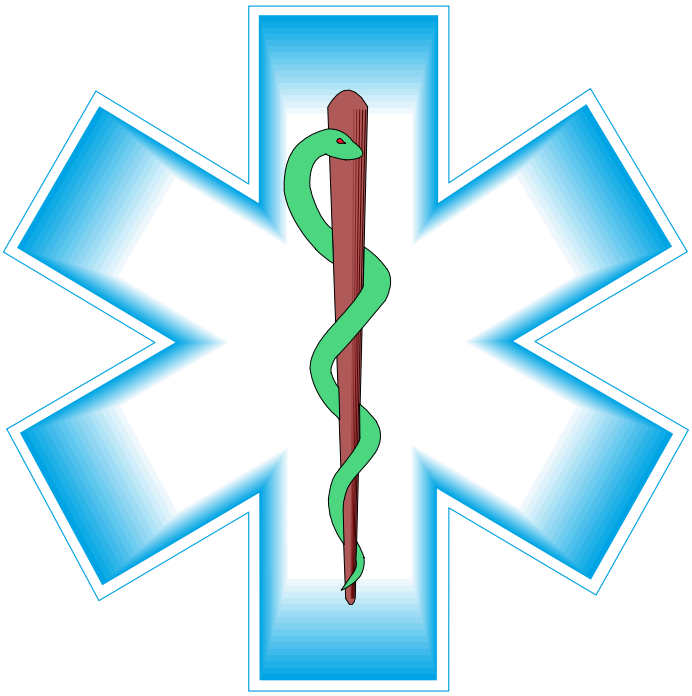

Maine EMS
Paramedic Interfacility Transfer (PIFT) Program
Instructor Manual

December 2006

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Introduction

This program was developed by the MDPB in response to an identified need to expand the capabilities of paramedic services, specifically in the area of interfacility transport. The course is designed to be a supplemental education program for paramedics. The 2006 PIFT Program represents a fundamental change in EMS education in Maine. Paramedics who complete this program will now focus on learning concepts as a foundation for advanced understanding rather than rote memorization of medications and protocols. For instructors, this will require alterations in the way we teach. Problem solving and critical thinking must be a part of the class, for on a PIFT transport, only the paramedic at the bedside will be there to troubleshoot the problem, react, and plot a new course of action. The 2006 PIFT Program will allow some additional skills for paramedics, but instructors should remind students not to focus on procedures or drugs but instead on decision-making and problem solving. Implementing the 2006 PIFT program will be both a challenge and an opportunity for all of us in EMS, as we advance the practice of EMS in the State of Maine.

Services interested in utilizing the paramedic skills taught in this module must work with Maine EMS to meet a number of new requirements in order to provide this level of service. While these will be discussed more in depth below, they include establishment of an acceptable QA program that includes 100% QA of all PIFT transports, a service medical director who can oversee the PIFT program to include education, operations, and the QA program, and approval by Maine EMS to operate as a PIFT service.

Who can instruct a PIFT program?

The lead in a PIFT Program will be a Maine EMS Licensed I/C- Paramedic Level that has completed the 2006 Maine EMS PIFT Program, the 2006 PIFT Train-the-Trainer Program, and has met the specific PIFT instructor requirements developed by MEMS. Paramedics wishing to "bridge" from other critical care programs approved by Maine EMS to the Maine EMS 2006 PIFT Program (e.g. UMBC CCEMT-P) may function as PIFT paramedics without having to complete the Maine EMS 2006 PIFT Program as long as the other credential is maintained. Should the other certification lapse, these paramedics would need to complete a full MEMS 2006 PIFT Program to perform PIFT transports. To become PIFT instructors, however, these "bridged" paramedics must complete the entire 2006 Maine EMS PIFT Program and the PIFT Train-the-Trainer to ensure thorough familiarity with the 2006 Maine EMS PIFT Program, its content, and its administrative requirements. It is recognized that "subject matter experts" such as physicians, nurses, and other specialists can and should be used to assist in the program; however, the lead instructor MUST meet the above listed criteria AND be present during the administration of the course.

PIFT Course Application

In order to schedule a PIFT program, a credentialed instructor must complete the PIFT Course Application (see attached) and return it to the Maine EMS Education Coordinator.

This application will allow MEMS to track the administration of courses and allow certificates to be issued at the conclusion of the course. PIFT courses will require prior approval of Maine EMS and instructors are expected to be in frequent contact with the Maine EMS Education Coordinator about their courses. MEMS will issue the PIFT Course Administration Packet to the instructor prior to the course and additional support materials will be available on the MEMS website.

The PIFT Course in General

PIFT is truly designed to be service specific. That is, services are encouraged to sponsor and tailor PIFT courses to suit their specific needs. That said, the PIFT minimum objectives (see Course Objectives) must be completed in every course. Beyond that, however, instructors should consider service specific equipment and issues when planning their lessons. For example, there are minimum objectives to cover concerning medical direction. However, during a service specific PIFT course, an instructor might choose to cover those objectives and then add specific detail as to the inner workings of medical direction within that particular service. On the other hand, perhaps an instructor might choose to cover a specific type of infusion pump in far greater detail than the objectives require because that pump is utilized frequently by that service. Please note that there is no obligation to conduct the course for only a specific service. "Open" or regional classes are perfectly acceptable and the generality in the objectives and flexibility in the length of the class were designed to support this.

As a reminder, if PIFT providers have been trained in an open class, it is the service's responsibility to assure that the paramedics involved in a PIFT transfer are adequately trained in the specific equipment used by the service, including IV pumps, urinary drainage systems, chest drainage systems, transvenous pacemakers, and orogastric/nasogastric drainage systems. MEMS recommends that services providing PIFT transfers conduct training regularly on these specialty devices to include a competency-based orientation to the equipment with practical review on an annual basis. Services needing assistance with developing a competency-based orientation to PIFT devices should contact the Maine EMS Education Coordinator. Additionally, services should take responsibility to assure their PIFT providers are adequately trained in all service PIFT related procedures including medical direction and QA.

Active Learning and PIFT

The goal of PIFT is to produce competent, confident paramedics who are able to make sound clinical decisions with regard to the often dynamic world of interfacility transport. With this in mind, the principles of adult learning would demonstrate that a purely didactic (straight lecture) course does little to foster long-term retention and or understanding of these necessary attributes. As such, an active learning approach is necessary. PIFT focuses on resource use. Instructors must utilize all the listed scenarios at a bare minimum (see Lesson Plan), including the exercise on student resource use, to effectively meet the minimum objectives. Further, it is recommended that instructors utilize other active learning models such as small group work, additional scenarios and

oral questioning to enhance the learner's experience and improve competency.

Course Requirements

This course is designed around a didactic and small group exercise format. As a result, the classroom environment and instructor to student ratio should be conducive to such a format. 6-10 students per instructor is a generally recommended ratio.

There are Power Point presentations available from Maine EMS for instructors to use in teaching the PIFT class, however, instructors should feel free to decide if they wish to use them or not. This course is designed to meet the specific needs of individual services and as such, should be customized on a service by service basis. Minimum objectives must be met, but many aspects may be specifically tailored to the service where the program is being taught.

Note: If instructors wish to develop their own visual aids (power points), MEMS would ask that they be submitted to the MEMS Education Coordinator for review as part of the PIFT course application packet.

Specific equipment necessary for this course includes:

1) PIFT drug resources (printed or electronic or both) for use by students in class
   a) If small group work is anticipated, the number of resources should meet the needs of the anticipated groups.
   b) A variety of different resources are recommended to demonstrate the various resources available
   c) Note: these resources may vary depending on service utilization
   d) See PIFT resource section for specific examples

2) PIFT devices* (*At least one of each of the following examples of PIFT devices):*

1) Infusion Pump
2) Chest tube and drainage set up
3) Foley Catheter set up
4) OG/NG Tube set up

*(Note: These devices should reflect that which is used most by the specific services)

Evaluation

Learning will assessed at the end of the program using four scenarios based on the four major areas of PIFT (Overview/Decision Making, Resource Use, Pharmacology, and Devices). Depending on the size of the class, students will work either individually or in small groups with one assigned leader and be taken the through scenarios. Each student must clearly demonstrate the objectives of the particular scenarios to successfully complete the PIFT course ***(see Evaluation Section). Students who do not meet the***

terminal objectives will be offered remediation in accordance with the PIFT remediation plan (see Remediation).

Completion of the PIFT Course

The PIFT instructor should follow the instructions contained within the PIFT Course Administration Packet to include forwarding a copy of the signed roster to the Maine EMS Education Coordinator along with the course evaluations and any remediation sheets within seven days of the course. MEMS will subsequently issue completion certificates back to the instructor for distribution to the course participants. **Note: it is the course instructor's responsibility to distribute certificates to the students**. In the event a participant requires documentation of PIFT course completion prior to being issued a certificate), a photocopy of a roster signed by the instructor will serve as satisfactory proof of completion in the eyes of Maine EMS. Instructors should inform students that certificate turnaround time by MEMS will be 10-14 business days and the course instructor will distribute certificates to them, not Maine EMS.

PIFT Operations

In order to conduct PIFT transfers using the revised criteria, two aspects must be completed. First, providers must complete the 2006 PIFT course and second, the service must complete the PIFT permitting process and be approved by MEMS as a PIFT service (See PIFT Permitting Process). It is important to note to students that BOTH aspects must be complete before conducting PIFT transfers. The presence of one aspect without the other is meaningless.

The initial decision to transfer a patient utilizing paramedics trained at this level is the decision of the hospital nursing staff, the attending physician, and the paramedic service. **However, the final decision rests with the transferring paramedic** as to whether or not they feel comfortable transporting the patient without additional hospital staff. Instructors should be consistently reinforcing to participants during the class that the ***MDPB's intent for PIFT transfers remains as before: stable patients being attended by a single paramedic***. The addition of new medication classes and patient care devices is *not a license to transfer unstable patients under the PIFT protocols*. Ultimately, the QA process will be focusing on appropriateness of the PIFT transport and the individual paramedic's judgment to accept the transport. To that end, please reinforce that paramedics must complete a PIFT QA form for all PIFT trips, even when the patient was judged to be unstable and additional staff were required.

Instructor Preparation

Instructors of this program must be Maine EMS Instructor/Coordinators at the Lead Instructor- Paramedic Level who have completed the 2006 PIFT Provider Program, are in good standing as an instructor, and meet any additional requirements set forth by Maine EMS. The Maine EMS Education Committee feels strongly that to be an effective PIFT instructor, many I/C's may benefit from seeking out additional learning opportunities,

especially in the areas of pharmacology, either through self-study or formal coursework. At minimum, most instructors will benefit from having a personal resource library that includes an up-to-date paramedic textbook, pharmacology textbook, and nursing drug guide.

Time

As noted above, this course should be specifically tailored for individual service needs. The time it takes to conduct this course will vary depending on the level of specificity and focus necessary to meet those needs. The Maine EMS Education Committee notes that this course generally will take between 8-12 hours to complete.

Continuing Education Hours

The following hours have been assigned to the PIFT course as a Maine EMS approved standardized CEH program. No further application to the Regional Office is needed.

Category #1 EMS Operations- 2 hours
Category #4 ALS Topics- 6 hours
Category #5 ALS Skills- 2 hours

Should an instructor wish to lengthen the program to include service-specific information (i.e. a 3 hour class on the particular IV pump the service uses), and then the instructor should apply for additional CEH credits through the Regional Office where the course is being conducted following the normal CEH process. In this case, two CEH certificates would be issued to the participant on successful completion of the PIFT course- one for the standardized CEH program and one from the regional office for the additional program hours.

PIFT Objectives

(Section 1) PIFT Overview/Decision Making

Terminal Objective:

Upon completion of this section, the student will understand when and under what circumstances they can safely transfer a patient following the PIFT guidelines.

Enabling Objectives: The student will be able to

- Identify the eligibility requirements for PIFT certification
- Describe the impact legal issues have on arranging interfacility transports.
- Explain the fundamental principals of EMTALA
- Compare the roles and responsibilities of a PIFT Paramedic, a Paramedic, an RN, or other health care provider on a patient transfer.
- Differentiate between medications and devices that a PIFT trained Paramedic can monitor/utilize in the field (routine day to day calls) and the medications and devices that a PIFT trained paramedic can monitor/utilize on interfacility transports.
- Describe when the medications and devices allowed in the PIFT program can be utilized.
- Define when a paramedic can transport a patient under the PIFT guidelines
- Describe the importance of receiving a detailed patient report and specific physician orders before patient transfer.
- Describe the components of a detailed patient report given to the receiving facility
- Identify the general concepts of patient stability
- Perform a stability assessment.
- Recognize the signs and symptoms of patient deterioration
- Discuss appropriate steps to deal with patient deterioration during transfer.
- List actions/treatments that require the sending facility to send additional transport personnel
- Differentiate the patient eligible for transfer by a PIFT Paramedic and those patients requiring ancillary personnel.
- Define the role of the PIFT Paramedic in the transport decision.
- List the standards and guidelines that help ensure safe and effective ground transport.
- List the components of a pre-trip check on all necessary equipment to ensure proper understanding and operation.

(Section 2) Medical Direction and QI

Terminal Objective:

Upon completion of this section, the student will be able to describe the components of medical control and continuous quality improvement.

Enabling Objectives: The student will be able to

- Identify the key roles of the service medical director for the interfacility transfer program.
- Define the role of the Service Medical Director concerning transport decisions.
- Describe the components of the interfacility transport QA/QI program.
- Complete the required QI forms used in interfacility transport.
- Define the role of the emergency department clinician in providing medical control in unusual circumstances.
- Using a case study of a hospitalized patient requiring transport, the PIFT paramedic will:
    - Perform a patient assessment and determine eligibility for PIFT transfer.
    - Document criteria used to determine eligibility.
    - Develop transfer plan to include, medications, personnel, medical devices, patient care, patient reports, and QI forms
    - Discuss the paramedic's responsibility for completing the PIFT QA form

(Section 3) Utilizing PIFT Resources

Terminal Objective:

Upon completion of this section, the student will recognize and appropriately utilize available drug resources.

Enabling Objectives: The student will be able to:

- List at least three available print drug resources according to the MDPB PIFT resource list.
- List at least one available electronic drug resource according to the MDPB PIFT resource list.
- Demonstrate the ability to procure specific drug information using a MDPB PIFT drug resource.
- Demonstrate the ability to make an appropriate drug specific transport decision in a practical scenario.

(Section 4) Pharmacology

Terminal Objective:

Upon completion of this section, the student will understand the fundamental principles

of pharmacology including autonomic nervous system, pharmacodynamics, pharmacokinetics, mechanism of action, drug distribution, absorption, biotransformation, and excretion.

Enabling Objectives: The student will be able to:

- List the two major subdivisions of the nervous system.
- Explain how autonomic nerve impulses are conducted.
- List and define the two functional divisions of the autonomic nervous system.
- Identify the neurotransmitters for both functional divisions.
- Define cholinergic and adrenergic receptors.
- Define the following terms:
    - Antagonism
    - Therapeutic Action
    - Hypersensitivity
    - Parenteral
    - Pharmacodynamics
    - Synergism
    - Cumulative action
    - Untoward effect
    - Pharmacokinetics
    - Refractory
    - Bolus
    - Tolerance
    - Idiosyncrasy
    - Potentiation
    - Supportive therapy
    - Therapeutic index

- List and define the steps of drug transport in the body to include:
    - Absorption
    - Receptor interactions
    - Distribution
    - Mechanism of Action
    - Half life
    - Biotransformation
    - Elimination

- List and define the aspects of negative/unexpected drug effects including the following:
    - Untoward effects
    - Adverse drug reactions
    - Drug Interactions
    - Life span issues effecting drug metabolism (age)
    - Co-morbidity considerations (chronic conditions, etc)

- Using a case study of a hospitalized patient that includes a drug interaction, life span issue or co-morbid factor, the PIFT paramedic will:
    - Perform a patient assessment and determine eligibility for PIFT transfer.
    - Document criteria used to determine eligibility.
    - Discuss the effect these factors have on transfer decision.

(Section 5) Classifications of Medications

Medications are no longer included individually, as in the prior PIFT programs, but are now described and taught by classification. The scope of practice for PIFT paramedics performing PIFT transfers now includes pharmacologic agents from any of the medication classes.

Terminal Objective:

Upon the completion of this section, the student will have a basic understanding of the classifications of PIFT medications and their major characteristics.

The MDPB recognizes the following medication classifications for the purposes of PIFT:

- Anticoagulants
- Anticonvulsants
- Antidiabetics
- Antidysrhythmics
- Antihypertensives (including ACE inhibitors, Calcium Channel Blockers, Diuretics, Alpha Blockers and Beta Blockers)
- Anti-infectives
- Antipsychotics
- Cardiac Glycosides
- Corticosteroids
- Drotrecogin
- Gastrointestinal Agents (including H2 Blockers, PPI's and Somatostatin and its analogues)
- IV Fluids, Electrolytes (including Dextran, Albumin, and Hetastarch)
- Narcotics (including all routes except epidural)
- Parenteral Nutrition and Vitamins
- Platelet Aggregation Inhibitors (including IIb/IIIa Inhibitors)
- Respiratory Medications (Beta Agonists, Anticholinergics, Mucolytics and Steroids)
- Sedatives (Benzodiazepines, Barbiturates)
- Vasoactive Agents (Antihypertensives, Pressors/sympathomimetics)

Specific learning objectives for each classification are as follows:

Enabling Objectives: The student will be able to:

- Develop a strategy to accurately recall all the classifications of PIFT medications.
- Briefly describe each classification of medication.
- Use a PIFT drug resource and identify the following for each PIFT medication classification:
    - generic and trade names
    - mechanism of action
    - common indications
    - contraindications and precautions
    - significant side effects
    - adult and pediatric doses
    - overdose/toxicity signs and symptoms and treatment for same
    - special considerations

    - Using a case study of a hospitalized patient on medications the PIFT paramedic will be able to:
        - Determine PIFT transfer eligibility based on medication classification.
        - Determine dose, significant side effects, contraindications, precautions and treatment considerations and management using a PIFT drug resource.

(Section 6) Devices

Terminal Objective:
At the completion of this section the student will understand the basic mechanical principals, basic operation and troubleshooting of PIFT devices.

Enabling Objectives: The student will be able to:

- Pumps
    - Describe the basic mechanical principals of infusion pumps including syringe pumps.
    - Demonstrate infusion pump operation to include: tubing set up, on, and off controls, and rate adjustment of a common (typical) infusion pump.
    - Diagnosis and correct common infusion pump problems to include: blockages or power failure.

- Foley Catheters/Continuous Bladder Irrigation
    - Describe the fundamental purpose of continuous bladder irrigation.
    - Describe the physiology and basic operation of Foley Catheters and continuous bladder irrigation.
    - Describe the aspects of “normal operation/expectations” for Foley

Catheters and continuous bladder irrigation.
    - Diagnosis and correct common problems such as equipment failure, clogged/kinked tubing, and extubation.

- Central Lines
    - Identify the basic anatomy and physiology pertaining to central lines.
    - Describe the aspects of “normal operation/expectations” for central lines.
    - Recognize and troubleshoot a common problem such as unexpected removal.

- Transvenous Pacemakers
    - Describe the anatomy and physiology pertaining to transvenous pacers.
    - Describe the fundamental operation of a transvenous pacer.
    - Describe the aspects of “normal operation/expectations” for transvenous pacer operation.
    - Recognize and troubleshoot a common problem such as failure to capture, equipment failure, electrode wire breakage.

- Chest Tubes
    - Describe the basic physiology of chest tubes and pleural vacuum.
    - List the basic equipment associated with chest tubes including the Heimlich valve and the water seal.
    - Describe the aspects of “normal operation/expectations” for chest tubes including Heimlich valve and water seal.
    - Recognize and troubleshoot common problems such as disconnection or blockage and leakage.

- Orogastric and Nasogastric Tubes (OG/NG Tubes)
    - Describe the basic physiology of orogastric and nasogastric tubes.
    - List the basic equipment associated with OG and NG tubes.
    - Recognize and troubleshoot common problems such as extubation or blockage.

PIFT MASTER LESSON PLAN

1) Introduction/Course Overview
   a) Paramedics must not transport unstable patients without necessary additional nursing staff. Paramedics will have the final say whether or not they feel comfortable transporting a particular patient without accompanying hospital-nursing staff.
   b) Services providing paramedics trained in this program must work closely with their Medical Director and their QI process to assure a high standard of care.
   c) Medical direction will be the responsibility of the sending facility. Medical orders for the transport shall be in writing. If the ambulance has traveled far enough so that it is no longer possible to get medical control from the sending facility, control should be sought from the receiving facility. If neither is possible, seek medical control from the closet appropriate facility.
   d) Explain how the practical portion of the program will be accomplished.
2) Overview Part 1
   a) PIFT (Paramedic Interfacility Transfer)
      i) Paramedic
         (1) PIFT is designed for paramedics only.
         (2) Critical Care Technicians, etc. do not meet this requirement
      ii) Interfacility
         (1) As defined in NHTSA's 2006 *Guide to Interfacility Patient Transfer* means "Any transfer, after initialization assessment and stabilization, from and to a health care facility."
         (2) Interfacility means one health care center to another. Hospital, clinic, rehab, long-term care, etc.
         (3) PIFT does not include other type scene responses (i.e. homes, roads etc.)
      iii) Interfacility Transfer
         (1) Interfacility take place every day within the normal scope of practice of Maine EMS providers
         (2) Examples:
            (a) EMT Basic transfers a patient with a saline lock from one hospital to another.
               (i) Saline drip is within the MEMS EMT-B scope of practice if trained in IV maintenance module
            (b) EMT Paramedic transfers a patient on a Fentanyl drip from one hospital to another
               (i) Fentanyl is a MEMS protocol drug and can be transported by a non-PIFT paramedic
            (c) If the MEMS scope of practice is not exceeded, then no special circumstances are required and the patient is transferred routinely
               (i) This would be the "non-PIFT" transfer
               (ii) Any provider is eligible to conduct non-PIFT transfers as long as their scope of practice is not exceeded
               (iii) Hospital personnel are not necessarily required for non-PIFT

transfers

(iv) Although they would be if the transfer exceeded the scope of practice (more on this to follow)

b) Occasionally, the needs of the transfer patient exceed the scope of practice of the MEMS provider.
   i) When this occurred in the past, the only option was for hospital staff to accompany MEMS providers to handle that which exceeded MEMS scope of practice
   ii) Typically, an RN would be part of the team, but hold ultimate responsibility for administering non-EMS scope of practice medications, treatments, and devices.
   iii) This practice was costly and often not needed.
      (1) Example: The stable cardiac patient on an amiodarone drip
   iv) PIFT program was developed in conjunction with select Maine hospitals to address this issue
   v) The MEMS Medical Direction and Practice Board (MDPB) determined that a properly trained paramedic could safely transfer patients who were receiving medications that were outside of the MEMS paramedic scope of practice.
   vi) This led to the development of the original PIFT training classes.
   vii) Original PIFT Training
      (1) Assumed one paramedic would be caring for the patient in the back of the ambulance
      (2) Standards set were based on this crew assumption
      (3) Expanded the paramedic standard of care in the inter-facility setting only.
      (4) Original parameters for expanded scope were (and remain) in the health care facility to health care facility setting only.
      (5) Allowed paramedics in specific circumstances to control and administer a new list of medications and monitor and troubleshoot a variety of patient care devices.
      (6) Required patient stability.
      (7) Unstable patients were not eligible for PIFT transfers and required hospital personnel to accompany crew.
   viii) Original PIFT limitations
      (1) Specific list of accepted medications required frequent updates to training as new medications were created and added to the hospital formularies
      (2) These updates became incredibly difficult to track
      (3) “Who has had which version of training?”
   ix) MDPB’s Charge

(1) In 2005, the MDPB called for a revised PIFT program based on classifications of medications rather than specific medications so as to make training more realistic and expandable

(2) New devices added (see device section later in course).

c) "**New" 2006 PIFT Program**

i) Born of the same principals of the old PIFT

ii) Expanded scope of practice in the inter-facility setting

iii) Requires patient stability

iv) Now PIFT trained paramedics may transport medications established by the normal standard of care as defined in the current MEMS protocols plus:

(1) Transport the following additional classifications of medications

(a) Anticoagulants

(b) Anticonvulsants

(c) Antidiabetics

(d) Antidysrhythmics

(e) Antihypertensives (including ACE inhibitors, Calcium Channel Blockers, Diuretics, Alpha Blockers and Beta Blockers)

(f) Anti-infectives

(g) Antipsychotics

(h) Cardiac Glycosides

(i) Corticosteroids

(j) Drotrecogin

(k) Gastrointestinal Agents (including H_2 Blockers, Proton Pump Inhibitors, and Somatostatin and its analogues)

(l) IV Fluids, Electrolytes (including Dextran, Albumin, and Hetastarch)

(m) Narcotics (including all routes except epidural)

(n) Parenteral nutrition and Vitamins

(o) Platelet Aggregation Inhibitors (including IIb/IIIa Inhibitors)

(p) Respiratory Medications (Beta Agonists, Anticholinergics, Mucolytics and Steroids)

(q) Sedatives (Benzodiazepines, Barbiturates)

(r) Vasoactive Agents (Antihypertensives, Pressors/sympathomimetics)

v) Paramedics may not only transport these medications, but administer them on specific order of the sending/receiving physician

vi) Paramedics may maintain and potentially utilize additional routes of administration including central lines and personal (patient) controlled anesthesia (PCA) devices

vii) Now PIFT trained paramedics may transport patients with additional health care devices not available in the previous PIFT program

(1) e.g. Active chest tubes, continuous bladder irrigation, transvenous pacers, etc. (see "Devices" Section later).

d) New PIFT Parameters

i) The MDPB defined very specific limitations for which to utilize the new PIFT scope of practice.

(1) PIFT Transfers are limited to PIFT trained *paramedics*

(2) In order to be eligible to participate in a PIFT transfer, the provider must be a paramedic who has attended an updated (2006) PIFT training

(3) PIFT Transfers are limited to Maine EMS permitted PIFT services

(a) Note: service qualifications will be discussed in the "Medical Direction and QA" section.

(4) Paramedics and services must both meet the PIFT standard

(a) It is not enough to be a PIFT service without PIFT trained paramedics nor is it enough to be a PIFT trained paramedic associated with a non-PIFT service.

(5) Expanded protocols are limited to the "interfacility transfer setting"

(a) Interfacility transfer setting means the transfer of a patient from one health care facility (hospital, clinic, SNF, rehab, etc.) to another.

(b) PIFT trained paramedics are not allowed to use expanded protocols in any setting other than a PIFT transfer.

(6) Patient stability is necessary to qualify for a PIFT transfer

(7) Exercise 1

(a) Note: the following scenarios can be verbal discussions or small group assignments depending on the size of your class.

(b) Scenario

(i) *A local service has been called to the small primary care center to transport a cardiac patient who has been placed on an amiodarone infusion. Neither of the crew are PIFT trained paramedics. Your service has been contacted for guidance. Can a non-PIFT crew* transport this patient?

(ii) The goal of this scenario is to discuss PIFT vs. non-PIFT decision-making. In this case amiodarone would be a PIFT medication even though it is a common ACLS medication.

(iii) Another topic for discussion might be the alternatives, such as hospital staff, in the event a PIFT crew is not readily available.

(c) Scenario

(i) *You are called to the local cardiac care unit to transport an AMI patient currently on a Lidocaine drip. Do you transport this*

patient? What are the considerations with regard to making this decision?

(ii) The goal of this scenario is to discuss PIFT vs. non-PIFT decision-making. In this case Lidocaine would not necessarily be a PIFT medication as it included in the MEMS protocol for paramedics. However, other aspects of this scenario can play a role in the PIFT vs. non-PIFT decision. Stability, complexity of the patient condition, etc. may all be considered when making this decision.

(iii) Another topic for discussion might be the alternatives, such as hospital staff, in the event a PIFT crew is needed and not readily available.

e) Stability Assessment

i) Unstable patients are ineligible for PIFT transfer

(1) These patients are not manageable with one paramedic and therefore would require additional hospital staff

ii) MDPB Stability Definition

(1) "A patient is considered "stable" when there is no foreseeable likelihood of material deterioration in the condition of the patient as a result of or during the transport."

(a) "Foreseeable material deterioration" would be situations like expected ventricular dysrhythmias, anticipated hemodynamic changes, probable respiratory compromise, etc.

(i) Likely "bad things to come"

iii) The MDPB defined 3 categories of stability

(1) A stable "Low Risk" Patient:

(a) A patient who has hemodynamic and neurological stability with no foreseeable deterioration. This is the patient who is not suffering from an acute illness, but has medications or interventions being administered which are outside of the scope of the Paramedic without PIFT training.

(i) This patient would be eligible for a PIFT transfer

(2) A stable "Moderate Risk" Patient:

(a) A Stable patient is one who has hemodynamic and neurologic stability from therapies initiated. Therapies initiated must be expected to maintain patient stability during the transport. This patient is typically going via emergent transfer to a tertiary facility for services not readily available at a local facility. Variation on existing therapy has demonstrated no deterioration and may be reasonably predicted to remain without change during the transport without the need for further adjustments to such therapy.

(i) This patient would be eligible for PIFT transfer

(3) An unstable "High Risk" patient and those receiving interventions outside the scope of the PIFT module

(a) This patient will require the sending facility to provide other appropriate staff to assure appropriate clinical care during transport.

iv) Stability Assessment will require:

(1) "Hemodynamic and neurologic signs which have demonstrated no deterioration from the acute presentation of the patient, or are within acceptable limits of variation on existing therapy and may be reasonably predicted to remain so during the transport without the need for further adjustments to such therapy"

(a) The patient is not going "down hill" in the recent past or expected to go down hill in the near future.

(b) Or the patient is changing in an expected manner with therapy

(c) *"Acceptable limits of variation"* could be likened to a AMI patient continuing to have degrees of chest pain.

(i) Pain would be expected and within the norm for such a patient and therefore not necessarily indicate instability

(ii) Ventricular dysrhythmias would be outside the acceptable limits of variation and therefore would indicate instability

(2) "The pathophysiology of the patient's acute condition is known to favorably respond to the therapeutic interventions which have been undertaken at the sending hospital"

(a) e.g.: Pressors might make a previously hemodynamically unstable patient stable and, if continued properly, are likely to continue to keep the patient stable

(3) A comprehensive patient report

(a) In order to make a reasonable assessment of patient stability, the provider must obtain a detailed understanding of the patient history as it relates to this current treatment plan as well as additional relevant patient history and physician instructions for managing patient change during transport.

(b) This patient report must be communicated by a knowledgeable sending facility staff member who is capable of answering provider questions

(c) Third hand reports are bad.

(d) Remember you may be called upon to explain the patient's history and condition to a third party physician in the case of patient deterioration and necessary diversion.

v) The final decision on whether the patient can be transported under the PIFT program will be made by the transporting paramedic

(1) PIFT providers have the right to refuse to transport those patients who do not meet the above listed PIFT parameters
(2) In such a case, the patient must be treated as a non-PIFT transfer and hospital staff utilized.
(3) Note: every effort should be used to cooperate with the sending facility in the best interest of the patient. In the unlikely event of a disagreement, the PIFT provider should offer suggested resources to resolve the impasse.
(a) Hospital staff
(b) Delaying the transfer to assure stability

vi) Specific Non-PIFT Situations
(1) Patients who are not stable according to the definition listed previously.
(2) Patients who are on medications or equipment that is not included in the PIFT program.
(a) Blood products
(b) Ventilator patients
(3) Situations where the paramedic is not comfortable transporting without additional hospital personnel

vii) Bottom Line
(1) A safe and effective inter-facility transport requires the use of adequately trained personnel utilizing appropriate equipment for the management of the patient

viii) Stability (Exercise 2)

(1) Note: the following scenarios can be verbal discussions or small group assignments depending on the size of your class.

(2) PIFT resources such as a nursing medication handbook should be introduced here. Although resources will be covered in detail later, this is a good opportunity to demonstrate their utility with regard to PIFT.

(3) Scenario

(a) You are called to a local ED to transport an anterior wall AMI patient to the catheterization lab. The sending physician notes that the patient originally presented in atrial flutter with a rapid ventricular response, was treated with Ibutilide, but soon converted to torsades de pointes. The patient was discontinued from the Ibutilide, placed on a magnesium sulfate infusion, and converted into an accelerated junctional rhythm. The physician now requests immediate transport. Do you transport this patient? What are the considerations with regard to making this decision? If you do transport this patient, please discuss your pre-trip checklist.

(b) The goal of this scenario is to discuss the stability assessment and transfer decision-making process. In this case the patient has a recent history of ventricular dysrhythmias and has not established a clear pattern of stability. Therefore the decision should be that this patient is too unstable for immediate PIFT transfer.

(c) The considerations for making this decision would include the recent

history of ventricular dysrhythmias, the relatively unstable current rhythm, and the context of his overall condition (AMI). Please note that an AMI by itself does not preclude a PIFT transfer, but rather its underlying context in combination with the other dysrhythmia issues would indicate an extremely unpredictable immediate future.

(d) Another topic for discussion might be the alternatives, such as hospital staff, in the event a PIFT crew is needed and not readily available.

(4) Scenario

(a) After receiving a patient report from a sending physician, you and your partner agree that the patient is too unstable for transport. When you bring this up with the sending physician he disagrees and tells you to "just take the patient, things will be fine." What are you options?

(b) The goal of this scenario is to affirm that the transporting paramedic will make the final decision on whether the patient can be transported under the PIFT program.

(c) Discussion should be centered on conflict resolution. The PIFT crew should work with the sending physician to find alternatives to a PIFT transfer (hospital staff would be the primary answer).

f) Conducting PIFT Transfers

i) Pre-Trip Check

(1) Before accepting a PIFT patient, providers must complete a comprehensive pre-trip check. Important aspects would include (but not be limited to):

(a) A thorough patient report including patient conditions, medications running, and required equipment (prior to leaving to pick up patient).

(i) Dispatch will be an integral component

(b) An inventory to ensure that they have the appropriate equipment, gas levels, and resources for the requested transport.

(c) Check oxygen levels, monitor batteries, etc.

(d) If given medications to administer, do you have a large enough supply on hand given the length of the trip.

(e) Can you anticipate delays? (Snow, mechanical difficulties, etc?)

(f) Paramedic reviews operation of any required equipment to ensure proper familiarity with operation.

(i) Services should conduct routine training on common hospital equipment such as pumps, but paramedics must take the time to familiarize themselves with any equipment they will be expected to utilize during transfer.

(g) Paramedics should review any medications they are not familiar with to identify:

(i) Mechanism of action

(ii) Contraindications

(iii)Precautions

(iv)Side effects

(v) Potential Complications and Solutions

g) Patient Deterioration

i) Patient must be regularly re-assessed in order to identify changes in patient condition as soon as possible.

ii) Paramedics must be acutely aware of specific physician orders regarding this patient and the medications that are being administered so that alterations may be made as ordered to accommodate patient condition.

(1) What are your orders? Paramedics should have written transfer orders on board from the sending physician that specifies therapies to be continued, given as needed (prn), and dose titration parameters

(2) What medications must be administered to prevent deterioration?

(3) Are there medications to administer in the event of deterioration?

(4) If patient deterioration is dramatic, severe or unexpected, medical control should be contacted for further instructions

(a) First choice would be sending physician

(i) That person has the most information regarding the patient

(b) Second choice would be receiving physician/facility

(i) Presumably, this person/facility would have received a detailed report and understand the patient's condition

(c) Third choice would be a third party physician/facility (local hospital en route)

(i) Difficulty here is that this facility will have no information regarding the patient

(ii) This puts the major responsibility on the PIFT paramedic to have received a thorough patient report prior to transfer.

(iii) Third party hospitals may be necessary for life saving interventions

(d) The transporting crew should also consider diverting to the closest hospital with an emergency department for assistance.

(e) In rare and unusual cases, medical control may not be available

(i) Some of these situations might require immediate action by the paramedic

(ii) MEMS protocols may be utilized

1. e.g. the patient goes into V-Fib and the paramedic begins MEMS protocol to deal with the situation

(iii) Medications could be discontinued

1. e.g. the patient goes into anaphylactic shock as a result of a medication being administered.
2. Note: Extreme caution should be taken in discontinuing medications
   a. As the medications are discontinued, so are the therapeutic effects.

b. Is the value of discontinuing the medication more than the danger of discontinuing the therapeutic benefit

h) Post Trip Checklist

i) Report to receiving facility

ii) Information that should be passed along to the receiving facility includes:

(1) Report/Patient history received from the sending facility

(2) Assessment findings during transport

(3) Patient general condition

(4) Treatments administered and/or altered during transport

(5) Patient response to treatments or changes.

i) General Overview Summary

i) PIFT enables paramedics to broaden their scope of practice during interfacility transfers

ii) Not all interfacility transfers will qualify for PIFT

iii) PIFT has rigid parameters including a stability assessment

iv) Appropriate transport decisions must be made

v) Good judgment is an ongoing requirement

3) Overview Part 2 (PIFT Medical Legal Issues)

a) Overriding Principle

i) The law requires that patients who are being transferred from one facility to another facility for a higher level of care continue to receive appropriate medical care during transport.

(1) EMTALA

ii) The sending facility is legally responsible for ensuring that the mode of transport and personnel accompanying the patient during the transport are appropriate for this particular patient at this particular time.

iii) It is the hospital's responsibility to be sure the patient is transported appropriately

b) Emergency Medical Treatment and Active Labor Act (EMTALA)

i) Originally passed in 1985 as part of The Consolidated Omnibus Budget Reconciliation Act (COBRA)

ii) Sometimes referred to as the Anti-Dumping law

(1) Passed to prevent hospitals from refusing to treat indigent persons or transferring them inappropriately to other facilities.

iii) Requires hospitals to provide a medical screening examination for all patients seeking medical attention in order to determine if a medical emergency situation exists.

iv) A patient may not be transferred to another facility if they are at risk to deteriorate from or during transfer unless the current hospital cannot meet the needs of the patient.

v) The patient may not be transferred if they are unstable and remain at risk of deterioration unless the sending physician certifies in writing that the benefits to be obtained at the receiving hospital justify the risks of transfer.

vi) The patient must be accepted by the receiving hospital prior to transfer

vii) The receiving hospital must accept the patient if it has the space and the skills necessary to care for the patient.

viii) The patient or a legally responsible person must request the transfer after being advised of the risks and benefits of transfer.

ix) The sending hospital must provide whatever treatment is within its capabilities to ensure that the patient is stabilized before transfer.

x) The sending hospital is required to make appropriate arrangements for transfer that include the following:

(1) Appropriate personnel and equipment must be provided

(a) In certain cases it might be necessary for a physician or other healthcare specialist to accompany the patient

(2) All relevant medical records must be sent with the patient

xi) Scope of EMTALA

(1) An ambulance service may not be charged with an EMTALA violation unless it is a hospital-owned service but…

(a) An ambulance service may still be sued by either the sending hospital or the patient for negligence or misrepresentation if it fails to provide the appropriate personnel and equipment requested by the sending facility.

(i) Examples:

1. A sending facility requests an ALS equipped ambulance staffed by an ACLS certified paramedic to transfer a cardiac patient to another hospital

2. The service provides only a BLS ambulance with an EMT and fails to advise the sending facility that it is not providing the equipment and personnel that were requested.

3. If the patient requires ALS treatment during transport and suffers damages, the EMS service may be liable.

4) Medical Direction and QA

a) To be eligible to conduct PIFT transfers two components must be confirmed

i) PIFT trained paramedics

(1) PIFT provider eligibility

(a) PIFT provider eligibility has been previously discussed (see section 1 PIFT Overview)

ii) PIFT permitted service

(1) PIFT Service Eligibility=2 components
(a) Service Medical Director
(b) QA plan including 100% review of all PIFT transfers
(2) PIFT permitting is completed through MEMS application process (see PIFT Permit application
(a) The process is very similar to existing service permitting process

b) Medical Direction and Oversight
i) 3 aspects of medical oversight
(1) Prospective
(a) Off line (indirect)
(i) E.g. Protocol/SOG development
(2) Concurrent
(a) On line/On scene (direct)
(i) E.g. Assistance with stability assessment
(ii) E.g. On line medical control/consultation
(3) Retrospective
(a) Off line (indirect)
(i) E.g. Quality assurance/quality improvement
(ii) E.g. PIFT call review
ii) Medical Director Qualifications
(1) Minimum requirements include:
(a) Knowledge of EMS prehospital and PIFT protocols
(b) The medical director is further encouraged to be an ambassador to local hospitals, acute and chronic care facilities, and medical staffs to help support and clarify the role of paramedics in these types of transfers.
(2) Choice of a medical director should include consideration of these aspects.
(a) Choose a medical director who has had experience in the emergency/prehospital environment.
iii) Medical Director Duties
(1) Although transport decisions are ultimately left to the discretion of the paramedic providing the PIFT level transfer.
(2) The medical director is expected to be able to offer support to the paramedic
(a) This support may be on line (direct)
(i) E.g. On line medical control
(ii) e.g. being involved in a real time stability assessment
(3) It may also include off line (behind the scenes) actions
(a) E.g. Quality improvement or call review

(i) e.g. the physician may act as a liaison to other health care facilities to prevent difficult situations from happening more than once.

(4) Discussions of "borderline" transfers may require the medical director to speak with the authorizing physician, and this is an expectation that should be offered willingly and easily.

(5) Provide educational or system support if issues of competency arise.

(6) Participating in quality assurance/quality improvement

c) Emergency Room Physicians

i) ED physicians should be considered a consulting resource in any case.

ii) An emergency department physician can provide medical oversight and guidance to any crew when patient safety is ever an issue.

(1) Sending facility physician

(2) Receiving facility physician

(3) Closest facility physician in an emergent situation

(4) Communication will be critical

(a) Sending physician instructions and overall patient report will enable an ED physician to assist you

d) Quality Assurance (QA)

i) Prospective evaluation is a key component of the PIFT program.

ii) PIFT services must have an active in-house QI program able to review 100% of PIFT transfers

(1) A clear plan should be available for review

(2) Medical director should participate in this QA

(3) A MEMS quality improvement form must be filled out for each PIFT transfer

(a) MEMS will focus on the issue of patient stability

(b) The MEMS QI form will delineate the definitions of stability:

(i) A stable "Low Risk" Patient: A patient who has hemodynamic and neurological stability with no foreseeable deterioration. This is the patient who is not suffering from an acute illness, but has medications or interventions being administered which are outside of the scope of the Paramedic without PIFT training.

(ii) A stable "Moderate Risk" Patient: A Stable patient is one who has hemodynamic and neurologic stability from therapies initiated. Therapies initiated must be expected to maintain patient stability during the transport. This patient is typically going via emergent transfer to a tertiary facility for services not readily available at a local facility. Variation on existing therapy has demonstrated no deterioration and may be reasonably predicted to remain without change during the transport without the need for further adjustments to such therapy.

(iii) An unstable "High Risk" patient and those receiving interventions outside the scope of the PIFT module will require the sending facility to provide other appropriate staff to assure appropriate clinical care during transport.
(iv) Vital signs and interventions will be recorded
(v) Any variance requiring contact of OLMC will be recorded.

(4) This information must be kept for 3 years, and should be made available to regional or state QI staff when requested.

5) PIFT Drug Resources
   a) In this section a variety of PIFT related medication resources should be introduced.
   b) Specific drug resources can be found in the PIFT recommended resource list, but availability and classroom situation may limit resources discussed
      i) e.g.: Classrooms with Internet access might discuss electronic and or PDA related resources, where a non-internet classroom would be limited to hard copy resources only.
      ii) Although specific examples may not be used, instructors must discuss at least one electronic resource (see list) and have at least one type of text based resource available in the classroom.
   c) PIFT related print resources currently recognized by the MDPB include, but are not limited to the following:
      i) Statutory and Regulatory
         (1) Maine EMS Prehospital Treatment Protocols (July 1, 2005)
         (2) Title 32 Chapter 2B Maine EMS Act 1982 (August 4, 2004)
         (3) Maine EMS Rules effective July 1, 2003
         (4) EMTALA Statute- Emergency Medical Treatment and Active Labor Law - www.dol.gov
         (5) COBRA Statute-Consolidated Omnibus Budget Reconciliation Act – www.cms.hhs.gov
         (6) HIPAA – Portability of Health Coverage – www.cms.hhs.gov
      ii) Interfacility Drugs-Text
         (1) Shannon, Wilson, Stang. Health Professionals Drug Guide. Prentice Hall, 2006
         (2) Springhouse. Nursing IV Drug Handbook. Lippincott, 9e
         (3) Bledsoe, Clayden. Prehospital Emergency Pharmacology. Brady, 2005, 6e.
      iii) Paramedic Emergency Care-Text
         (1) Bledsoe, Benner. Critical Care Paramedic. Brady, 2006.
         (2) Bledsoe, Porter, Cherry. Essentials of Paramedic Care. Brady, 2006, 2e.
      iv) PIFT related electronic resources currently recognized by the MDPB include, but are not limited to the following:
         (1) Epocrates – PDA products - www.epocrates.com
         (2) Lexidrugs – PDA pproducts – www.lexidrugs.com
         (3) PEPID – PDA products – www.PEPID.com

v) Students should be encouraged to seek out creative resources that best suit their needs.
(1) It would be impossible to anticipate all the avenues of information a PIFT paramedic might utilize to make a clinical judgment
(2) Consider mentioning "reputable sources"
(i) Known publishers/Educators as opposed to unknown Internet sites.

6) Pharmacology Review
a) Note: The pharmacology quiz should be administered at this point. Review of the results should guide the concentration of this section.
i) Regardless of the results, this section should be formatted as a review used to assure that learners have the appropriate foundation for later discussions
ii) Instructors should beware of being drawn into extended primary education of unprepared learners.
iii) Providers who are significantly under prepared should receive individual one-on-one counseling by the PIFT Instructor as to their readiness to conduct PIFT transfers.
(1) Please refer to the section of remediation for additional procedures
b) Individuals found unprepared to complete the PIFT program should be referred to their service medical director for remediation and a counseling form documenting this submitted with the roster to Maine EMS
c) Topics to be addressed:
i) Pharmacokinetics
ii) Pharmacodymanics
iii) Pharmacology Terminology
iv) Autonomic Nervous System
d) Pharmacokinetics
i) Study of the metabolism and action of drugs
ii) Particularly emphasizes the following:
(1) Absorption
(2) Distribution
(3) Biotransformation
(4) Excretion
iii) Absorption
(1) The movement of a drug from its point of entry into the body into systemic circulation
(2) Factors influencing rate of absorption:
(a) Drug concentration
(i) Stronger concentrations absorb faster than weaker concentrations
(b) Site of absorption
(i) Proximity to circulation
1. E.g.: Vascular areas
(c) pH of the drug (acids into acids, etc.)
(d) Status of circulation
(i) Peripheral shunt inhibits circulation
(e) Solubility---water based vs. oil based

iv) Distribution
(1) The manner in which a drug is transported from the site of absorption to the site of action
(a) Influenced by several factors:
(i) Cardiovascular function—HR, BP, EF
1. Pump must be working to move things along
(ii) Physical barriers---(blood-brain and placenta barriers)
1. Body has specific designs to prevent certain movement

v) Biotransformation
(1) The process by which drugs are inactivated and transformed into a form that can be eliminated from the body
(a) Inactive forms are called metabolites
(2) Rate of transformation will determine how often a drug must be administered
(a) E.g.: Epinephrine transforms in 3-5 minutes
(b) The liver is the most significant organ in the transformation process

vi) Excretion
(1) The process of eliminating drugs from the body
(2) Primarily accomplished through the kidneys but may also involve the liver, the lungs, intestines, sweat and mammary glands

e) Pharmacodynamics
i) How a drug works and how we can expect the body to respond to the administration of a drug
ii) Most drugs work through interactions with receptor sites
(1) Lock and key principal
(2) Receptors sites are protein coatings on the surface of the cell membrane
(3) Antagonism
(a) Direct competition for receptor sites
(i) Naloxone's competition with narcotics is an example
(4) Facilitated Diffusion
(a) One drug/hormone opens the door
(i) Insulin allowing glucose into the cell is an example

f) Autonomic Nervous System
i) The Peripheral nervous system is divided into afferent and efferent divisions.
(1) Afferent carries impulses to the brain
(a) Sensation
(2) Efferent carries impulses away from the brain
(a) Muscle control
ii) The section of the efferent division that controls involuntary bodily functions is known as the Autonomic Nervous System.
(1) These functions include cardiac function, body temperature, smooth muscle, gland function, and arterial blood pressure.
iii) Sympathetic and Parasympathetic
(1) Sympathetic
(a) Prepares body to deal with stress
(i) Fight or flight response

(b) Neurotransmitters are epinephrine and norepinephrine
(i) Chemical substances that facilitate excitation or inhibition of target cells
(c) A drug that stimulates the sympathetic nervous system is known as a sympathomimetic or adrenergic agent
(i) E.g.: Epinephrine
(d) A drug that inhibits the sympathetic nervous system is called a sympatholytic or anti-adrenergic agent
(i) e.g.: Propanolol (beta blocker)
(2) Parasympathetic
(a) Controls vegetative functions
(b) Neurotransmitter is Acetylcholine
(c) A drug that stimulates the system is called a Parasympathomimetic or cholinergic drug
(i) E.g.: Prostigmine
(d) A drug that blocks or inhibits the system is called a Parasympatholytic or anticholinergic drug
(i) E.g: Atropine

g) Important Pharmacological Terms
i) Note: this section is designed to be conducted in a class discussion format.
(1) Learners should be asked to provide a basic example of each term
(2) If teaching before large group, small group work may be useful
(a) A sample group quiz is included on the following page
ii) Antagonism
(1) The opposition between two or more medications ex. narcotics and Naloxone
iii) Bolus
(1) A single, often large dose of a drug. Often the initial dose
iv) Cumulative action
(1) An increased effect caused by multiple doses of the same drug.
(2) Caused by buildup in the blood.
v) Hypersensitivity
(1) A reaction to a drug that is more profound than expected and which often results in an exaggerated immune response
vi) Idiosyncrasy
(1) A reaction to a drug that is significantly different from what is expected
vii) Indication
(1) The medical condition for which the drug has proven therapeutic value
viii) Parenteral
(1) Any route of administration other than the digestive tract
ix) Pharmacodynamics
(1) Study of the mechanisms by which drugs act to produce biochemical or physiological changes in the body
x) Pharmacokinetics
(1) Study of how drugs enter the body, reach their site of action and are eliminated from the body

xi) Potentiation
    (1) The enhancement of a drug's effect by another drug ex. promethazine may enhance the effect of morphine; also alcohol and barbiturates
xii) Refractory
    (1) The failure of a patient to respond as expected to a certain medication
xiii) Therapeutic action
    (1) The intended action of a drug given in an appropriate medical setting
xiv) Therapeutic threshold
    (1) The minimum amount of a drug that is required to cause the desired response
    (2) Therapeutic index
    (3) The difference between the therapeutic threshold and the amount of the drug considered to be toxic
        (a) Often referred to as "Safe and Effective Range"
xv) Tolerance
    (1) The decreased sensitivity or response to a drug that occurs after repeated doses; increased doses are required to achieve the desired effect
xvi) Untoward Effect
    (1) A side effect of a drug that is harmful to the patient
xvii) Synergism
    (1) The combined action of 2 or more drugs that is greater than the sum of the 2 drugs acting independently

7) Medication Math
    a) Distribute and briefly review the "Answers to Pre-Course Exercises"
    b) Instructors should not get bogged down in a math review
    c) Individual remediation and counseling may be needed
    d) Refer students to the websites listed in the Pre-Course Packet and additional handouts in the Instructor's Resource section of the MEMS website

PARAMEDIC INTERFACILITY TRANSFER MODULE
Pharmacology Definitions Quiz

Using the following list of terms, fill in the blanks:

antagonism	**parenteral**	**synergism**
bolus	**pharmacodynamics**	**therapeutic action**
cumulative action	**pharmacokinetics**	**therapeutic threshold**
hypersensitivity	**potentiation**	**therapeutic index**
idiosyncrasy	**refractory**	**tolerance**
indication	**supportive therapy**	**untoward effect**

1. When a patient fails to respond as expected to a certain medication, we say that the patient is _____ to the medication.

2. The study of how drugs enter the body, reach their site of action and are eventually eliminated from the body is known as _____.

3. A route of drug administration that does not involve the drug passing through the digestive tract is said to be _____.

4. An _____ is an individual reaction to a drug that is not generally seen or expected.

5. The difference between the therapeutic threshold of a drug and the amount considered to be toxic is known as _____.

6. A single, often large dose of a drug is known as a _____.

7. The opposition between two drugs is known as _____.

8. The combined action of two drugs is known as _____.

9. A condition known as _____ can be said to occur when a patient requires increasingly larger doses of a drug in order to achieve the desired effect.

10. The study of how drugs act upon the body is known as _____.

11. When the effects of one drug are enhanced by another drug, this is known as _____.

12. When an increased effect of a drug occurs due to the administration of multiple doses of the drug, this is known as _____.

13. A patient experiences a harmful effect from a drug. This response is referred to as _____.

14. The minimum concentration of a drug that is required to achieve the desired response is known as _____.

15. Drugs are given for a very specific reason. The reason or reasons why we administer a specific drug are known as that drug's _____.

PARAMEDIC INTERFACILITY TRANSFER MODULE
Pharmacology Definitions Quiz
KEY

Using the following list of terms, fill in the blanks:

antagonism	**parenteral**	**synergism**
bolus	**pharmacodynamics**	**therapeutic action**
cumulative action	**pharmacokinetics**	**therapeutic threshold**
hypersensitivity	**potentiation**	**therapeutic index**
idiosyncrasy	**refractory**	**tolerance**
indication	**supportive therapy**	**untoward effect**

1. When a patient fails to respond as expected to a certain medication, we say that the patient is **refractory** to the medication.

2. The study of how drugs enter the body, reach their site of action and are eventually eliminated from the body is known as **pharmacokinetics.**

3. A route of drug administration that does not involve the drug passing through the digestive tract is said to be **parenteral**

4. An **idiosyncrasy** is an individual reaction to a drug that is not generally seen or expected.

5. The difference between the therapeutic threshold of a drug and the amount considered to be toxic is known as **therapeutic index**.

6. A single, often large dose of a drug is known as a **bolus**.

7. The opposition between two drugs is known as **antagonism**.

8. The combined action of two drugs is known as **potentiation.**

9. A condition known as **tolerance** can be said to occur when a patient requires increasingly larger doses of a drug in order to achieve the desired effect.

10. The study of how drugs act upon the body is known as **pharmacodynamics**.

11. When the effects of one drug are enhanced by another drug, this is known as **synergism**.

12. When an increased effect of a drug occurs due to the administration of multiple doses of the drug, this is known as **cumulative action**.

13. A patient experiences a harmful effect from a drug. This response is referred to as an **untoward effect.** .

14. The minimum concentration of a drug that is required to achieve the desired response is known as **therapeutic threshold**.

15. Drugs are given for a very specific reason. The reason or reasons why we administer a specific drug are known as that drug's **indication**.

8) Medication Classifications
   a) Medications and transport
      i) NHTSA Paramedic curriculum references very few medications
      ii) The interfacility setting exposes paramedics to a wide variety of medications
      iii) This variety is constantly changing
      iv) Update to PIFT classifies medications rather than addressing medications specifically
         (1) 20 different classifications
         (2) Focused on those classifications seen most often in the inter-facility setting
   b) General Concepts of dealing with medication classifications
      i) Note: When instructing a small group, or when circumstances allow, this section is well suited for "knowledge quest" type instruction. That is, rather than presenting each classification, one after the other, the instructor should assign cooperative work to learner groups and allow those groups present the various classifications utilizing resources discussed previously.
         (1) This active learning approach will aid overall comprehension of both the classifications and resource use.
      ii) Note: Because the focus of PIFT is classifications rather than specific medications, there are many particular aspects of medications we will not discuss. As such paramedics must clearly understand the following:
         (1) Transport orders must be specific and well understood.
            (a) Although the current MEMS protocols have moved increasingly to standing orders, in PIFT paramedics will compensate for general classification knowledge with clear, precise, prospective medical direction.
         (2) Paramedics must recognize the need to utilize PIFT resources to prepare for and understand the particulars of a medication when presented with specific circumstances.
         (3) This course has neither the time nor the resources to prepare a provider for every possible challenge or concern with regard to patients and their medications. Paramedics should understand this and refer to the previous two points if ever a question arises.
      iii) Check transfer order carefully to be sure that all medications ordered are permitted under the PIFT program.
         (1) Orders should be written and clearly understood by the paramedic
            (a) Questions must be answered before accepting the transfer.
         (2) Be sure that order specifies:
            (a) Dosage
            (b) Times of administration where applicable
            (c) E.g.: Nitroglycerin dosage is often altered based on pain and/or BP.
      iv) Ask the physician or RN to review medication with you if it is one that you are not familiar with.
         (1) Discuss potential adverse reactions and how to deal with them.
      v) Refer to PIFT resources when necessary

(1) Be sure to have a drug reference book available in your ambulance
(2) Review drug reference for detailed information about the drug.
(a) It will provide information about side effects, adverse reactions, dosing, interactions, etc.

vi) Determine how long it will take to reach receiving facility and calculate the amount of the drug you will need to reach your destination.
(1) Allow for unforeseen delays.

vii) Check to be sure that you have the right drug and the right concentration.

viii) Check expiration dates of all medications.

ix) Be sure that you thoroughly understand how to use the infusion pump being supplied by the hospital
(1) Are you able to troubleshoot potential problems?

x) Check IV site for patency, redness, etc.

xi) Contact medical control if it becomes necessary to administer another drug to ascertain possible interaction problems

c) Allergic Reactions
i) Note: All the classifications of medications we are about to discuss have the potential to create an allergic reaction.
(1) Rather than mention allergic reaction with each classification, we make this disclaimer here.

ii) Be vigilant for signs of allergic reactions or anaphylaxis

iii) Treat according to MEMS protocol

d) Format Notes
i) Each classification will follow a standard format
(1) First we will discuss a general overview of the class
(a) What the class does essentially
(2) Next, we will discuss common patients who will use medications in the class
(a) Note that this will not be comprehensive, but rather an overview
(3) "What to watch for" is then discussed
(a) This is meant to give the paramedic an idea of issues that may arise secondary to complications of medications within this class.
(b) Note there will be repetition throughout, but major issues, such as respiratory suppression and narcotics, need to be emphasized and not lost in the sheer volume of information
(4) Common interventions are designed to give paramedics a brief idea of interventions they may need to have at the ready when dealing with medications within this class.
(a) Again, there is much repetition
(b) It is recommended that instructors focus on common topics early on and then simply mention them in repetitive categories.
(c) Common themes include:
(i) Using MEMS treatment protocols to handle unforeseen circumstances
1. Anaphylaxis
2. Cardiac dysrhythmias

3. Etc.
(ii) Using OLMC to discuss, altering the medication dose, discontinuing the medication and/or diversion
(iii) Constant reassessment
(d) Note: *Key scenarios have been added to the Power Point to aid in this discussion.*
(5) Note: Certain medications will appear in several different classifications during this program as some of them are indicated for different medical conditions.
(a) *E.g.: Beta blockers and calcium channel blockers appear as Antidysrhythmic agents but will also be seen in the section on Antihypertensives*

9) Medication Classes

a) Anticoagulants
i) Used to prevent extension of existing clot or formation of new blood clots
ii) Does not dissolve existing clots
iii) Patients may be on these drugs for extended periods of time
iv) Patients on anticoagulants
(1) MI or suspected MI patients
(2) DVT—deep vein thrombosis
(3) Pulmonary embolism
(4) DIC—disseminated intravascular coagulation
(5) Other clotting-related disorders
v) Most commonly used anticoagulants:
(1) Heparin
(2) Lovenox (enoxaparin)
vi) Generally administered IV but in certain cases may be given SQ
vii) What to watch for:
(1) Signs of bleeding, either internally or externally
(2) Monitor vitals frequently
(3) Signs and symptoms of shock
(4) Altered level of consciousness
viii) Potential interventions in case of adverse reaction:
(1) Consider discontinuing drug
(2) Control any external bleeding
(3) Treat for shock
(4) Consider contacting medical control
ix) Thrombolytics
(1) Paramedics are not permitted to transport patients with thrombolytic drugs running
(2) BUT…..
(3) Paramedics may transport patients shortly after completion of thrombolytic therapy.
(4) These patients may present in several different ways

(a) Patients may have received thrombolytics for either an acute MI or non-hemorrhagic CVA
(b) Patients have reprefused and have improved OR…
(c) Failed perfusion and continue to show symptoms

(5) What to watch for during transport:
(a) Signs of bleeding
(i) Particularly intracranial or GI bleeding
(b) Signs of shock
(c) Altered level of consciousness
(d) Hypotension
(e) Dysrhythmias

(6) Potential interventions for adverse reactions:
(a) Treat dysrhythmias as per Maine EMS protocols
(b) General supportive measures
(c) Consider fluids for hypotension
(d) Contact OLMC for options including diversion

b) Anticonvulsants

i) Used primarily to prevent or treat seizures

ii) Seizures are often associated with epilepsy, head injury, fever, infection or unknown etiology

iii) Anticonvulsants consist of three types of drugs:
(1) Benzodiazepines
(a) Lorazepam (Ativan®)
(b) Midazolam (Versed®)
(c) Diazepam (Valium®)
(2) Barbiturates
(a) Barbiturate of choice for many years has been Phenobarbital
(3) Dilantin® or Cerebryx®

iv) May be administered IV, IM, PO or rectally in infants
(1) Usually administered by IV infusion pump during inter-facility transport

v) It is not uncommon to see 2 or more different anticonvulsants used in combination during inter-facility transport

vi) Doses may have to be altered during transport due to increased seizure activity

vii) What to watch for:
(1) Hypotension
(2) Respiratory depression
(3) Vomiting
(4) Bradycardia and other dysrhythmias
(5) Increased seizure activity

viii) Potential interventions in case of adverse reaction:
(1) Consider discontinuing drug or drugs
(2) Consider fluids for hypotension
(3) Support ventilations as necessary
(4) Treat dysrhythmias per Maine EMS protocols

(5) If increased seizure activity occurs, consider increasing dosage if permitted by transfer order or contact OLMC

c) Antidiabetics
   i) In the context of inter-facility transport, it is not uncommon to encounter patients that require treatment with antidiabetic agents
   ii) In most cases, the medication that you will be monitoring or administering will be insulin.
   iii) Patients will generally have a diagnosis of:
      (1) Hyperglycemia
      (2) Hyperglycemic coma
      (3) Hyperosmolar hyperglycemic nonketotic coma
   iv) Insulin comes in many forms. They are generally either rapid, intermediate, or long acting preparations.
      (1) Common names include the following:
         (a) Humulin®
         (b) Novolin®
         (c) NPH®
         (d) Iletin®
         (e) Lantus®
         (f) Lente®
         (g) Ultralente®
      (2) Remember that longer acting preparations may cause a hypoglycemic event 6-8 hours after administration if the patient is NPO
   v) Administration will generally be by IV infusion in the inter-facility mode but…
      (1) In some long distance transfers it may be necessary to administer the patient's routine dose of insulin by subcutaneous injection
   vi) Blood glucose monitoring may be necessary depending on the patient's condition and the length of the transfer
   vii) What to watch for during transport:
      (1) Seizures
      (2) Alterations in blood glucose
         (a) Signs and symptoms of hypoglycemia
         (b) Nausea, anxiety, altered level of consciousness, tachycardia, diaphoresis
   viii) Potential interventions:
      (1) Treat hypoglycemia or seizures as per Maine EMS protocols
      (2) Consider discontinuing or altering the infusion rate of insulin as per OLMC
      (3) Provide general supportive measures
   ix) Oral hypoglycemics may also be administered by the PIFT paramedic during long distance interfacility transfers as part of the patient's regularly scheduled medications

d) Antidysrhythmics

i) This is the largest classification of medication in the PIFT module as it contains several sub-classifications
   (1) Beta Blockers
   (2) Calcium Channel Blockers
   (3) Cardiac Glycosides
   (4) Miscellaneous Antidysrhythmics such as:
      (a) Amiodarone (Cordarone®)
      (b) Magnesium sulfate
      (c) Procainamide (Pronestyl®)
      (d) Phenytoin (Dilantin®)
      (e) Lidocaine
ii) What kinds of patients will we see on antidysrhythmic medications?
   (1) CARDIAC PATIENTS
      (a) Confirmed or suspected AMIs
      (b) Angina
      (c) Tachydysrhythmias
      (d) Bradydysrhythmias with or without heart blocks
      (e) Atrial fibrillation and flutter
      (f) PVCs and other ectopic conditions
iii) Beta Blockers
   (1) Common medications
      (a) Metoprolol (Lopressor®)
      (b) Propranolol (Inderal®)
      (c) Atenolol (Tenormin®)
      (d) Esmolol (Brevibloc ®)
   (2) During transport primarily used to treat various tachydysrhythmias, atrial fibrillation and atrial flutter
   (3) Used to treat MIs but generally given in hospital prior to transfer
iv) Calcium Channel Blockers
   (1) Common medications
      (a) Diltiazem (Cardizem®)
      (b) Verapamil (Calan®)
      (c) Nifedipine (Procardia®)
   (2) Commonly used for treatment of tachydysrhythmias, atrial fibrillation and flutter
v) Cardiac Glycosides
   (1) Common Medications
      (a) Digoxin (Lanoxin®)
   (2) Commonly used for treatment of tachydysrhythmias, particularly to control ventricular rate in atrial fibrillation or flutter; PSVT
vi) Amiodarone
   (1) Generally used to treat atrial and ventricular tachydysrhythmias during interfacility transport
vii) Lidocaine
   (1) Used to treat wide complex tachycardia and ventricular ectopy

viii) Antidysrhythmics will almost always be administered IV by infusion pump
ix) What to watch for during transport:
(1) Dysrhythmias
(2) Altered levels of consciousness
(3) Hypotension/changes in vital signs
(4) Seizures
x) Potential interventions in case of adverse or allergic reaction:
(1) Treat dysrhythmias and seizures per Maine EMS protocols
(2) Consider fluids for hypotension if not contraindicated by patient's condition
(3) OLMC for option of discontinuing drug, adjusting dosage or diversion
(4) General supportive measures
xi) Other general notes on Antidysrhythmics:
(1) Keep in mind that all patients on cardiac medications should be transported on a cardiac monitor
(2) Record any changes in rhythm
(3) Take frequent vitals
(4) Remember that cardiac patients can deteriorate quickly and you must be prepared for a code or other serious event at all times

e) Antihypertensives
i) These medications are essentially used to control hypertensive crisis of various etiologies
ii) Included within the classification of antihypertensives are several other classes of medications that have antihypertensive action
(1) Other classifications and sub classifications of antihypertensives include:
(a) ACE Inhibitors
(i) Benazepril (Lotensin®)
(ii) Enalapril (Vasotec®)
(iii)Iisinopril (Zestril®)
(iv)Captopril (Capoten®)
(b) Beta Blockers
(i) Atenolol (Tenormin®)
(ii) Propranolol (Inderal®)
(iii)Metoprolol (Lopressor®)
(iv)Labetalol (Normodyne®)
(c) Alpha Blockers
(i) Doxazosin (Cardura®)
(ii) Prazosin (Minipress®)
(iii)Terazosin (Hytrin®)
(d) Calcium Channel Blockers
(i) Diltiazem (Cardizem®)
(ii) Verapamil (Calan®)
(iii)Nifedipine (Procardia®)
(iv)Amlodipine (Norvasc®)

(e) Diuretics
(i) Furosemide (Lasix®)
(ii) Bumetadine (Bumex®)
(iii)Torsemide (Demadex®)
(f) Vasodilators
(i) Hydralazine (Apresoline®)
(ii) Minoxidil (Loniten®)
(iii)Nitroglycerin

iii) Generally IV but may be given PO in certain cases on long transfers
iv) What to watch for during transport
(1) Severe hypotension
(2) Nausea/vomiting
(3) Symptomatic bradycardia
(4) Other dysrhythmias
v) Possible interventions when adverse reactions occur during transport:
(1) Treat bradycardia and other dysrhythmias as per Maine EMS protocols
(2) Consider fluids for hypotension if not contraindicated by patient condition
(3) Consider promethazine (Phenergan) for nausea
(4) Contact OLMC for options of discontinuing medication, altering dosage or diversion
vi) General Notes on Antihypertensives:
(1) All patients on antihypertensive medications should be transferred on a cardiac monitor
(2) Take frequent vitals

f) Anti-Infectives
i) Includes the following:
(1) Antibiotics
(2) Antivirals
(3) Antifungal agents
ii) Note: Rarely will we see an antiviral or antifungal agent on an interfacility transfer
iii) What types of patients can we expect to see on anti-infectives?
(1) Pneumonia/respiratory infections
(2) Meningitis
(3) Sepsis
(4) Cellulitis
(5) UTI
(6) Various infectious diseases
iv) Most common medications used in transport:
(1) Vancomycin
(2) Rocephin
(3) Penicillin
(4) Cefazolin (Ancef®)
(5) Gentamicin
v) Almost always administered IV

vi) What to look for:
    (1) Signs and symptoms of allergic reaction
        (a) Note: Antibiotics have a greater potential for allergic reactions than any other drugs
    (2) Induration or redness at the IV site
    (3) Altered level of consciousness
    (4) Nausea/vomiting

g) Antipsychotics
    i) The number of psychiatric transfers has increased dramatically in recent years
    ii) Many patients are transferred with chemical restraints and sometimes need to be given additional medication during transport
    iii) Medication is administered to control psychotic behavior that is otherwise difficult to manage in an ambulance
    iv) Patients will have a number of different diagnoses including agitation, schizophrenia, depression, delusional disorders, etc.
    v) A number of different medications are used to provide chemical restraint
        (1) Common Chemical Restraint Medications:
            (a) Haloperidol (Haldol®)
            (b) Chlorpromazine (Thorazine®)
            (c) Risperidone (Risperdal®)
            (d) Ziprasidone (Geodon®)- oral form coming into increasing favor in ED for acutely agitated patients
            (e) Benzodiazepines (Diazepam, Lorazepam, Midazolam)
        (2) These drugs may be given alone or in combination with other antipsychotic drugs
        (3) May also be administered in combination with other medications such as diphenhydramine (Benadryl®) to prevent dystonic reactions
            (a) Watch for added sedative effects
    vi) Routes of administration
        (1) Generally given IV but may be given IM or PO in some cases
        (2) For IV medication, the patient should leave the hospital with a saline lock in place if possible
    vii) Considerations…
        (1) Discuss all medication issues with the sending physician before leaving the hospital
        (2) If the patient is sedated upon your arrival, ask if the drug will last long enough for you to reach your destination
        (3) Transfers of more than 2 hours are not uncommon
        (4) If medication will be needed during transport, do not wait until the patient becomes disruptive and combative
        (5) Make sure that any patient who is medicated or may require medication during transport is “Blue Papered”
            (a) “Blue Papered” means involuntarily committed and as such the patient should have paperwork to indicate this is the case

(b) This patient is been deemed a danger to self/others and warrants a period of involuntary commitment for observation, diagnosis, and treatment as ordered by the court
(c) Administration of chemical restraint carries with it the same legal implications as physical/mechanical restraints and requires impeccable documentation of justification

viii) What to watch for during transport:
(1) Respiratory depression
(2) Hypotension
(3) Seizures
(4) Extrapyramidal reactions
(5) Agitation, muscle tremor, drooling, tremors, etc.

ix) Potential interventions in cases of adverse or allergic reactions:
(1) Treat allergic reactions and seizures as per Maine EMS protocols
(2) Support ventilations as necessary and be prepared to intubate
(3) Consider fluids for hypotension
(4) Diphenhydramine for extrapyramidal reactions- often potentiates sedative effects
(5) OLMC for other options including diversion

h) Cardiac Glycosides
i) These are essentially digitalis preparations
ii) The most commonly used drug is digoxin (Lanoxin®)
iii) Generally used to treat atrial fibrillation, atrial flutter or atrial tachycardias
iv) Sometimes used to treat CHF
v) Generally IV infusion
vi) What to watch for during transport:
(1) Dysrhythmias including heart blocks
(2) Cardiac arrest
(3) Nausea/vomiting
(4) Digitalis toxicity

vii) Potential interventions for adverse reactions:
(1) Treat all dysrhythmias per Maine EMS protocols
(2) Consider promethazine for nausea/vomiting
(3) Contact OLMC for options of discontinuing drug, altering dose or diversion

viii) General Notes:
(1) All patients on cardiac glycosides must be transported on a cardiac monitor and watched carefully for developing adverse reactions

i) Corticosteroids
i) Medications in this class are primarily used to treat the following:
(1) Cerebral edema associated with head injury
(2) Status asthmaticus
(3) To suppress the immune system in cases of severe allergic reactions/anaphylactic shock

(4) Chronic inflammatory conditions
ii) Routes of administration
(1) IV infusion in most cases
(2) Also used in inhaled form for certain respiratory conditions
iii) Commonly used medications in this class
(1) Betamethasone (Celestone®)
(2) Dexamethasone (Decadron®)
(3) Methylprednisolone (Solu-Medrol®)
(4) Hydrocortisone (Solu-Cortef®)
iv) Also in inhaled form…
(1) Beclomethasone (Beconase®, Beclovent®)
(2) Triamcinolone (Azmacort®, Kenalog®)
(3) Flunisolide (Aerobid®)
v) What to watch for during transport:
(1) Hypertension
(2) Nausea/vomiting
(3) Acute pulmonary edema
vi) Potential interventions in case of adverse reactions:
(1) Follow Maine EMS protocols for allergic reactions, CHF or nausea/vomiting
(2) Contact OLMC for options of discontinuing drug

j) Drotecogin (Xigris®)
i) An Antisepsis agent
(1) Used to treat severe sepsis or septic shock
ii) Administered by IV infusion only
iii) What to watch for during transport:
(1) Be alert for signs of internal bleeding
(2) Shock symptoms
iv) Potential interventions during transport in cases of adverse reactions:
(1) Treat for shock
(2) Contact OLMC for option of discontinuing drug

k) Gastrointestinal Agents
i) Used to treat a variety of GI disorders
ii) Three different sub-classifications of GI medications:
(1) Protein pump Inhibitors
(a) Omeprazole (Protonix ®)
(b) Lansoprazole (Prevacid®)
(c) Esomeprazole (Nexium®)
(d) Rabeprazole (Prilosec®)
(2) Somatostatin Analogues
(a) Octreotide acetate (Sandostatin®)
(3) H2 Blockers
(a) Famotidine (Pepcid®)
(b) Cimetidine (Tagamet®)

(c) Ranitidine (Zantac®)

iii) What kind of patients will we see being transported on these medications?
(1) Active duodenal or gastric ulcers
(2) GERD—gastric esophageal reflux disease
(3) Upper GI bleed
(4) Esophageal varices

iv) Routes of Administration
(1) IV infusion
(2) PO

v) What to watch for during transport:
(1) Adverse reactions are rare but may consist of dysrhythmias
(2) Hypoglycemia is possible but will probably only be seen on longer transfers

vi) Potential interventions for adverse or allergic reactions:
(1) Treat dysrhythmias and hypoglycemia per Maine EMS protocols
(2) Consider termination of drug
(3) OLMC for further options

l) IV Fluids

i) Consists of a wide variety of fluids including the following:
(1) Normal saline, ½ NS
(2) Lactated Ringers
(3) D5W and D10W
(4) Dextran, Plasmanate
(5) Hetastarch, albumin

ii) Why do we give IV fluids during transport?
(1) Increase or maintain blood volume and blood pressure
(2) Maintain hydration
(3) Access for medication
(4) Treat hypoglycemia (D10W)

iii) What to watch for during transport:
(1) Signs of fluid overload
(2) Edema
(3) Pulmonary edema
(4) Take vitals often to monitor BP

iv) Potential interventions in cases of adverse reactions:
(1) Consider discontinuing or reducing rate of infusion
(2) Treat CHF per Maine EMS protocols

v) Electrolytes
(1) Electrolytes consist of the following:
(a) Potassium
(b) Calcium chloride or calcium gluconate
(c) Sodium chloride
(d) Sodium bicarbonate (alkalizing agent)
(e) Magnesium sulfate
(2) What type of patients will we see who require electrolyte therapy?

(a) Patients requiring potassium supplementation due to deficiency diseases when oral replacement is not feasible
(b) Those who have lost potassium due to severe vomiting or diarrhea
(c) Patients with severe hypocalcemia
(d) Sodium depletion
(e) Patients requiring sodium bicarbonate to treat hyperacidity or metabolic acidosis due to shock or dehydration

(3) Primarily IV infusion
(4) What to watch for during transport:
(a) Dysrhythmias
(b) Seizures
(c) Signs and symptoms of allergic reactions (rare)
(d) Chemical phlebitis at the infusion site related to pH of drug or hyperosmolarity

(5) Know what is a safe concentration of electrolyte to administer via a peripheral vs. central line and over what time period
(6) Hypotension with Magnesium sulfate
(7) Potential interventions in cases of adverse reactions:
(a) Treat seizures and dysrhythmias per Maine EMS protocols
(b) Consider option of discontinuing drug or modifying dose as per OLMC or transfer orders

m) Narcotics
i) Used to control moderate to severe pain
ii) May be administered by IV infusion pump but may also be given by IV or IM injection as per transfer order
(1) Instructors may mention the idea of equivalent analgesic dosing and potency here

iii) Commonly used narcotics:
(1) Fentanyl
(2) Morphine
(3) Hydromorphone (Dilaudid®)
(4) Meperidine (Demerol®)
(5) Pentazocine (Talwin®)

iv) What to watch for during transport:
(1) Respiratory depression
(2) Hypotension
(3) Nausea/vomiting
(4) Bradycardia

v) Potential interventions in cases of adverse reactions:
(1) Consider discontinuing medication
(2) Treat dysrhythmias per Maine EMS protocols
(3) Consider Naloxone
(4) Assist ventilations as necessary and be prepared to intubate

n) Parenteral Nutrition and Vitamins

i) Nutritional supplements are used to treat the following:
   (1) Patients requiring nutrition who are unable to take food and/or fluids by mouth
   (2) Patients requiring vitamin supplements to prevent or treat vitamin deficiency conditions
ii) Common forms include the following:
   (1) Vitamin solutions
   (2) TPN (Total Parenteral Nutrition)
      (a) An individualized solution designed to meet the needs of the patient
      (b) Often contains regular insulin due to the high glucose content- monitor patient's blood sugar
      (c) May be infusing with lipids (given in separate line)
iii) What to watch for during transport:
   (1) Adverse or allergic reactions are rare but have been seen
   (2) Hypoglycemia
      (a) Can occur since most TPN preparations contain Insulin
iv) Potential interventions in case of adverse reactions:
   (1) Treat hypoglycemia as per Maine EMS protocols
   (2) Consider discontinuing drug

o) Platelet Aggregation Inhibitors (including IIb/IIIa Inhibitors)
i) They are potent agents that inhibit platelets from aggregating or clumping together in the context of coronary artery disease.
ii) Frequently used in combination with Heparin
iii) Types of patients being transported on these drugs
   (1) Acute MI
   (2) Unstable angina
   (3) Acute coronary syndrome
   (4) Many of these patients are being transported to the cath lab for diagnostic and/or interventional catheterization/angioplasty
iv) IV infusion only
v) What to watch for during transport:
   (1) Any signs of bleeding
   (2) Signs and symptoms of shock
   (3) Changes in level of consciousness
vi) Potential interventions in cases of adverse or allergic reactions:
   (1) Control any external bleeding
   (2) Treat for shock as needed
   (3) Contact OLMC for options of discontinuing drug, altering dose or diversion
   (4) In cases of suspected bleeding, the provider may also have to D/C heparin if it is also being administered
   (5) Treat dysrhythmias and allergic reactions as per Maine EMS protocols

p) Respiratory Medications
i) Within this classification are several sub classifications of drugs that are used in treating patients with respiratory conditions

(1) Beta agonists
(a) Albuterol (Proventil®)
(b) Terbutaline
(c) Metaproterenol (Alupent®)
(d) Piruterol (Maxair®)
(e) These drugs provide relief through bronchodilation
(2) Anticholinergics
(a) Ipratropium (Atrovent®)
(b) These drugs provide long term maintenance of bronchodilation
(3) Steroids
(a) Beclomethasone (Beclovent®)
(b) Flunisolide (AeroBid®)
(c) Fluticasone (Flovent®)
(d) Triamcinolone (Azmacort®)
(e) These drugs provide relief by reducing inflammation
(4) Mucolytics
(5) Miscellaneous
(a) Aminophylline
(b) Montelukast (Singulair®)

ii) What kinds of patients will you be transporting on respiratory medications?
(1) The respiratory problem may be primary or secondary
(2) Acute or chronic
(a) Asthma
(b) COPD
(c) Emphysema
(d) Certain cases of allergic reaction

iii) Routes of administration:
(1) Most of these drugs will be administered by inhaler or nebulized
(2) Aminophylline is given by IV infusion
(3) Terbutaline may be IV or by inhalation
(4) Epinephrine as a respiratory medication

iv) Transport respiratory medication patients on cardiac monitor

v) What to watch for during transport:
(1) Dysrhythmias
(2) Beta agonists such as Albuterol can cause tachydysrhythmias
(3) Palpitations, chest pain

vi) Potential interventions in case of adverse reaction:
(1) Treat dysrhythmias and chest pain per Maine EMS protocols

q) Sedatives
i) Sedatives consist of a variety of medications from several different classifications (Some that we have already reviewed)
(1) Narcotics
(a) Fentanyl
(b) Morphine
(c) Dilaudid

(d) Meperidine.
(2) Benzodiazepines
(a) Diazepam
(b) Lorazepam
(c) Midazolam
(3) Antipsychotics
(a) Haloperidol
(b) Risperidone
(c) Chlorpromazine
(4) Barbiturates and anesthetics
(a) Phenobarbital
(b) Thiopental
(c) Amobarbital
(5) Anesthetics
(a) Etomidate
(b) Propofol
(c) NOTE: Paramedics will not transport patients on anesthetics unless accompanied by an RN
(i) Most patients on anesthetics are intubated

ii) Types of patients on sedatives…
(1) Agitation and combativeness associated with head injury, psychosis, etc.
(2) Control of seizure activity
(3) Any condition where it is necessary to provide sedation

iii) What to watch for during transport:
(1) Respiratory depression
(2) Hypotension
(3) Bradycardia

iv) Potential interventions in cases of adverse reactions:
(1) Oxygen, Support ventilations as necessary and be prepared to intubate
(2) Treat bradycardia per Maine EMS protocols
(3) Consider fluids for hypotension
(4) OLMC for other options

v) Take vitals often

vi) Transport on cardiac monitor

r) Vasoactive Agents

i) These are medications that have an effect on the tone and caliber or diameter of blood vessels
(1) Vasopressors and sympathomimetic drugs cause constriction of blood vessels…….
(2) Nitrates, vasodilators, Calcium Channel Blockers and ACE Inhibitors cause relaxation and dilation of vessels, thereby reducing BP

ii) Vasopressors
(1) What kinds of patients will we see on Vasopressors and Sympathomimetics?

(a) Patients on these drugs are generally being treated for hypotension and certain types of shock
(b) Note: pressor use should cause concern with regard to stability assessment

(2) Commonly used vasopressors and sympathomimetics:
(a) Vasopressin (Pitressin®)
(b) Metaraminol (Aramine®)
(c) Dopamine (Intropin®)
(d) Dobutamine (Dobutrex®)
(e) Epinephrine and norepinephrine
(f) Isoproterenol (Isuprel®)

iii) Nitrates
(1) Patients taking nitrates are generally being treated for ischemic chest pain or hypertensive crisis
(2) Commonly used nitrates include:
(a) Nitroglycerin
(b) Nitroprusside (Nipride®)

iv) Vasodilators
(1) Used primarily for treatment of hypertensive crisis and management of CHF
(2) Calcium Channel Blockers and ACE Inhibitors are primarily used to treat hypertension as we saw in the section on Antihypertensives

v) Routes of administration:
(1) IV infusion
(2) Usually by infusion pump

vi) What to watch for during transport:
(1) Severe hypotension or hypertension
(2) Dysrhythmias
(3) Dyspnea
(4) Altered level of consciousness
(5) Nausea/vomiting

vii) Potential interventions in case of adverse or allergic reactions:
(1) Treat dysrhythmias as per Maine EMS protocols
(2) Consider fluids for hypotension
(3) Consider discontinuing drug or modifying dose as per OLMC or transfer order
(4) Diversion

viii) NOTE……
(1) These patients must be transported on a cardiac monitor
(2) Monitor vitals frequently

s) Over the Counter Medications
i) During the course of a transport, particularly a long distance transfer, it may be necessary to administer certain commonly used OTC medications
ii) May include medications for the following:
(1) Pain (ibuprofen, acetaminophen, etc)
(2) Motion sickness (Dramamine)

(3) Antacids
(4) Antihistamines

iii) Guidelines for administration:
(1) Written order by physician that includes name of drug, route of administration, indication, dose and time of initial and repeat dosing
(2) Drug must be supplied by the sending facility
(3) Drug must have been used previously by patient without adverse reactions

iv) Administration must be documented as with all other medications

v) Remember that even OTC drugs can result in adverse or allergic reactions so watch for any such reactions following administration

t) Other Prescription Medications
i) During longer transports you may need to administer one or more of the patient's regular prescription drugs
ii) The drug must be included in one of the classifications that are part of the PIFT module

11) Device Module

a) Equipment
i) Your trusted friend and tool or
ii) The Bain of Your Existence!!!

b) What to remember about devices in the PIFT setting
i) An ounce of prior planning at the bedside can prevent untold misery on the trip
ii) It is your responsibility as the PIFT paramedic to be thoroughly familiar with the devices used at your service
iii) At least annual competency-based skills checks on the new devices included in the 2006 PIFT course are strongly recommended by Maine EMS

c) Infusion Pumps
i) Broad category that can include IV pumps, feeding pumps, and pain pumps
ii) Infusion Pumps- Why Use Them?
(1) Accurate delivery of critical care medications often requires precise dosing over time
(2) While the paramedic is able to calculate drip rates using a micro drop set (60 gtt/ml), this is often inaccurate in the prehospital setting
(3) The use of electronic IV infusion pumps builds in a safety factor and allows for precise calculation of drug dosages over time
iii) Several different types of infusion pumps exist
(1) Syringe pumps
(2) Piston Pumps
(3) Peristaltic Pumps
(4) Diaphragmatic pumps
iv) Goal of PIFT is a general awareness of pump types and common problems
v) Individual service training on the pumps you will use is expected to be conducted at the service level

vi) Describe the basic mechanical principles of infusion pumps
    (1) Piston Pumps
        (a) Work when a piston moves back, allowing fluid into a chamber through a one way valve. When the piston moves forward, fluid is pushed out of the chamber and into the IV line.
    (2) Peristaltic pumps
        (a) Have a rotating head that pushes fluid along in a tube. Because the turning is continuous, fluid can't go backwards. The rate of administration is controlled by the speed of rotation.
    (3) Diaphragm Pumps
        (a) Have a thin spring loaded diagram that moves up and down. The pressure changes cause fluid to rush into the negative space created by the diaphragm (just like the thoracic cavity)
    (4) Syringe Pumps
        (a) Have a turning shaft that causes the syringe cylinder to move in as the shaft is turning
vii) Demonstrate infusion pump operation to include:
    (1) Tubing set up
        (a) Prime the tubing with the solution following the manufacturer's recommendations. Be sure all air is removed.
        (b) Place the tubing, cartridge, or syringe in the chamber.
    (2) On and off controls
    (3) Rate adjustment of a common (typical) infusion pump.
        (a) Set the rate, volumes to be infused, remove IV line clamps, and start the pump assure that the pump is infusing, then connect to your patient.
viii) Diagnosis and correct common infusion pump problems to include:
    (1) Blockages
    (2) Power failure.
ix) Basic Things you should know how to do with your pumps
    (1) Set each of the following
    (2) Volume to be infused
    (3) Rate in ml/hr
    (4) Silence and clear any alarms
    (5) Get readings of volumes infused in transit
x) General Pump Principles
    (1) Power functions
    (2) Lock functions
    (3) Alarm silence/reset
    (4) Programming
    (5) Run time
    (6) Low Battery Warning
xi) Power for On-Board Devices
    (1) Know what you have on your vehicle
    (2) Some inverters best left off until needed for AC conversion so they don't burn up

(3) How many plugs do you need vs. the number of "live" plugs in truck
(4) Do you need to carry a power strip?

xii) Lock Functions
(1) IV Pumps may have lock to stop patient or family from changing settings- Ask staff about this if you are not familiar with pump
(2) PCA/pain pumps have lock to prevent access to the narcotics- do you need a key or a code?

xiii) Alarm Silence/Reset
(1) (If using slides) Isn't this annoying ????? (***Instructor should click on the red box to stop the alarm!!)***
(2) The first thing to know is where silence is!!
(3) The second is to remember that it alarmed for some reason so find out why!!

xiv) Programming
(1) Very Pump Specific
(2) Pumps now becoming very complex
(3) JCAHO "smart pumps"
(a) Still need to know what's being infused and check the math, rates, etc.

xv) 2 Pump user levels
(1) "I can get by!"
(2) "Super-user"

xvi) Pumps- The Graduate Course
(1) This varies by pump
(2) FYI only
(3) Tailor to pump students will use the most
(4) Dose Rate Calculators
(5) Medication Libraries
(6) Concurrent infusions
(7) Micro and macro modes
(8) Callback features
(9) Secondary infusions/piggybacks
(10) Infusion pressure adjustments
(11) Other

xvii) Pump Power
(1) The internal battery in infusion pumps is just like our EMS gear
(a) Expect it to die at the least opportune time
(2) Ask how long they typically last and plan on half that time on battery power
(3) Any time you can, plug it in
(4) Know how to verify it's charging
(5) Is there a low battery warning or does it just die?

xviii) Pump Tubing
(1) Know what the pumps take and get extra tubing in case something happens en route
(2) Know how to prime tubing so you don't get air bubbles
(3) Is tubing from your pump compatible with sending facilities stuff?

xix) Develop PIFT Tool Kit-
- (1) Common items you don't keep on a 911 truck that might be needed on PIFT transfers
- (2) IV stuff
  - (a) Clave connectors
  - (b) Dead end caps
  - (c) Alcohol wipes
  - (d) PRN adapters
  - (e) Three-way stopcocks
  - (f) 18 Gauge IM needles
  - (g) Sharpie type marker
  - (h) Tape
  - (i) Carabineer to hang multiple fluids
  - (j) Extra tubing that fits your pumps
  - (k) Buretrol set or micro drip sets

xx) Hints
- (1) Double check that all lines are labeled and secure
- (2) Understand what is plumbed to what
- *(3) Will increasing a rate cause something bad to happen down the line?*
- *(4) Are the medications compatible?*
- (5) Always have an open line for code meds
- (6) Make sure pumps are set right
- (7) If it starts beeping when you push start, there's a clamp closed somewhere

xxi) Common Audible Alarms
- (1) A "down pressure" sensor will detect when the patient's vein is blocked, or the line to the patient is kinked.
  - *(a) Small lumen central lines/PICs often need to have pressure settings in pump reset*
  - *(b) Same if an in-line filter is being used (Dilantin, Mannitol, etc.)*
- (2) An "air-in-line" detector. A typical detector will use an ultrasonic transmitter and receiver to detect when air is introduced to the closed system. Some pumps actually measure the volume, and may even have configurable volumes, from 0.1 to 2 ml of air. None of these amounts can cause harm, but sometimes the air can interfere with the infusion of a low-dose medicine.
- (3) An "up pressure" sensor can detect when the bag or syringe is empty, or even if the bag or syringe is being squeezed.

xxii) Pump Troubleshooting
- (1) All makes have no single point of failure. That is, no single cause of failure should allow the pump to silently fail. At the minimum, it should stop functioning or make an audible alert. This is a minimum requirement on all human-rated infusion pumps of any age. It is not required for veterinary infusion pumps.
- (2) Batteries, so the pump can operate if the power fails or is unplugged.
- (3) Anti-free-flow devices prevent blood from draining from the patient, or volume from freely entering the patient, when the infusion pump is being

set-up.

(4) Many pumps include an internal electronic log of the last several thousand therapy events. These are usually tagged with the time and date from the pump's clock. Usually, erasing the log is a feature protected by a security code, specifically to detect staff abuse of the pump or patient.

(5) Many makes of infusion pump can be configured to display only a small subset of features while they are operating, in order to prevent tampering by patients, untrained staff, and visitors.

xxiii) General Pump Operation

(1) **This is the nuts & bolts that need to get across to students!!**

(2) Prime the tubing with the solution following the manufacturer's recommendations. Be sure all air is removed.

(3) Place the tubing, cartridge, or syringe in the chamber.

(4) Set the rate, volumes to be infused, remove IV line clamps, and start the pump assure that the pump is infusing, then connect to your patient.

(5) Monitor infusion rates and IV sites for complications.

(6) Alarms indicate that the precise rate of fluid administered cannot be assured. The first step with any alarm sound includes assessing the patency and integrity of the system.

xxiv) **(EXERCISE)** Take some time to become familiar with the pump you will be using, before the actual call.

(1) The instructor should walk students in small groups through setting rates using a variety of problems

(2) Duplicate alarm conditions such as line occlusion, air in line, etc for students to troubleshoot

(3) Key is not complete understanding but general principles

d) Urinary Drainage Systems

i) Foley catheters and Continuous Bladder Irrigation (CBI)

ii) Foley Catheters

(1) The indications of a Foley catheter insertion include:

(a) Management of chronic incontinence

(b) Monitor of fluid balance status (i.e. monitor output carefully- 1ml/kg/hr is the minimum expected volume for kids, 30 ml/hr for adults)

(c) Allow for bladder irrigation or drainage post operatively

(d) Resolve obstruction (i.e. prostate)

(2) Indwelling Foley catheters consist of a drainage tube, with an inflatable balloon to prevent inadvertent removal. Balloon are inflated with sterile water only, as saline causes the balloon to deteriorate.

(a) Can check levels of Foley balloon saline and potentially change that level.

(b) Note once Foley has been removed, it is no longer sterile and cannot be replaced.

(3) When caring for a catheter that is already in place, the major tasks include:

(a) Assuring adequate urine output, without obstruction.

(i) Be aware of input and output
(ii) Do you have containers to dump wasted irrigation fluid in?
(b) Assuring the system remains closed to prevent infection.
(c) Keeping the Foley bag below the level of the bladder, to prevent urine from the bag from flowing back into the bladder.
(d) Assessing the bladder to make sure there is no pain or distention.
(e) Preventing accidental dislodgment by assuring that the Foley balloon is inflated, and the bag is appropriately secured.

(4) Normal expectations for Foley care
(a) Pain free
(b) Free flow drainage of clear or amber urine of at least 30 ml/hr

iii) Continuous Bladder Irrigation

(1) Continuous bladder irrigation is utilized to keep the bladder free of clots and to maintain the patency of the urethra in patients with complications of infection or postoperatively.

(2) CBI can be either open or closed. In an open system, the bladder is drained using a 60 ml syringe. In a closed system, the bladder drains directly into a Foley bag.

(3) CBI involves instilling sterile irrigation solution into the bladder, then allowing that fluid to drain out. Failure to recognize that the fluid isn't draining can result in severe bladder injury, as large volumes of irrigation solution are typically instilled.
(a) Typically, triple lumen catheters are used. One port is to fill the balloon so the catheter stays in place, one is used to infuse fluid, and the last is used to drain fluid.

(4) CBI Care Issues
(a) When caring for a patient with CBI, the major tasks include:
(i) Monitoring the color and type of drainage. Postoperatively, clots and small volumes of blood are expected. Bright red blood, or large volumes of drainage may indicate active bleeding.
(ii) Maintaining close input and output balance. All instilled fluid should be measured. Output is also measured. (fluid out minus fluid in = patient losses)
(iii)Maintaining catheter patency, and delivering instilled fluid at the ordered rate.

(5) Normal Expectations for CBI
(a) Cloudy, tea colored, or bloody urine
(b) Free flow of catheter, with occasional clots
(c) Free of bright red, or high volumes of bleeding or drainage
(d) Frequent bladder spasms and cramps, which may be reduced with pre-medication. Increases in spasm may indicate outlet obstruction.

(6) Logistical Issues for Transport
(a) What do I do with the CBI drainage?
(b) Do I have additional irrigation solution?
(c) How do I secure the irrigation solution?
(d) Be sure ambulance has 60cc catheter tip syringe in case of the need to

manually flush.

iv) Issues with Flushing the Catheter
   (1) Requires sterile technique
   (2) Need sterile supplies
      (a) Irrigation tray with cath tip syringe or
      (b) 60 ml cath tip syringe and NS/SW
   (3) Must maintain sterility of system if possible???
      (a) Sets patient up for infection

v) Complications of Foley Catheters/CBI
   (1) The main complications are tissue trauma and infection. Care should be taken when a Foley catheter is in place to protect the catheter from undue movement.
   (2) The most common short term complications are inability to insert catheter, and tissue trauma during the insertion.

Complication	Action	Notes
Catheter draining little or no urine despite adequate fluid intake	Consider level of drainage bag Consider flushing catheter	Bag should always be lower than level of the bladder to prevent black flow of urine
Unexpected removal	Do not reinsert tube.	Retained catheter fragments are usually the result of balloon rupture (catheter disruption, in this case) and can potentiate many complications. The Catheter must be inspected to determine potential of catheter fragments in the bladder.
Infection	None during transport	After 48 hours of catheterization, most catheters are colonized with bacteria, thus leading to possible bacteruria and its complications. Catheters can also cause renal inflammation, nephro-cysto-lithiasis, and pyelonephritis if left in for prolonged periods.
Bleeding into or around the catheter	Control bleeding if external	Monitor for cessation of flow; consider flushing

		catheter
Urethral swelling around the catheter	None during transport	Contact OLMC for consultation with significant swelling
Leakage of large amounts of urine around the catheter	None during transport	Contact OLMC for consultation to consider flushing the catheter

e) Central Lines
   i) The instructor should emphasize that this is a review of central venous devices is to refresh the paramedic on central venous devices that are already accessed
   ii) It is not a substitute for the MEMS Central Venous Access Program
   iii) Paramedics wishing to access central lines in the field must still complete the Central Venous Access Program
   iv) Central Line Facts
      (1) Central venous lines typically are inserted in the internal jugular or subclavian veins. The catheter tip enters directly into these large veins. Central lines are utilized in patients requiring long term IV therapy, in patients who had poor peripheral IV access, or in clients requiring large volumes of fluid. Various types and manufacturers of Central Lines exist.
      (2) Dual lumen, triple lumen, and quad lumen lines are used, allowing for administration of various medications simultaneously, without the risk of in line medication compatibility issues.
      (3) Some central lines are peripherally inserted (PICC lines).
      (4) Note that there is a significant difference between a chest tube or central line that has been in place for 3 days vs one that has been recently placed.
      (5) Complications may not have set in yet in a newly placed central ine
         (a) Monitor for pneumo and be ready for decompression
         (b) See the MEMS Central Venous Access document for additional information regarding central lines.
   v) Care of Central Lines
      (1) When accessing central lines to give medications or connect to a fluid source, it is critical to maintain sterile technique. Nosocomial infections from central lines are one of the major contributors to patient death. Sterile gloves and mask are typically worn when changing dressings or cleaning the site.
      (2) Before departure, determine which lines are being utilized, which medications are going to which line tale. Flush each line before departure following the manufacturer's recommendations. Cover the site with an occlusive dressing and avoid touching the site during transport.
      (3) Assess the insertion site frequently for bleeding, infiltration, or signs of infection. Monitor IV fluid administration closely, as large volumes can be infused over a short period of time. Be sure all ports are secure and all clamps are closed. Loss of a clamp can result in rapid bleeding, due to the large vessels that are cannulated.

(4) Accidental dislodgement can result in high volumes of bleeding. If dislodgement occurs, maintain direct pressure for 5-10 minutes. Because of the anti-coagulants used to maintain line patency, recurrent bleeding

vi) Central Line Flushing
  (1) Need adequate volume to flush lumen (usually 5-10 ml between meds)
  (2) SASH Method
    (a) Saline
    (b) Administer Med
    (c) Saline
    (d) Heparin (if not going to keep it accessed)
    (e) Use push-pause method to flush blood out of catheter by creating turbulent flow in lumen
  (3) Need specific syringes at times
  (4) Never use smaller syringes (less than 5 ml) with PIC lines as pressure can lead to line rupture

vii) Describe the aspects of "normal operation/expectations" for central lines.
  (1) When accessing central lines to give medications or connect to a fluid source, it is critical to maintain sterile technique. Nosocomial infections from central lines are one of the major contributors to patient death. Sterile gloves and mask are typically worn when changing dressings or cleaning the site.
  (2) Before departure, determine which lines are being utilized, which medications are going to which line tale. Flush each line before departure following the manufacturer's recommendations. Cover the site with an occlusive dressing and avoid touching the site during transport.
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viii) Accidental dislodgement can result in high volumes of bleeding. If dislodgement occurs, maintain direct pressure for 5-10 minutes. Because of the anti-coagulants used to maintain line patency, recurrent bleeding may occur.

ix) Complications of Central Lines
  (1) Complications with central lines generally occur at time of insertion and vary by site of insertion. In one study, (Steele R, Irvin CB: Central line mechanical complication rate in emergency medicine patients. Acad Emerg Med 8:204, 2001) complications were defined as pneumothorax, hemothorax, or any issue with the CVC excluding infection or thrombosis that required an inpatient consultation.

Complication	Action	Notes
Unexpected removal	Treat as open wound with occlusive dressing and direct pressure.	Contact OLMC for consultation
Shortness of breath	Observe patient for s/sx of	Monitor for pneumothorax with

	tension pneumothorax	any subclavian or internal jugular vein cannulation

f) Transvenous Pacers
   i) Transvenous pacemakers are inserted into the right ventricle, where the pacemaker lead contacts the endocardium near the ventricular septum. The lead is connected to a small pulse generator.
   ii) Transvenous pacemakers deliver electrical currents that stimulate cardiac depolarization. They are used to treat symptomatic bradycardia, heart blocks, or sick sinus syndromes. They may also be sued to override symptomatic tachycardias.
   iii) Transvenous pacemakers can be permanent or temporary, depending on the clinical situation.
      (1) Newer pacemakers typically are dual chambers, where both the atria and the ventricles are stimulated.
   iv) Pacemakers in General
      (1) Pacemakers are set for rate and mode.
         (a) Demand mode indicates the pacemaker will only generate an impulse if preset parameters are met (i.e. HR falls below 60).
         (b) Asynchronous pacers pace the heart at a set rate regardless of the patient's own electrical or physical activity.
      (2) The electrical output is how much activity is needed to generate an impulse that results in depolarization.
      (3) Pacer rhythms are fairly distinctive and therefore easy to identify on a rhythm.
         (a) Nursing should be consulted to identify what capture looks like in this specific patient
   v) Model 5388 Dual Chamber Temporary Pacemaker (example only)
      (1) Pace/Sense LEDs
      (2) Lock/Unlock Key
      (3) Lock Indicators
      (4) Rate Dial
      (5) Atrial Output Dial
      (6) Ventricular Output Dial
      (7) Menu Parameter Dial
      (8) Parameter Selection Key
      (9) Menu Selection Key
      (10) Pause Key
      (11) Power on Key
      (12) Power off Key
      (13) Emergency/Asynchronous
      (14) Low Battery Indicator
   vi) Cable to Device Connections
      (1) Standard Connections
      (2) Emergency Connections
   vii) Low Battery Indicator

viii) Normal Expectations for patients with Transvenous Pacemakers
   (1) Patients with newly inserted pacemakers typically will complain of localized pain, as well as pain associated with each battery generate impulse. Analgesic medication and anti-anxiety medications may be appropriate.
   (2) Patients should be monitored closely for the complications outlined below. Failure to recognize transvenous pacemaker malfunction quickly could result in patient demise.

ix) Things to Know If Transporting a Transvenous Pacer
   (1) When and why was it inserted?
   (2) What was the underlying rhythm?
   (3) Is the patient hemodynamically dependent on the pacer? (Stability??)
   (4) What are the settings?
   (5) mA (output)- energy needed get electrical & mechanical capture of myocardium
   (6) Rate- number of paced impulses per minute
   (7) Sensitivity- threshold measure to detect patient's own electrical activity
   (8) Mode- Typically DDD, VVI, VVO

x) Pacer Modes
   (1) First letter standards for chambered sensed (D=dual, A=atrial, V=Ventricle)
   (2) 2nd letter is chamber paced (D, A, V, O)
   (3) 3rd letter is what pacer does in response to sensing a patient's own "native" beat (impulse)
      (a) Triggered
      (b) Inhibited
      (c) Dual (Triggered or Inhibited)
      (d) None (O)

   (4) Most emergency pacing concerned with pacing the ventricles and minimizing risk of R on T phenomenon
      (a) DDD, VVI, VVO usually safe modes
      (b) Demand pacing typically see pacer rate 10 beats below patient's native rate so it will pace as need but is sensing all the time
      (c) Fixed, asynchronous pacing should be avoided unless patient is in asystole as the pacer will fire without regard for the patient's native electrical activity
   (5) Pacer Emergencies
      (a) Failure to Capture- See spike with no QRS after; reposition first, then increase mA as ordered;
      (b) Failure to Sense- May see many or no spikes
         (i) Oversensing- Thinks patient's rate faster than it is so pacer does not fire. Correct by decreasing sensitivity (turn towards zero).
         (ii) Undersensing- pacer thinks rate too slow so fires too much and competes with native beats (risk of R on T). Correct by increasing sensitivity.

(c) *Lead wire fracture- Common cause of problems with sensing and capture- try to correct by repositioning patient on left side or placing arm above head*

xi) Tips for a Safe Pacer Transport

(1) Tape all wire connections
(2) Make sure there is a fresh battery in unit and you have a spare
(3) If you don't have to change pacer boxes, don't
(4) If you do, set your box up to mimic their settings
(5) Connect lead extension wire to box
(6) Rapidly disconnect patient leads from their box and connect to your box
(7) Assess for capture
(8) Conduct trial on new pacer

xii) Never change a pacer box out if the patient

(1) Has an underlying rhythm of asystole
(2) Is hypothermic
(3) Is acidotic
(4) Capture was hard to achieve

xiii) Epicardial pacing wires (s/p CABG) are not a PIFT approved device- you must take a RN

xiv) Always place your transcutaneous pacing pads and leads as a backup before transport

xv) Describe the aspects of "normal operation/expectations" for transvenous pacer operation.

(1) Patients with newly inserted pacemakers typically will complain of localized pain, as well as pain associated with each battery generated impulse.
(2) Analgesic medication and anti-anxiety medications may be appropriate.
(3) Patients should be monitored closely for the complications outlined below. Failure to recognize transvenous pacemaker malfunction quickly could result in patient demise

xvi) Recognize and troubleshoot a common problem such as failure to capture, equipment failure, electrode wire breakage.

xvii) Complications of emergency transvenous cardiac pacing are numerous and are similar to those related to central venous catheterization, right heart catheterization (dysrhythmias with PVC's), and transvenous pacing.

Complication	Action	Notes
Failure to capture	Adjust current to the minimum current necessary to obtain capture	
Undersensing	Increase sensitivity number on generator	Note- this is most dangerous from risk of R-on-T
Oversensing	Decrease sensitivity number on generator	Leads to slower rate than pacer is set at since it is sensing artifact inappropriately

Equipment failure	New battery prior to transport	Additional backup battery for transport
Displacement, fracture of the catheter, loose leads	Contact OLMC for consultation	Suspect with intermittent or complete loss of capture after other causes have been considered

g) Chest Drainage
  i) What is it?
    (1) ***A tube inserted into the pleural space that drains air, blood, or other fluid, allowing apposition of the visceral and parietal pleura, thus sealing any visceral pleural holes and enabling full expansion of the lungs.***
  ii) Indications
    (1) Tension pneumothorax
    (2) Spontaneous or iatrogenic pneumothorax (particularly if the pneumothorax is large, progressive, or if the patient is symptomatic or has underlying lung disease)
    (3) Pneumothorax of any size in a patient receiving mechanical ventilation
    (4) Penetrating chest trauma
    (5) Hemothorax
    (6) Complicated parapneumonic effusion or empyema
    (7) Chylothorax
    (8) Pleurodesis for symptomatic pleural effusions, which are usually malignant
    (9) Bronchopleural fistula
    (10) In a trauma situation, if >1500 cc fluid obtained immediately, or >200 cc/hr for 4 hrs, then OR for evacuation and necessary repairs.
  iii) Contraindications
    (1) Absolute: None.
    (2) Anticoagulation or bleeding diatheses are relative contraindications to elective tube thoracostomy for pleurodesis.
  iv) Contrast CT scan should be obtained and used to guide chest tube placement in patients who have undergone lung transplantation, or in patients with multiple loculations from infection or previous pleurodesis
  v) Potential Complications
    (1) Chest tube malposition is by far the most common complication (CT to distinguish b/w intrafissural, intraparenchymal, and sub-Q placement).
    (2) Other common problems are clotting, kinking, or dislodgement of the chest tube.
    (3) Other possibilities, albeit rare, include empyema, diaphragmatic perforation, perforation of the right ventricle, right atrium, and abdominal organs (spleen, liver, stomach, colon).
    (4) Cardiogenic shock from chest tube compression of the right ventricle, mediastinal perforation with contralateral hemothorax and pneumothorax, bleeding from intercostal artery injury, and infection at the chest tube site

have all been reported.

(5) Re-expansion pulmonary edema – potentially life-threatening –usually occurs following rapid re-expansion of a collapsed lung, evacuation of large volumes of pleural fluid (>1.0 to 1.5 liters) or after the removal of an obstructing tumor. (Tx: supportive w/ O2 +/- mechanical ventilation prn).

vi) The chest tube connects to a Pleuravac® (which is simply a fancy name for a three-chambered box).

vii) How a Pleuravac® works…

(1) Choosing the Tube

(a) Type: Silastic chest tubes should be used preferentially over rubber tubes, as they contain more drainage holes, produce less pleural inflammation, and they contain a radio-opaque strip with a gap that serves to mark the most proximal drainage hole.

(b) Size: Sizes range from 10 to 40 Fr, and the size required depends on the indication for the chest tube. In general, tube sizes can roughly follow the algorithm:

(i) pneumothorax<pleural effusion<empyema<hemothorax

(c) Length: There are two standard lengths, and either is appropriate for use in the adult, while the shorter is more appropriate in pediatric patients.

viii) Maintenance Information

(1) Immediately after insertion and q 4 hours while chest tube is in place assess:

(2) Breath sounds, heart rate, blood pressure, temperature, respiratory rate, and O2 saturation

(3) Tidaling

(4) Air leaks

(5) Appropriate suction

(6) Amount, color and consistency of drainage (it may be helpful to mark the volume of drainage, as well as the date, time, and one's initials directly on the Pleuravac®)

(7) Dressing for occlusiveness and drainage from insertion site

(8) Chest wall at insertion site for subcutaneous emphysema ("Rice Krispies")

(9) Always position the Pleuravac® in an upright position, below the level of the heart.

(10) Always keep emergency equipment in patient's room (NS, 4 x 4, Vaseline gauze, tape & non-toothed padded clamps).

(11) Frequent deep breathing, coughing, and repositioning of the patient is necessary to help re-expand the lung, assist with drainage, and prevent normal fluids from collecting in the lungs.

(12) Dressing changes as appropriate, or immediately if they become soiled, saturated, or loose.

ix) Never clamp a chest tube, except *momentarily*, when:

(1) Changing the chest tube system

(2) Running the system

(3) Assessing patient's tolerance of chest tube removal

x) "Tidaling"
   (1) With the Pleuravac® off suction, the fluid within the water seal chamber should move with respiration.
   (2) If the pleura seals off the chest tube, then the tube cannot suction appropriately, and tidaling will not be observed.

xi) "Running the System"
   (1) Bubbles passing through water seal fluid while on suction = large air leak. If suction is off, bubbles observed when patient coughs = small air leak.
   (2) Running the system determines whether the air leak (i.e. bubbles seen in the water seal chamber) is from the patient or from the tubing.
   (3) Momentarily occlude the chest tube. If the air leak is still present (i.e. bubbles are still seen), then the leak is from the tubing or tubing connections, and not from the patient.

xii) Intervention Required
   (1) If a new air leak develops that is attributable to the patient (example- sudden increase in leak after movement or coughing).

xiii) Migration of the tube:
   (1) If it pulls out so slightly that no holes are yet visible, secure tube in place and perform STAT CXR to confirm location of tube – opacity must be in the pleural space.
   (2) If a hole is visible in the tube, then immediate removal of tube with covering of incision site, until proper re-insertion can take place.
   (3) Under no circumstance should the tube be re-advanced, for this could introduce infection.

xiv) If the tube becomes clogged or if the drainage drops expeditiously, then suction with a sterile suction catheter.
   (1) The Usual Course
      (a) Suction until the original indication resolves (i.e. the pneumothorax and air leak are gone).
      (b) Place patient on water seal for 24 hours (i.e. turn off suction).
      (c) Remove the chest tube if original indication doesn't return after the 24 hrs (i.e. no pneumothorax or air leak are observed).

xv) Chest Tubes
   (1) Chest tubes are used to drain fluid and air from the pleural space or mediastinum. Indications include pneumothorax, empyema, hemothorax, or hemopneumothorax
   (2) Normal negative pressure in the pleural space is maintained, allowing for improved ventilation and oxygenation.
   (3) Water seal systems are used to maintain negative pressures. Typically, chest drainage units are connected to continuous suction to allow for drainage from the thoracic cavity.
   (4) Chest tubes are sutured in place, however care should be taken to prevent accidental removal.
   (5) Equipment needed during transport includes a functioning suction unit, tape, occlusive dressing, and Pleuravac or Heimlich valve. Pleuravac should be secured to prevent spilling of fluids and inadvertent introduction

of air into the pleural cavity. Continuous or intermittent negative pressure should be maintained, as ordered.

(6) Heimlich valves are one way valves that prevent air from entering the pleural space through the chest tube, but permit air to drain out. They may be preferred for simple pneumothrorax during transport because they don't require water filled containers.

(7) It is important to verify tube placement before departure, and after each transfer. Record where the tube is taped in cm, and assure that the tube is properly secured. Retape all connections as needed.

(8) A normally functioning chest tube with Pleuravac should have air bubbling in the water seal chamber that fluctuates during inspiration and expiration (tidaling).

(9) Monitor drainage carefully. Bright red drainage indicates active bleeding.

(10) Avoid "milking" or clamping the tube.

(11) Assess frequently for placement, crepitus at the insertion site, leakage, and monitor connections carefully.

(12) Assure that the water seal chambers are filled appropriately

xvi) Troubleshooting Chest Drainage Systems.

(1) Recognize and troubleshoot common problems such as disconnection or blockage and leakage.

(2) The most common complications of chest tube insertions include infections, laceration of an intercostal vessel, laceration of the lung, and intra-abdominal or solid organ placement of the chest tube.

Complication	Actions	Notes
Recurrent pneumothoraces with chest tube failure	Observe patient for s/sx of tension pneumothorax	
Mechanical failure to drain air or fluid	Ensure that drainage collection is secure and below the level of the tube insertion	
Tube obstruction: Blood clots, kinks	Place and tape tubing to prevent kinks. Obstruction for by any other means, contact OLMC for consultation	
Unexpected removal	Treat as open chest wound. Immediately apply sterile occlusive dressing: Do not reinsert tube.	Remember to ventilate occlusive dressing to relieve tension pneumothorax. May need to divert to acute care facility to stabilize patient and replace chest tube.
Increased bleeding from chest tube	Do not clamp chest tube	Contact OLMC for consultation
Chest tube disconnects from drain unit	Keep bottle of sterile saline or	

	water with patient, if chest tube disconnects from drain unit, submerge end in the water This is done instead of clamping to prevent another pneumothorax. Air is still allowed to escape.	
Infection of the entry site or pleural fluid	None	Prophylactic antibiotics are controversial
Bleeding at site	Control bleeding with direct pressure	

h) OG/NG Tube
   i) Gastric Drainage Principles
      (1) Nasogastric and orogastric tubes are inserted to empty abdominal contents, to promote release of air, to prevent gastric distention, to provide a route to administer medications and feedings, and in cases of GI bleed or abdominal surgery, to drain blood or perform gastric lavage.
   ii) The nasogastric tube is measured from the edge of the nose, to the angle of the jaw, and down to the xiphoid process. The orogastric tube is measured from the corner of the mouth instead of the nose. They may connected to intermittent or continuous suctioning, or be open to the air.
   iii) The preferred way to determine correct tube placement is to measure the pH of the aspirate using pH strips. Gastric content pH is less then four, intestinal contents are greater than four, and respiratory secretions typically greater than six.
   iv) Levin tubes are single lumen, with holes near the tip of the tube. Salem Sump tubes have two lumens; one is for gastric contents removal, the other is for air venting.
      (1) A 60 cc syringe with a catheter tip is used to verify position and to aspirate contents
      (2) An anti-reflux valve is often used when the tube is not connected to the suction unit.
      (3) Crew should carry an extra Lopez valve as often they are left behind in the ED.

i) Recognize and troubleshoot common problems such as extubation or blockage.
   (1) The main complications of NG tube insertion include aspiration and tissue trauma. Additional complications are at time of placement. Placement of the catheter can induce gagging or vomiting, therefore suction should always be ready to use in the case of this happening.

Complication	Action	Notes
Unexpected removal *note severe vomiting could dislodge tube from stomach, but not from nose.	Do not reinsert tube.	Anticipate need for suction Anticipate vomiting
Sinusitis	None during transport	
Aspiration	Place head of be at 30 degrees	
Nasal Hemorrhage	Place head of bed at 30 degrees	
Passage of the tube into the trachea	Confirm by placing external end of tube into bottle of saline and observing bubbles	Contact OLMC for option of tube removal
Perforation of the esophagus	None during transport	
Gastrointestinal bleeding	None during transport	

j) Other Devices
- i) Patient Centric issue vs. Special Devices
  - *(1) MDPB recognizes that some devices that patient may use at home and require minimal intervention from the paramedic may be appropriate for transfer under PIFT protocols*
- *ii) This is not intended to expand the approved PIFT device list at this time*

k) Wound Drainage Devices
- i) Constant, negative pressure Wound Vacs very common now
- ii) MDPB recognizes that these usually would require no intervention from the paramedic
  - (1) OK for transport
  - (2) Get education from the sending facility about the device
- iii) Standard gravity or suction drains
  - (1) T tubes
  - (2) Penrose Drains
  - (3) Hemovacs
  - (4) Jackson-Pratt

l) Feeding Pump
- i) OK for transport as nutritional agent
- ii) Review operation with hospital staff

m) Other Devices
- *i) MDPB working on a special device protocol*
- ii) If it's not covered here, it's not a PIFT transfer so will need to take staff

n) Special Cases
- i) IV pumps and non-medicated IVF

(1) EMT-B with IV maintenance or above can transport
ii) PCA pumps (peripheral or central line)
(1) EMT-B with IV maintenance or above can transport if PCA only
iii) G tubes, J tubes, PEG tubes
(1) Any level
iv) Epidural or intrathecal pumps
(1) See below
o) PCA Pumps
i) Patient controlled is key
ii) Narcotics mainly but can include steroids and other meds
iii) Ok under all circumstances for EMT-B with IV maintenance or above if just getting PCA (pt triggers dose of medication)
(1) See appendix for MEMS policy
iv) If it has continuous infusion, that is a PIFT transfer
v) Route can be via central or peripheral IV access
p) Non-PIFT Devices
i) Epidural or intrathecal infusion pumps for acute patients not OK
(1) Be aware that implanted epidural and intrathecal pain pumps exist for chronic pain patients
(2) These are ok for all levels under home devices stance from MDPB (new in 2007)

12) How Not to Get Caught In a Quandary
a) Assess the patient
b) If they have a catheter taped to their back connected to a pump, it's probably an epidural or intrathecal device (pain meds, steroids, chemo, etc.) and you can't transport it under PIFT

PIFT Instructor Evaluation Packet

Evaluation Overview

At the conclusion of the PIFT Course, students will be evaluated using four scenarios. Although the PIFT course should not necessarily be viewed in a pass/fail sense, these scenarios will be used to assess the learner's understanding of the basic PIFT principles of resource use and informed clinical judgment.

Remediation

In the event a student cannot satisfactorily demonstrate competency in meeting the given objectives, instructors should take the following steps:

1. Oral counseling by the instructor.

Are there reasonable steps the instructor can take in the course setting to remediate on site? If so, the instructor should take those steps. Note: if the student cannot be successfully remediated on site, that student has not successfully completed the PIFT course.

2. Unsatisfactory completion.

If the student cannot be successfully remediated in the course setting, this situation should be identified to the Maine EMS Education Coordinator, who will work together with the provider's service medical director to develop an appropriate remediation/re-evaluation plan. Specific remediation plans will be developed on a case-by-case basis. *Note: any unsatisfactory completion should be identified by the instructor using the counseling form found in the PIFT course application packet. A copy of this form should be provided to the student indicating the reasons for unsatisfactory completion of the program.*

Evaluation Format

- The scenarios are designed to be completed in an oral question and answer session.
  - If group sessions are utilized, one student should be designated as the leader.
- The student should be allowed to reference any necessary PIFT reference to complete the objectives.

Scenarios

Scenario One (PIFT Overview/Decision Making)

Scenario Objectives:

- *Given PIFT resources, the student will be able to identify dopamine as a "non-PIFT" medication.*
- *Given PIFT resources, the student will be able to list two of the three physiologic/patient history issues making this patient unstable by the outlined MDPB's stability definition.*
- *Given PIFT resources, the student will be able to identify this patient as ineligible for PIFT transport.*

Scenario

You are called to the local ICU to transport a 66 year old woman with a history of "infection". You are met by staff members who give you the following report: *"Patient was admitted to the ICU approximately 3 hours ago from the ED. Patient walked into the ED complaining of not feeling well and then crashed. The ED had significant difficulty keeping her pressure up. Crystalloid volume replacement was initiated and approximately 6 liters of fluid has been administered. They note they were forced to begin a dopamine drip roughly 30 minutes ago and since then, her pressure has leveled off."*

Current vitals:

Mental status: Confused, lethargic
Pulse:126
R/R: 24 (unintubated)
B/P: 96/62

Diagnosis: Urosepsis

Instructor Notes:

- *A physical exam or further inquiry by the provider will reveal minimal output after fluid resuscitation and rales in the bases of the lungs.*

- *The student should correctly identify dopamine as a non-PIFT medication. If this does not occur, then the instructor should ask the question*
- *This patient is unstable*
  - *Recent history of unstable vitals signs*
    - *Crash*
  - *No pattern of stability*
    - *Only very recent regulation of hypotension*
  - *Potential immediate future instability*
    - *Huge fluid input/little output*
    - *Rales indicating pulmonary edema)*

Scenario Two (Resource Use)

Scenario Objectives:

- *Given PIFT resources, the student will be able to identify Flecainide as a Anti-Dysrhythmic classification of medication.*
- *Given PIFT resources, the student will be able to identify Flecainide as a medication utilized for tachycardic dysrhythmias.*
- *Given PIFT resources, the student will be able to identify Flecainide as a "PIFT" medication.*
- *Given PIFT resources, the student will be able to identify at least two questions concerning patient stability with regard to the use of Flecainide.*

Scenario:

You are dispatched to a small emergency department "at shift change" to transport a 40 year old male. The charge nurse notes that "this is not her patient", but evidently the patient had been admitted an hour ago complaining of vertigo and shortness of breath. She tells you that the patient has been treated with oral Metropolol and Flecainide and has been doing better since. She notes that the patient is "stable and needs to be transported immediately".

Current vitals:
Mental status: AOX3
Pulse:134
R/R: 20
B/P: 94/64

Diagnosis: The nurse states she is not sure what the admitting diagnosis was and "she'll have to get back to you on that one."

Instructor Notes:

- *This scenario is designed to challenge the learner to utilize PIFT resources in a situation where detailed information is scarce. MAKE THEM EARN INFORMATION!*
- *The student should correctly identify Flecainide as a antidysrhythmic used to combat tachydysrhythmias and as such should be very concerned with gathering further information as to the stability of this patient.*
- *This patient is potentially unstable. At a minimum, the student should be asking questions to determine stability before transporting such as:*
  - *Short term care with oral antidysrhythmics*
    - *What is his current ECG rhythm?*
  - *Has this patient truly been stabilized?*
    - *How have his vital signs trended?*
    - *Is 94/64 at 134 beats per minute stable?*
    - *What is the history of the present illness*

- The point of this scenario is not necessarily determining patient stability, but rather utilizing PIFT resources to identify the issue.

Scenario Three (Pharmacology)

Scenario Objectives:

- *Given PIFT resources, the student will be able to identify Amaryl as an Anti-Diabetic classification of medication.*
- *Given PIFT resources, the student will be able to identify hypoglycemia as a potential side effect/unintended consequence of the administration of Amaryl.*
- *Given PIFT resources, the student will be able to identify hypoglycemia as the proximal cause of patient deterioration in this scenario*
- *Given PIFT resources, the student will initiate MEMS hypoglycemia protocol to care for this patient.*

Scenario
Your crew is conducting a long distance transport from a rehabilitation center to home for a six-week post hip replacement patient. Prior to departure you conducted a stability assessment and deemed this patient stable. Because of the length of the trip, you have received instructions to administer this patient's daily oral medications which include: Amaryl, and Lipitor. You administer them as ordered shortly into the trip. Approximately thirty minutes later the patient has an abrupt change in mental status. She becomes confused, lethargic and quickly deteriorates.

Current Vital Signs:
Mental status: Confused lethargic
Pulse: 120 (sinus tach)
R/R: 28
B/P: 132/80

Instructor Notes:
- *This scenario is designed to assess the learner's ability to deal with patient deterioration.*
- *The learner should utilize PIFT resources (texts, electronic resources, on line medical control, etc.) to determine Amaryl has caused hypoglycemia and take MEMS protocol action to counter the effects.*
- The key to this scenario is that the learner MUST take some action. Continuing the transfer without taking steps to identify and treat the proximal cause is not acceptable.

Scenario Four (Devices)

Scenario Objectives:

- *Given PIFT resources, the student will be able to identify two common IV pump alarm conditions*
- *Given PIFT resources, the student will be able to state and demonstrate the correct initial action to take for an IV pump alarm*
- *Given PIFT resources, the student will be able to troubleshoot and return the IV pump to a functioning state in less than 3 minutes*
- *Given PIFT resources, the student will be able to verbalize and/or demonstrate assessment of a patient receiving continuous bladder irrigation who complains of increasing bladder spasms*
- *Given PIFT resources, the student will be able to list two indications that a temporary transvenous pacemaker was misfiring and verbalize a troubleshooting technique for each*

Scenario:

You are part of a PIFT paramedic/Intermediate team called to transport a 78 year old male patient from an outlying community hospital to EMMC for a pacemaker insertion. This patient presented to the E.D. via EMS last night after a history of several syncopal events at home that were witnessed by his wife. He was admitted for observation to the ICU. During the night, he was noted to have a persistent episode of a slow, wide complex rhythm in the 30's accompanied with chest pain, hypotension, and dyspnea. Atropine was administered by the ICU nursing staff with no change in the patient's condition and the patient was placed on a Zoll transcutaneous pacemaker. The pacemaker captured easily and the patient became relatively asymptomatic a short time later. Eventually, the attending was called to place a transvenous pacemaker for transport. The patient has been "stable" now for about 6 hours on the transvenous pacemaker. The cardiologist is "waiting" for you in Bangor and the nurse states that the patient is "fine". Additionally, the patient is receiving continuous bladder irrigation since a catheter had to be placed for urinary retention on admission. The patient has a past medical history of hypertension for which he takes HCTZ, atrial fibrillation for which he is taking Pacerone, and prostate cancer, which is currently being treated with radiation after a resection (TURP) 7 weeks ago at EMMC.

Current Vitals:

Mental Status: A+O x3
Pulse: 62 and irregular
RR: 22
B/P: 108/58
ECG: Intermittent ventricular paced rhythm with some apparent native beats noted

Diagnosis: Syncope, bradycardia

Instructor Notes:

- This scenario builds on all of the others while calling on the student to remember some generalities in dealing with PIFT devices.
- Begin this scenario by reading the history and then have the students question you as if you were the staff member. The group leader should assign members to research the medications the patient is on, care of the devices in place, and strategies for dealing with different problems that may arise.
- Question the students as to if this patient is stable or unstable? They should be able to defend their answers with assessment and history data. Expect some debate on this.
- Three distinct issues come to light in assessing stability with this patient: the IV fluid infusing and device (infusion pump), the presence of the continuous bladder irrigation and troubleshooting this therapy, and the past history of a symptomatic bradycardia that necessitated pacing for management. Students should be encouraged to discuss each one and how it would affect their decision to transport or not under PIFT guidelines.
- This is a "stable, moderate risk patient" based on vitals signs, mental status, absence of chest pain, and inherent native beats noted on the ECG. The patient is not 100% dependent on the pacemaker but has demonstrated successful capture when needed. Only the single episode of persistent bradycardia into the 30's was noted that lasted brief moments until transcutaneous pacing was initiated. The rhythm upon transvenous pacer placement was noted to be a junctional rhythm at rate 48 without ectopy.
- Specific Problems to have students troubleshoot are listed below.

Devices:

- IV pump with $D_5W0.45\%NaCl$ at 75 ml/hr via 20 G Insyte, R forearm
- Transvenous pacemaker with settings as follows:
  - Mode: VVI
  - Rate: 60 BPM
  - Output: 10 mA
  - Sensitivity: 3 mA
- Continuous Bladder Irrigation via 18 Fr three-way Foley with normal saline irrigation solution- orders reads "irrigate to clear"

Problems and Troubleshooting:

- Occlusion Alarm on Pump
  - 1. Silence
  - 2. Check IV site
  - 3. Check all clamps in IV line
  - 4. Attempt to flush line
- Air in line Alarm on Pump
  - 1. Silence

- 2. Stop infusion
- 3. Close clamp to patient and disconnect
- 4. Remove air (syringe, running through, etc)
- 5. Return tubing to pump
- 6. Open clamps
- 7. Restart pump
- 8. Check for other problems

- Patient with Continuous Bladder Irrigation complains of increasing bladder spasms
  - 1. Check to see if urine is draining into bag
  - 2. Make sure drain tube is not kinked
  - 3. Assess abdomen for suprapubic distension (distended bladder)
  - 4. Consult OLMC about irrigating catheter
  - 5. Increase flow rate on irrigation solution
- About half-way through the transport, the patient begins to feel faint. What should the PIFT paramedic do?
  - Assess mental status, VS, ECG
  - ECG rhythm now shows pacer spikes with no accompanying QRS complex. What is this called?
    - Failure to capture
    - Treatment:
      - Reposition patient with Right side down
      - Have patient move arm above head
      - Check all connections from pacing leads to pacemaker generator
      - If patient becomes severely symptomatic, stop transvenous pacer and start TCP
  - If the ECG showed no or very few pacer spikes and patient is symptomatic, what might be wrong?
    - Oversensing
    - Treatment- adjust sensitivity downward (counterclockwise or towards zero so the pacer is more sensitive) if OLMC orders it or switch to TCP

Reinforce with students that they need to review the devices thoroughly when they are not familiar with them so they can troubleshoot as needed.

MEMS PIFT Course Application Packet

Instructions:

A MEMS credentialed PIFT I/C must complete the following steps in order to conduct a PIFT Program.

- A PIFT Course Continuing Education Request Form must be filled out and returned to Maine EMS no less than 7 business days prior to the start of the course. MEMS will then verify that all the prerequisites are in place and if the course is approved, will forward to the instructor the entire course administration packet before the start of the program. At this time, Maine EMS plans to make the course materials accessible for download on the MEMS website for instructors to reproduce on their own. If the course is not approved, then MEMS will notify the instructor in writing the reasons for disapproval.

- Once approved, the instructor/coordinator should then download course materials (instructor manual, pre-course packet, and student manual) from the Maine EMS website which can be found at this address: (http://www.state.me.us/dps/ems/index.html). Note: students will need to have the pre-course materials to review and complete at least 3 days prior to the start of the PIFT course.

    - The precourse document will include:
        - Introduction to PIFT
        - Basic Pharmacology Review Excercises
        - Pharmacology Math Review

- The instructor coordinator(s) then conducts the program utilizing the lesson plan, student manual, student pre-course packet, Power Point slides, and devices as specified in the lesson plan.

- At the conclusion of the program, the instructor completes and signs the course roster.

- This roster must be submitted to Maine EMS no more than 7 days following completion of the course. Note: Students who require immediate verification of course completion may use a signed copy of this roster as course completion verification.

- Instructors must identify students requiring further remediation both on the roster and by completion of a counseling form. Counseling forms should be attached to the course roster and submitted to MEMS.

- Upon receiving a completed roster, MEMS will issue course certificates and forward them back to the course instructor. It is the instructor's responsibility to distribute these certificates to his/her students. The Education Coordinator will also take steps to arrange specific remediation for those identified by remediation forms in concert with the paramedic's service medical director.

- MEMS will maintain a current database of paramedics who have successfully completed all PIFT course requirements.

- For any PIFT Course questions or concerns, please contact Scott Smith at Maine EMS at (207) 626-3862 or via email at scott.a.smith@maine.gov.

Maine EMS
PIFT Continuing Education Hours Approval Request Form

It is required that this form be submitted to the MEMS office seven (7) business days prior to the date of the program in order to provide for proper processing.

Name of Instructor Coordinator: _____

Mailing Address: _____

_____

Daytime Phone # _____

email:_____

Program Location: _____

Date(s): _____Time(s):_____

The following equipment is required for the PIFT course. *By checking the box you are stating that you have arranged for this equipment to be present in the classroom. MEMS may be able to assist in locating equipment, but does not guarantee that equipment will be available for your course.*

1. PIFT Resource(s) (type) _____
2. Infusion Pump_____ 3. Chest Tube and Drain _____ 4. NG/OG Tube _____
5. Foley Catheter _____

Please attach visual aids if different from the standardized presentations available on the MEMS website.

Assistant Instructor(s): _____

Course Service Affiliation (not required): _____

Signature of person applying: _____

Please return application to:

Maine EMS
152 State House Station
Augusta, ME 04333

Approval Section (MEMS use only)

Received 7-days prior to start of course ___ Devices Available ___
Approved PIFT Instructor _____
Reason Course was not approved

_____

_____

MEMS PIFT Course Roster

Course Date: _____

Course Location: _____

Instructor Coordinator: _____

Instructor Coordinator Signature_____

By signing this roster, I acknowledge that all those students listed below have satisfactorily completed the PIFT course minimum objectives.

Student Name	MEMS #	Student Signature	*Pass*	*Remediation Required*
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				

Student Name	MEMS #	Student Signature	*Pass*	*Remediation Required*
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				
24.				
25.				
26.				
27.				
28.				
29.				
30.				

MEMS PIFT Program Student Counseling Form

Student: _____ License #_____

Address: _____

_____

Daytime Telephone Number: _____

Instructor: _____

Daytime Contact Number: _____

Date of Class: _____

Place: _____

Please describe the reasons for counseling below.

Reasons for Counseling
Math Skills
General Knowledge
Pharmacology Knowledge
Resource Use
Problem Solving
Other

_____

_____

_____

_____

I have reviewed the reasons for counseling with the above PIFT instructor and have received a copy of this counseling record.

_____ _____
Student Date

I have reviewed this counseling record with the above student. The student:

___ Successfully completed PIFT after in class remediation

___ Is referred to Maine EMS and the service medical director for further remediation before a course completion can be granted

_____ _____
Instructor Signature Date

Please return a copy to the student and to Maine EMS for follow-up.

Maine EMS PIFT Course Evaluation Form

Instructor: _____

Date of Course: _____

Please rate the PIFT Program using a numerical scale 0= Poor to 5=Excellent

1. Pre-Course Packet

a. Usefulness	0	1	2	3	4	5	
b. Organization	0	1	2	3	4	5	
c. Content	0	1	2	3	4	5	

Comments:

2. PIFT Student Manual

a. Usefulness	0	1	2	3	4	5	
b. Organization	0	1	2	3	4	5	
c. Content	0	1	2	3	4	5	

Comments:

3. PIFT Power Points

a. Usefulness	0	1	2	3	4	5	N/A
b. Organization	0	1	2	3	4	5	N/A
c. Content	0	1	2	3	4	5	N/A

Comments:

4. Other Power Points (if applicable)

a. Usefulness	0	1	2	3	4	5	N/A
b. Organization	0	1	2	3	4	5	N/A
c. Content	0	1	2	3	4	5	N/A

Comments:

5. PIFT Scenarios

a. Usefulness	0	1	2	3	4	5	N/A
b. Organization	0	1	2	3	4	5	N/A
c. Content	0	1	2	3	4	5	N/A

Comments:

6. The instructor

a. Was prepared for class?	Y	N
b. Communicated effectively with students?	Y	N
c. Demonstrated knowledge of topic?	Y	N

7. Please comment on the classroom environment.

8. What did you like best about this program?

9. What did you like least?

10. What changes would you recommend to the Maine EMS Education Committee to make this program better?

11. Will the 2006 PIFT Curriculum changes greatly affect your job performance as a paramedic?

12. Other comments or suggestions.

Name (optional): _____

Appendix C: Maine EMS Policies and Procedures Impacting Interfacility Transport

IV Pumps

PCA Pumps

MDPB DRAFT Language on Home Devices

****Further Guidance on Interfacility Transfers can be found in the PIFT Instructor Manual, Maine EMS Law, and the Maine

Maine EMS Policy and Procedure

Policy/procedure regarding:

Transport/transfer by an EMT-Basic of a patient who is being administered non-medicated fluids via an infusion pump

Policy/procedure:

An EMT-Basic may transport/transfer a patient being administered non-medicated fluids via an infusion pump when:

1. The EMT-Basic has received service level training on the specific type of pump to be used in the transfer, to include:

    a. Familiarization with the model of pump used in the transport/transfer;
    b. Activation and deactivation of the pump;
    c. Setting infusion rates; and,
    d. Concerns/issues inherent with the use of the specific infusion pump and of infusion pumps in general.

    and,

2. The service maintains a record of such training.

Background statement:

There are situations when patients (e.g. dialysis patients) - who are receiving non-medicated IV solutions via a mechanical infusion pump - require EMS transport/transfer. It is appropriate that an EMT-Basic attend a patient receiving non-medicated fluids via an infusion pump so long as transfer of the patient by an EMT-Basic is medically indicated and the EMT-Basic attending the patient is trained in the use of the pump as per paragraph 1, above.

Policy/procedure Date: August 13, 2003

Expiration Date: None at this time.

Author: Drexell White

Maine EMS Policy and Procedure

Policy/procedure regarding:

Transfer/Transport of patients on Patient Controlled Analgesia (PCA) pumps

Policy/procedure:

Any provider licensed at the Basic EMT level or above may transport a patient who is receiving medication via a PCA pump, regardless of the medication being administered. If the EMT has reason to be concerned of the medication being administered by the PCA pump, the EMT should contact Medical Control for further instructions.

Background statement:

PCA pumps function independently and in most situations, the medication administered to the patient through these pumps, do not create a significant potential for harm or side effects at the pre-arranged dosing in the pump.

Policy/procedure Date:

March 17, 2003

Expiration Date:

None at this time.

MDPB Devices and Appliance DRAFT Statement 11/06

1 (for the brown pages)

It is recognized that many patients will, as part of their totality of care, have devices and appliances (drains, ports, etc.) placed. Many of these are devices with which patients are routinely discharged home and patients (or their care providers) are expected to maintain them on their own. While these devices have some risk associated with them, they are generally considered safe in the home environment. As such, EMS providers are not restricted in the care or transfer of these patients based solely on the presence of these devices or appliances. Unfamiliarity with or any questions concerning these devices should be referred to medical control.

2 (for the PIFT document)

Nothing in the PIFT requirements shall prohibit the transport of patients with surgical or medical appliances that will routinely or prospectively require active management by Maine EMS personnel during the course of transport and whose consequences of unforeseen malfunction would present an immediate threat to the patient. The sending facility is responsible for contemporaneous education and training on the use of these devices prior to Maine EMS providers taking responsibility of the patient. Unfamiliarity with or any questions concerning these devices should be referred to medical control.