex from stimulus of the posterior pharynx
(2) Sighing
(a) Involuntary deep breath that increases opening of alveoli
(b) Normally sigh about once per minute
(3) Hiccough - intermittent spastic closure of glottis

l. Respiratory pattern changes
(1) Cheyne-Stokes
(a) Gradually increasing rate and tidal volume followed by gradual decrease
(b) Associated with brain stem insult
(2) Kussmaul's breathing
(a) Deep, gasping respirations
(b) Common in diabetic coma
(3) Biot's respirations
(a) Irregular pattern, rate, and volume with intermittent periods of apnea
(b) Increased intracranial pressure
(4) Central neurogenic hyperventilation
(a) Deep rapid respirations similar to Kussmall's
(b) Increased intracranial pressure
(5) Agonal
(a) Slow, shallow, irregular respirations
(b) Resulting from brain anoxia

m. Inadequate ventilation
(1) Occurs when body cannot compensate for increased O_2 demand or maintain O_2/ CO_2 balance
(2) Many causes
(a) Infection
(b) Trauma
(c) Brainstem insult
(d) Noxious or hypoxic atmosphere
(e) Renal failure
(3) Multiple symptoms
(a) Altered response
(b) Respiratory rate changes (up or down)

XIV. Supplemental oxygen therapy
1. Rationale
a. Enriched O_2 atmosphere increases oxygen to cells
b. Increasing available O_2 increases patient's ability to compensate
c. O_2 delivery method must be reassessed to determine adequacy and efficiency
2. Oxygen source

a. Compressed gas
   (1) Oxygen compressed in gas form in an aluminum or steel tank
   (2) Common sizes and volumes
      (a) D 400L
      (b) E 660L
      (c) M 3450L
   (3) O_2 delivery measured in liters/ min (LPM)
   (4) Calculating tank life
      (a) Tank pressure (psi) x 0.28 = volume
      (b) Volume/ LPM = tank life in minutes

b. Liquid oxygen
   (1) O_2 cooled to its aqueous state
      (a) Converts to gaseous state when warmed
   (2) Advantage
      (a) Much larger volume of gaseous O_2 can be stored in aqueous state
   (3) Disadvantage
      (a) Units generally require upright storage
      (b) Special requirements for large volume storage and cylinder transfer

3. Regulators
   a. High-pressure
      (1) Attached to cylinder stem delivers cylinder gas under high pressure
      (2) Used to transfer cylinder gas from tank to tank
   b. Therapy regulators
      (1) Attached to cylinder stem
      (2) 50psi escape pressure is "stepped down" through regulator mechanism
      (3) Subsequent delivery to patient is adjustable low pressure

4. Delivery devices
   a. Nasal cannula
      (1) Nasally placed O_2 catheter for oxygen enrichment
      (2) Optimal delivery: 40% at 6 L/ min
      (3) Indications
         (a) Low to moderate O_2 enrichment
         (b) Long term O_2 maintenance therapy
      (4) Contraindications
         (a) Poor respiratory effort
         (b) Severe hypoxia
         (c) Apnea
         (d) Mouth breathing
      (5) Advantages
         (a) Well tolerated
      (6) Disadvantages
         (a) Does not deliver high volume/ high concentration
   b. Simple face mask
      (1) Full airway enclosure with open side ports
         (a) Room air is drawn through side ports on inspiration
         (b) Diluting O_2 concentration
      (2) Indications
         (a) Delivery of moderate to high O_2 concentrations
         (b) Range - 40-60% at 10 L/ min

(3) Advantages
(a) Higher O_2 concentrations
(4) Disadvantages
(a) Delivery of volumes beyond 10 L/ min does not enhance O_2 concentration
(5) Special considerations
(a) Mask leak around face decreases O_2 concentration

c. Partial rebreather
(1) Mask vent ports covered by one-way disc
(a) Residual expired air mixed in mask and rebreathed
(b) Room air not entrained with inspiration
(2) Indications
(3) Contraindications
(a) Apnea
(b) Poor respiratory effort
(4) Advantages
(a) Inspired gas not mixed with room air
i) Higher O_2 concentrations attainable
(b) Disadvantages
i) Delivery of volumes beyond 10 L/ min does not enhance O_2 concentration
(c) Special considerations
i) Mask leak around face decreases O_2 concentration

d. Non-rebreather mask
(1) Mask side ports covered by one-way disc
(2) Reservoir bag attached
(3) Range: 80-95+% at 15 L/ min
(4) Indications
(a) Delivery of highest O_2 concentration
(5) Contraindications
(a) Apnea
(b) Poor respiratory effort
(6) Advantages
(a) Highest O_2 concentration
(b) Delivers high volume/ high O_2 enrichment
(c) Patient inhales enriched O_2 from reservoir bag rather than residual air
(7) Disadvantages

e. Venturi mask
(1) Mask with interchangeable adapters
(a) Adapters have port holes that entrain room air as O_2 passes
(b) Patient receives a highly specific concentration of O_2
(c) Air is entrained by venturi principle

f. Small volume nebulizer
(1) Delivers aerosolized medication
(2) O_2 enters an aerosol chamber containing 3-5 ccs of fluid
(3) Pressurized O_2 mists fluid

5. Oxygen humidifiers
a. Sterile water reservoir for humidifying O_2
b. Good for long term O_2 administration
c. Desirable for croup/ Epiglottitis/ bronchiolitis

6. Tracheostomy, stoma, and tracheostomy tubes
   a. Tracheostomy
      (1) Surgical opening into trachea
         (a) Done in operating room under controlled conditions
         (b) A stoma located just superior to the suprasternal notch
   b. Stoma
      (1) Resultant orifice connecting trachea to outside air
      (2) Patient now breathes through this surgical opening
   c. Tracheostomy tube
      (1) Plastic tube placed within tracheostomy site
      (2) 15 mm connector for ventilator acceptance

XV. Ventilation

1. Mouth-to-mouth
   a. Most basic form of ventilation
   b. Indications
      (1) Apnea from any mechanism when other ventilation devices are not available
   c. Contraindications
      (1) Awake patients
      (2) Communicable disease risk limitations
   d. Advantages
      (1) No special equipment required
      (2) Delivers excellent tidal volume
      (3) Delivers adequate oxygen
   e. Disadvantages
      (1) Psychological barriers from
         (a) Sanitary issues
         (b) Communicable disease issues
            i) Direct blood/ body fluid contact
            ii) Unknown communicable disease risks at time of event
   f. Complications
      (1) Hyperinflation of patient's lungs
      (2) Gastric distension
      (3) Blood/ body fluid contact manifestation
      (4) Hyperventilation of rescuer
2. Mouth-to-nose
   a. Ventilating through nose rather than mouth
   b. Indications
      (1) Apnea from any mechanism
   c. Contraindications
      (1) Awake patients
   d. Advantages
      (1) No special equipment required
   e. Disadvantages
      (1) Direct blood/ body fluid contact
      (2) Psychological limitations of rescuer
   f. Complications
      (1) Hyperinflation of patient's lungs
      (2) Gastric distension

(3) Blood/ body fluid manifestation
(4) Hyperventilation of rescuer

3. Mouth-to-mask
   a. Adjunct to mouth-to-mouth ventilation
   b. Indications
      (1) Apnea from any mechanism
   c. Contraindications
      (1) Awake patients
   d. Advantages
      (1) Physical barrier between rescuer and patient blood/ body fluids
      (2) One-way valve to prevent blood/ body fluid splash to rescuer
      (3) May be easier to obtain face seal
   e. Disadvantages
      (1) Useful only if readily available
   f. Complications
      (1) Hyperinflation of patient's lungs
      (2) Hyperventilation of rescuer
      (3) Gastric distention
   g. Method for use
      (1) Position head by appropriate method
      (2) Position and seal mask over mouth and nose
      (3) Ventilate as appropriate
4. One person bag-valve-mask
   a. Fixed volume self inflating bag can deliver adequate tidal volumes and O_2 enrichment
   b. Indications
      (1) Apnea from any mechanism
      (2) Unsatisfactory respiratory effort
   c. Contraindications
      (1) Awake, intolerant patients
   d. Advantages
      (1) Excellent blood/ body fluid barrier
      (2) Good tidal volumes
      (3) Oxygen enrichment
      (4) Rescuer can ventilate for extended periods without fatigue
   e. Disadvantages
      (1) Difficult skill to master
      (2) Mask seal may be difficult to obtain and maintain
      (3) Tidal volume delivered is dependent on mask seal integrity
   f. Complications
      (1) Inadequate tidal volume delivery with
         (a) Poor technique
         (b) Poor mask seal
         (c) Gastric distention
   g. Method for use
      (1) Position appropriately
      (2) Choose proper mask size - seats from bridge of nose to chin
      (3) Position, spread/ mold/ seal mask
      (4) Hold mask in place
      (5) Squeeze bag completely over 1.5 to 2 seconds for adults

(6) Avoid overinflation
(7) Reinflate completely over several seconds

h. Special considerations
(1) Medical
(a) Observe for
i) Gastric distension
ii) Changes in compliance of bag with ventilation
iii) Improvement or deterioration of ventilation status (i.e., color change, responsiveness, air leak around mask)
(2) Trauma
(a) Very difficult to perform with cervical spine immobilization in place

5. Two person bag-valve-mask ventilation method
a. Most efficient method
b. Indications
(1) Bag-valve-mask ventilation on any patient
(a) Especially useful for cervical spine immobilized patients
(b) Difficulty obtaining or maintaining adequate mask seal
c. Contraindications
(1) Awake, intolerant patients
d. Advantages
(1) Superior mask seal
(2) Superior volume delivery
e. Disadvantages
(1) Requires extra personnel
f. Complications
(1) Hyperinflation of patient's lungs
(2) Gastric distension
g. Method for use
(1) First rescuer maintains mask seal by appropriate method
(2) Second rescuer squeezes bag
h. Special considerations
(1) Observe chest movement
(2) Avoid overinflation
(3) Monitor lung compliance with ventilations

6. Three person bag-valve-mask ventilation
a. Indications
(1) Bag-valve-mask ventilation on any patient
(a) Especially useful for cervical spine immobilized patients
(b) Difficulty obtaining or maintaining adequate mask seal
b. Contraindications
(1) Awake, intolerant patients
c. Advantages
(1) Superior mask seal
(2) Superior volume density
d. Disadvantages
(1) Requires extra personnel
(2) "Crowded" around airway
e. Complications
(1) Hyperinflation of patient's lungs

(2) Gastric distension

f. Method for use
(1) First rescuer maintains mask seal by appropriate method
(2) Second rescuer holds mask in place
(3) Third rescuer squeezes bag and monitors compliance

g. Special considerations
(1) Avoid overinflation
(2) Monitor lung compliance with ventilations

7. Flow-restricted, oxygen-powered ventilation devices
a. The valve opening pressure at the cardiac sphincter is approx 30 cm H_2O
b. These devices operate at or below 30 cm H_2O to prevent gastric distension
c. Indications
(1) Delivery of high volume/ high concentration of O_2 (1 L/ sec)
(2) Awake compliant patients
(3) Unconscious patient with caution
d. Contraindications
(1) Noncompliant patients
(2) Poor tidal volume
(3) Small children
e. Advantages
(1) Self administered
(2) Delivers high volume/ high concentration O_2
(3) O_2 delivered in response to inspiratory effort (no O_2 wasting)
(4) O_2 volume delivery is regulated by inspiratory effort minimizing overinflation risk
(5) O_2 volume delivery is also restricted to less than 30 cm H_2O
f. Disadvantages
(1) Cannot monitor lung compliance
(2) Requires O_2 source
g. Complications
(1) Gastric distension
(2) Barotrauma
h. Method
(1) Mask is held manually in place
(2) Negative pressure upon inspiration triggers O_2 delivery or medic triggers release button
(3) Patient is monitored for adequate tidal volume and oxygenation

8. Automatic transport ventilators
a. Volume/ rate controlled
b. Indications
(1) Extended ventilation of intubated patients
(2) In situations in which a BVM is used
(3) Can be used during CPR
c. Contraindications
(1) Awake patients
(2) Obstructed airway
(3) Increased airway resistance
(a) Pneumothorax (after needle decompression)
(b) Asthma
(c) Pulmonary edema
d. Advantages

(1) Frees personnel to perform other tasks
(2) Lightweight
(3) Portable
(4) Durable
(5) Mechanically simple
(6) Adjustable tidal volume
(7) Adjustable rate
(8) Adapts to portable O_2 tank

e. Disadvantages
(1) Cannot detect tube displacement
(2) Does not detect increasing airway resistance
(3) Difficult to secure
(4) Dependent on O_2 tank pressure

9. Cricoid pressure - Sellick's maneuver
a. Pressure on cricoid Ring
b. Occludes esophagus
c. Facilitates intubation by moving the larynx posteriorly
d. Helps to prevent passive emesis
e. Can help minimize gastric distension during bag-valve-mask ventilation
f. Indications
(1) Vomiting is imminent or occurring
(2) Patient cannot protect own airway
g. Contraindications
(1) Use with caution in cervical spine injury
h. Advantages
(1) Noninvasive
(2) Protects from aspiration as long as pressure is maintained
i. Disadvantages
(1) May have extreme emesis if pressure is removed
(2) Second rescuer required for bag-valve-mask ventilation
(3) May further compromise injured cervical spine
j. Complications
(1) Laryngeal trauma with excessive force
(2) Esophageal rupture from unrelieved high gastric pressures
(3) Excessive pressure may obstruct the trachea in small children
k. Method
(1) Locate the anterior aspect of the cricoid ring
(2) Apply firm, posterior pressure
(3) Maintain pressure until the airway is secured with an endotracheal tube

10. Artificial ventilation of the pediatric patient
a. Flat nasal bridge makes achieving mask seal more difficult
b. Compressing mask against face to improve mask seal results in obstruction
c. Mask seal best achieved with jaw displacement (two person bag-valve-mask)
d. Bag-valve-mask ventilation
(1) Bag size
(a) Full-term neonates and infants - minimum of 450 ml tidal volume (pediatric BVM)
(b) Children up to eight years of age - pediatric BVM preferred but adult-sized BVM (1500 ml) may be used
(c) Children over eight years of age require adult-sized BVM for adequate ventilation

(d) Proper mask fit
(e) Length based resuscitation tape
(f) Bridge of nose to cleft of chin

(2) Proper mask position and seal (EC-clamp)
(a) Place mask over mouth and nose; avoid compressing the eyes
(b) Using one hand, place thumb on mask at apex and index finger on mask at chin (C-grip)
(c) With gentle pressure, push down on mask to establish adequate seal
(d) Maintain airway by lifting bony prominence of chin with remaining fingers forming an "E"; avoid placing pressure on the soft area under chin
(e) May use one or two rescuer technique

(3) Ventilate according to current standards

(4) Obtain chest rise with each breath
(a) Begin ventilation and say "squeeze"; provide just enough volume to initiate chest rise; DO NOT OVERVENTILATE

(5) Allow adequate time for exhalation
(a) Begin releasing the bag and say "release, release"

(6) Continue ventilations using "squeeze, release, release" method

(7) Assess BVM ventilation
(a) Look for adequate chest rise
(b) Listen for lung sounds at third intercostal space, midaxillary line
(c) Assess for improvement in color and/ or heart rate

(8) Apply cricoid pressure to minimize gastric inflation and passive regurgitation
(a) Locate cricoid ring by palpating the trachea for a prominent horizontal band inferior to the thyroid cartilage and cricothyroid membrane
(b) Apply gentle downward pressure using one fingertip in infants and the thumb and index finger in children
(c) Avoid excessive pressure as it may produce tracheal compression and obstruction in infants

11. Ventilation of stoma patients
a. Mouth-to-stoma
(1) Locate stoma site and expose
(2) Pocket mask to stoma preferred
(a) Seal around stoma site, check for adequate ventilation
(b) Seal mouth and nose if air leak evident
b. Bag-valve-mask to stoma
(1) Locate stoma site and expose
(2) Seal around stoma site, check for adequate ventilation
(3) Seal mouth and nose if air leak evident

XVI. Airway obstructions
1. Causes
a. Tongue
b. Foreign body
c. Laryngeal spasm
d. Laryngeal edema
e. Trauma
2. Classifications/ assessment
a. Complete obstruction

b. Partial obstruction
(1) With good air exchange
(2) With poor air exchange

3. Management
a. Heimlich maneuver
b. Finger sweep
c. Chest thrusts
d. Suctioning
e. Direct laryngoscopy for the removal of foreign body in airway obstruction
(1) If patient is unconscious and you are unable to ventilate and BLS methods fail
(a) Insert laryngoscope blade into patient's mouth
(b) If foreign body is visualized carefully and deliberately remove foreign body with Magill forceps
f. Intubation

XVII. Suctioning
1. Suction devices
a. Hand-powered suction devices
(1) Advantages
(a) Lightweight
(b) Portable
(c) Mechanically simple
(d) Inexpensive
(2) Disadvantages
(a) Limited volume
(b) Manually powered
(c) Fluid contact components not disposable
b. Oxygen-powered portable suction devices
(1) Advantages
(a) Lightweight
(b) Small in size
(2) Disadvantages
(a) Limited suctioning power
(b) Uses a lot of oxygen for limited suctioning power
c. Battery-operated portable suction devices
(1) Advantages
(a) Lightweight
(b) Portable
(c) Excellent suction power
(d) May "field" troubleshoot most problems
(2) Disadvantages
(a) More complicated mechanics
(b) May lose battery integrity over time
(c) Some fluid contact components not disposable
d. Mounted vacuum-powered suction devices
(1) Advantages
(a) Extremely strong vacuum
(b) Adjustable vacuum power
(c) Fluid contact components disposable

(2) Disadvantages
(a) Non-portable
(b) Cannot "field service" or substitute power source

2. Suctioning catheters
   a. Hard or rigid catheters
      (1) "Yankauer" or "tonsil tip"
      (2) Suction large volumes of fluid rapidly
      (3) Standard size
      (4) Various sizes
   b. Soft catheters
      (1) Can be placed in oropharynx, nasopharynx, or down endotracheal tube
      (2) Various sizes
      (3) Smaller inside diameter than hard tip catheters
      (4) Suction tubing without catheter (facilitates suctioning of large debris)
3. Suctioning the upper airway
   a. Prevention of aspiration critical
      (1) Mortality increases significantly if aspiration occurs
      (2) Preoxygenate if possible
      (3) Hyperoxygenate after suctioning
   b. Description
      (1) Soft tip catheters must be prelubricated
      (2) Place catheter
      (3) Suction during extraction of catheter
      (4) Suction to clear the airway
      (5) Reevaluate patency of the airway
      (6) Ventilate and oxygenate
4. Tracheobronchial suctioning
   a. Use sterile technique, if possible
   b. Preoxygenation essential
   c. Description
      (1) Pre-lubricate soft tip catheter
      (2) Hyperoxygenate
         (a) May be necessary to inject 3 to 5 ccs of sterile water down endotracheal tube to loosen secretions
      (3) Gently insert catheter until resistance is felt
      (4) Suction upon extraction of catheter
      (5) Do not exceed 15 seconds
      (6) Ventilate and oxygenate
5. Gastric distention
   a. Air becomes trapped in the stomach
   b. Very common when ventilating non-intubated patients
   c. Stomach diameter increases
   d. Pushes against diaphragm
   e. Interferes with lung expansion
   f. Abdomen becomes increasingly distended
   g. Resistance to bag-valve-mask ventilation
   h. Management
      (1) Non-invasive
         (a) May be reduced by increasing bag-valve-mask ventilation time

i) Adults - 1.5 to 2 seconds
ii) Pediatrics - 1 to 1.5 seconds
(b) Prepare for large volume suction
(c) Position patient left lateral
(d) Slowly apply pressure to epigastric region
(e) Suction as necessary

(2) Gastric tubes
(a) Tube placed in the stomach for gastric decompression and/ or emesis control
(b) Nasogastric decompression
i) Indications
a) Threat of aspiration
b) Need for lavage
ii) Contraindications
a) Extreme caution in esophageal disease or esophageal trauma
b) Facial trauma (caution)
c) Esophageal obstruction
iii) Advantages
a) Tolerated by awake patients
b) Does not interfere with intubation
c) Mitigates recurrent gastric distension
d) Mitigates nausea
e) Patient can still talk
iv) Disadvantages
a) Uncomfortable for patient
b) May cause patient to vomit during placement even if gag is suppressed
c) Interferes with BVM seal
v) Complications
a) Nasal, esophageal or gastric trauma from poor technique
b) Endotracheal placement
c) Supragastric placement
d) Tube obstruction
vi) Method
a) Prepare patient
b) Head neutral
c) Oxygenate
d) Suppress gag with topical anaesthetic or IV lidocaine
e) Anesthetize and dilate nares
f) Lubricate tube
g) Advance gently along nasal floor
h) Encourage patient to swallow or drink to facilitate passage
i) Advance into stomach
j) Confirm placement
k) Auscultate while injecting 30-50 ccs of air
l) Note gastric contents through tube
m) No reflux around tube
n) Secure in place
(c) Orogastric decompression

i) Indications
   a) Same parameters as NG
   b) Generally preferred for unconscious patients
ii) Contraindications
   a) Same parameters as NG
iii) Advantages
   a) May use larger tubes
   b) May lavage more aggressively
   c) Safe to pass in facial fracture
   d) Avoids nasopharynx
iv) Disadvantages
   a) May interfere with visualization during Intubation
v) Method
   a) Neutral or flexed head position
   b) Introduce tube down midline
   c) Procedure same as NG
vi) Complications
   a) Same as NG
   b) Patient may bite tube

XVIII. Airway management
1. Manual maneuvers
   a. Head-tilt/ chin-lift maneuver
      (1) Technique
         (a) Tilt head back
         (b) Lift chin forward
         (c) Open mouth
      (2) Indications
         (a) Unresponsive patients who
            i) Do not have mechanism for c-spine injury
            ii) Unable to protect their own airway
      (3) Contraindications
            i) Awake patients
            ii) Possible c-spine injury
      (4) Advantages
         (a) No equipment required
         (b) Simple
         (c) Safe
         (d) Non-invasive
      (5) Disadvantages
         (a) Head tilt hazardous to c-spine injured patients
         (b) Does not protect from aspiration
   b. Jaw-thrust without head-tilt maneuver
      (1) Technique
         (a) Head is maintained neutral
         (b) Jaw is displaced forward
         (c) Lift by grasping under chin and behind teeth
         (d) Mouth opened
      (2) Indications

(a) Patients who are
i) Unresponsive
ii) Unable to protect their own airway
iii) May have c-spine injury

(3) Contraindications
(a) Responsive patients
(b) Resistance to opening mouth

(4) Advantages
(a) May be used in c-spine injury
(b) May be performed with cervical collar in place
(c) Does not require special equipment

(5) Disadvantages
(a) Cannot maintain if patient becomes responsive or combative
(b) Difficult to maintain for extended period
(c) Very difficult to use in conjunction with bag-valve-mask ventilation
(d) Thumb must remain in patient's mouth in order to maintain displacement
(e) Separate rescuer required to perform bag-valve-mask ventilation
(f) Does not protect against aspiration

c. Modified jaw-thrust maneuver

(1) Technique
(a) Head maintained neutral
(b) Jaw is displaced forward at mandibular angle

(2) Indications
(a) Unresponsive
(b) Cervical spine Injury
(c) Unable to protect own airway
(d) Resistance to opening mouth

(3) Contraindications
(a) Awake patients

(4) Advantages
(a) Non-invasive
(b) Requires no special equipment
(c) May be used with cervical collar in place

(5) Disadvantages
(a) Difficult to maintain
(b) Requires second rescuer for bag-valve-mask ventilation
(c) Does not protect against aspiration

2. Nasal airway

a. Soft rubber with beveled tip
(1) Distal tip rests in hypopharynx
(2) For adults, length measured from nostril to earlobe
(3) Diameter roughly equal to patient's little finger

b. Indications
(1) Unconscious patients
(2) Altered response patients with suppressed gag reflex

c. Contraindications
(1) Patient intolerance
(2) Caution in presence of facial fracture or skull fracture

d. Advantages