

**MEDICAL LECTURES
TO
STAFF BY PHYSICIANS**



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MEDICAL LECTURES TO STAFF BY PHYSICIANS

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INSTRUCTIONS

1. Lectures monthly at general staff meeting of lay and medical personnel.
2. Topic for lectures for any given month at direction of medical director (s) to insure uniformity of training for staff.
3. Copy of lecture outline to be provided all attendees with a copy for meeting minutes. (copies to be made at facility level from outline forwarded from administration)
4. Physician may expand on outline material as he/she sees fit during presentation.
5. Major errors or omissions on outline should be discussed with medical director.



METHADONE MAINTENANCE- HOW AND WHY IT WORKS

Historical

1919 – Federal government criminalizes use of heroin after review of Harrison Act of 1914.

Second world war – Methadone synthesized in Germany when opium supplies from Turkey cut off by U.S. and its allies' blockade.

Early 1960s- Drs. Vincent Dole and Marie Nyswander discovered methadone given by mouth relieved heroin withdrawal for a period of 24 hours.

Services Offered in a Methadone Clinic

Oral methadone administration

Counseling - psychosocial, nutritional, vocational – individual and group

Disease tracking of illnesses frequently associated with intravenous drug use such as HIV, hepatitis C, syphilis, tuberculosis.

Desired Response to Methadone Treatment

Prevention of opiate abstinence syndrome for 24 hours or more.

Reduction of drug hunger or cravings

Blockade of euphoric feeling should illicit opiate be used.

No euphoria or other undesirable side effects from the methadone itself.

Outcomes Sought

Opiate free state

Reestablishing normal relationships with family unit

Abstinence from crime

Return to work force

Life style changes including dissociating from other addicts not in treatment.

Inherent characteristics of methadone as a long term treatment tool.
Methadone does not cause damage to internal organs

Motor coordination, reaction time, and intelligence testing not impaired.

Key Terminology in Understanding How Most Drugs Work

Endorphins and enkephalins – the bodies natural opiates.

Heroin- an opiate derived from morphine and which becomes morphine on entering the human body.

Synapse – gap between nerve ending and its target organ.

Neurotransmitter- substance which carries excitatory or inhibiting message across the synapse to the target organ's **neuro-receptor**.

Agonist – a drug that binds to a receptor and stimulate the receptors function. Agonists mimic the bodies own regulatory functions. Examples of opiate receptor agonist would be heroin, morphine, codeine

Antagonist – a drug binding to a receptor which prevents it from being stimulated.. Examples – Narcan and Naltrexone bind to opiate receptors and do not allow them to be stimulated. Commonly, antagonists have greater affinity for the receptor than agonist and can displace an agonist already on the receptor. This is why Narcan used in cases of heroin overdose revives the patient since the heroin is displaced from the receptor by the Narcan.

Half Life – time it takes for the body to inactivate or eliminate half of the biologically active part of a drug. Heroin, which becomes morphine in the body has a half life of 4-6 hours. Methadone's half life on average is 24 hours (range 15-56 hours) which provides long duration of action.

Steady State – the time it takes for a drug dose being given at the same amount at intervals approximating its half life to cause a constant blood level of the drug. Steady state is computed by multiplying the half life by 4 to 5 times.

How Does Methadone Work?

Methadone, an opiate agonist works by coating the majority of opiate neuroreceptors and not letting Heroin on the receptor. Since the half-life of methadone is equal to a full day, once a day oral dosing can be used to coat the receptors. It might take several weeks to determine what dose of methadone will achieve the optimum effect since 4-5 days must elapse at a given dose to know what ultimate physiologic effect it will have based on the steady state principle. This initial period seeking a stabilizing dose is termed the stabilization period.

Since tolerance to any dose will in most cases take place over time, a dose might occasionally require change to meet the changing need, but these changes are far less often than one might expect. Dose changes should be dictated by patient's signs and symptoms of insufficient opiate maintenance and not by preconceived notions about what dose levels are appropriate. In general, many patients on methadone throughout the country are underdosed because of non-scientific limitations imposed on their dosage levels and their recovery is proportionately lessened.

From the Experts – excerpts taken from material presented at the International Methadone Providers conference in San Francisco, March, 2000.

General Barry McCaffrey, outgoing drug czar for the white house under President Clinton: “heroin rewires the brain in the heroin addict. Methadone aids in restoring the brain to its normal state.”

Dr. Alan Leshner, Director, National Institute on Drug Abuse(NIDA)- Dr. Leshner presented Pet scan slides at the conference graphically illustrating the veracity of General McCaffrey ‘s statement. These slides came from a recent study headed up by Dr. Marc Kaufman at MacLean Hospital, Harvard Medical School.

Slide 1 – normal brain

Slide 2 – untreated heroin addict’s brain showing severe deterioration of brain tissue .

Slide 3 – heroin addicts brain after brief administration of methadone- no significant change from slide 2..

Slide 4 – heroin addicts brain after 2 plus years of methadone maintenance- brain integrity restored and could not be distinguished from the normal brain.

CQ: METHADONE MAINTENANCE

Methadone Maintenance – How and Why It Works (circle single correct answer)

1. All of the following are goals of methadone maintenance except
 - a. Freedom from abstinence symptoms for at least 24 hour.
 - b. Opiate blockade of opiate euphoria (high)
 - c. Relief of patient's chronic pain
 - d. Reduction of drug cravings.

2. All of the below are desired outcomes from methadone treatment except
 - a. Abstinence from crime
 - b. Obtaining regular employment
 - c. Take methadone regularly and get counseled when its convenient
 - d. Abstain from use of addictive substances

3. Methadone was first manufactured in
 - a. Germany
 - b. Italy
 - c. Japan
 - d. USA

4. Synapse refers to
 - a. a guilt complex due to using opiates
 - b. a commune for heroin addicts
 - c. a gap in a nerves transmission pathway
 - d. blocking of an opiate high

5. The time needed for restoration of the brain by use of methadone after heroin addiction has set in
 - a. 6 months
 - b. 18 months
 - c. 24 months
 - d. 36 months

6. Agonist refers to
 - a. a substance that mimics or complements a natural, body neurotransmitter
 - b. somebody that believes the opposite way from what you do.
 - c. a painful or unpleasant drug use experience
 - d. the mechanism by which acupuncture achieves its effects.

7. Addiction is
 - a. just a bad, learned habit
 - b. all psychological
 - c. a brain disease
 - d. easily overcome by will power and just saying no

8. Actions of methadone
 - a. provides the user with a 2 day high
 - b. excellent laxative effects
 - c. is stored in the bones
 - d. is bought on the street by addicts trying to get well

9. Endorphins are
 - a. an aquatic mammal whose natural oils can be utilized in the formation of synthetic opiates
 - b. the human bodies natural opiates
 - c. the rear fin of a great white shark, rich in opiate chemicals
 - d. opiate antagonists

10. All of the following are frequently found health conditions in the untreated addict except
 - a. malnutrition
 - b. hepatitis C
 - c. tuberculosis
 - d. elephantiasis

METHADONE METABOLISM AND SPLIT DOSING

Methadone Metabolism

Methadone Metabolism takes place in the liver and utilizes a set of liver enzymes known as CYP-450 enzymes. The usual, anticipated metabolic response is that when stabilization dose is reached, the methadone will reach a peak level about 4 hours after dosing. This level will gradually be reduced until 24 hours after dosing it reaches about one half the peak level. Certain drugs are known to increase CYP-450 activity and can accelerate this metabolism, causing early wearing off of the methadone effect.. These drugs include *Rifampin, Dilantin, ethyl alcohol, barbiturates and Tegretol*. Other drugs have an inhibitory effect on these enzymes and cause prolongation of the effects of methadone. These include *Tagamet, Ketoconazole and Erythromycin*.

Other factors which can effect methadone metabolism include poor absorption, liver disease, urinary pH (acid urine promotes rapid elimination of methadone from kidneys, and alkaline urine slows this elimination), diet, vitamins, and last but not least, there is frequently accelerated metabolism in pregnant women during their 3rd trimester.

For reasons not known, some patients metabolize methadone at 4 Xs the rate of other patients.

Patient Complaints Suggesting Rapid Metabolism and Wearing Off of Methadone.

“My dose isn’t holding me”

“I wake up sick every morning”.

“My dose only lasts a few hours”

“I wake up dope sick in the middle of the night”.

“I get sleepy at work after dosing but start getting sick at bedtime”.

Establishing a Diagnosis

History- the above complaints are typical of rapid metabolism of methadone. Check medication and diet history. Probe for factors which might acidify the urine such as heavy ingestion of cranberry juice, large amounts of vitamin C, high protein diet, etc.

Physical – in suspected cases, just before giving patient his/her regular daily dose, check for signs of withdrawal such as agitation, sweating, runny nose and dilated, highly reactive pupils. These checks may be performed and recorded by the nurse in the absence of the physician and will corroborate the patient history.

Laboratory - **Blood Methadone Levels**

Trough – done 24 hours after dosing.- minimum therapeutic level 150-200 ng/ml; ideal 400 ng/ml or more (the latter level, i.e. 400 ng/ml will frequently provide *heroin blockade*)

Peak – done 2-4 hours after dosing – should be no more than twice the trough level.

Ratio of peak/trough of two or less is more important to 24 hour control of abstinence symptoms than the actual blood levels themselves. Commonly, peak/trough levels of 300ng/150ng (ratio of 2/1) will keep a patient more comfortable than a level of 600ng/200ng (ratio of 3/1), even though the actual peak and trough levels are greater in the latter.

Treatment

1. If history reveals factor(s) which is speeding methadone metabolism and which can be eliminated without adverse effects to the patient, this should be the first step. Example – changing anti-seizural from Dilantin to Neurontin.
2. If no contributing factors found or elimination of the adverse agent does not improve patient's condition, apply to *regulatory agencies for approval to split patient dose*. This is necessary since, although the first half of a split dose will be given and observed in the clinic, the second split will by necessity be a take home to be taken later that same day. When approval received, proceed as follows:
3. Give one half of most recent dose at the dispensing window and the other half as a take-home to be taken later in day by patient.. The split need not be ingested exactly 12 hours after the initial day's portion nor do the amounts in each dose have to be exactly equal.
4. Check the patient weekly, allowing time for the patient to evaluate response. At each visit carefully evaluate any withdrawal signs and symptoms after each portion of the split is given and adjust the dose, up or down of each portion to correct undesired effects. Example - if after AM dose patient experiences drowsiness while driving, reduce the AM portion of the split. If in the same instance the patient complains of not sleeping well, increase the take home portion of the split which will be ingested in the PM.
5. If the patient has been dirty up until the time of the split dose trial, which will more often than not be the case since the patient will have been self medicating with heroin to ward off withdrawal since their dose was not holding, the patient must be made to understand that continued dirties after split dose stabilization has been reached jeopardizes continuation of the split dose regimen and possible discharge or transfer from our program. *A contractual obligation must be assumed by the patient to stay clean and compliant*. It must be impressed upon the patient that you have gone to great lengths to solve their problem and the agencies have extended him/her special consideration in granting split dosing. Violation of your and the agencies trust will cause withdrawal of the special consideration granted by the agencies and places you, the physician, in a position of having to revert to inferior treatment in the form of a single, daily dose. Since this represents inferior treatment which all physicians would consider onerous,, it might be best to refer the patient elsewhere.
6. On occasion, *more than one split* might appear necessary over a twenty-four hour period. Example – giving initial dose at window and giving 3 take home splits to be taken Q 6 hours. This could occur with patients on antiseizural medication or Rifampin who are still not held after a trial of split dosing. This practice should not be undertaken without the approval of the chief medical director or one of the assistant chief medical directors. NO EXCEPTIONS since specifically tailored methadone blood levels will be needed to justify this many splits.

CQ: METHADONE METHABOLISM AND SPLIT DOSING

1. Methadone metabolism takes place in the
 - a. brain
 - b. intestine
 - c. liver
 - d. spinal cord
2. On average, peak blood levels of methadone are reached 3-4 hours after dosing and trough levels (lowest levels) 24 hours after dosing
 - a. true
 - b. false
3. Patients are generally most comfortable when the ratio of the peak level to the trough level is no greater than
 - a. 2/1
 - b. 3/1
 - c. 4/1
4. The ratio of peak to trough is in reality more important to a dose holding than the actual methadone blood levels themselves
 - a. true
 - b. false
5. Minimum blood level of methadone to suppress abstinence syndrome is
 - a. 50 ng-100 ng
 - b. 150 ng-200 ng
 - c. 250 ng-300 ng
 - d. 350 ng-400ng
6. Optimum blood level to control abstinence syndrome as well as ablate a heroin high
 - a. 200 ng
 - b. 300 ng
 - c. 400 ng
 - d. 500 ng
7. Which of the statements below does not reflect a probably unsatisfactory peak/trough blood level and rapid methadone metabolism
 - a. My dose doesn't hold me until morning
 - b. I wake up sick in the middle of the night
 - c. I get a little sleepy a couple of hours after dosing since my raise several weeks ago but I sleep through the night OK
 - d. I'm sleepy after dosing but sick by supper time
8. Which of the following drugs is not known to cause rapid methadone metabolism
 - a. Tegretol
 - b. Insulin
 - c. Rifampin
 - d. Dilantin

9. When instituting split dosing, doses must be exactly 12 hours apart
true false
10. Since split dosing involves exception take homes, violation of program rules and dirty urines can cause revocation of the split.
true false

METHADONE HALF-LIFE

Duration of action for most drugs is determined by the drug's **half-life**. Half-life is the time it takes for the body to eliminate or inactivate half of the active portion of the drug. As an example, morphine has a half-life of 4-6 hours. Therefore, 4-6 hours after an addict uses heroin (which becomes morphine once it enters the body), half of it will be inactivated or eliminated. Half of the remainder will be inactivated or eliminated in the next 4-6 hours, etc. For a person receiving a medication at a set dose, it will take 4-5 half-lives before a given dose will cause a steady and repeatable level of the medication in the blood stream. Although the blood level might have peaks and troughs throughout the day on day 5 of dosing, these same peaks and troughs will repeat in a similar manner each successive day the patient is on this dosage. This phenomenon is called **steady state**. Methadone has a half life averaging 24 hours or more (compare this with Heroin/morphine with a half-life of 4-6 hours). It is this long half life which provides methadone its long duration of action and which makes it ideal for once a day dosing. At a set dose of methadone it will take 4-5 days before steady state is reached. Each successive day after the first day's dose will show a progressive rise in the blood level until steady state is reached between the 4th and 5th day of dosing. The reason for this blood level is shown below:

Patient receives a daily methadone dose of 40 mg.

Day 1 – 40 mg given by mouth	available to blood stream	<u>40 mg.</u>
Day 2 – 40 mg given	available to blood stream	40 mg
	Plus half of day 1's dose	20 mg
	<u>Total</u>	<u>60 mg</u>
Day 3 – 40 mg given	available to blood stream	40 mg
	Plus one fourth day 1's dose	10 mg
	Plus half of day 2's dose	20 mg
	<u>Total</u>	<u>70 mg</u>
Day 4 – 40 mg given	available to blood stream	40 mg
	Plus one eighth day 1's dose	5 mg
	Plus one fourth day 2's dose	10 mg
	Plus one half day 3's dose	20 mg
	<u>Total</u>	<u>75 mg</u>
Day 5 – 40 mg given	available to blood stream	40 mg
	Plus one sixteenth day 1's dose	2.5 mg
	Plus one eighth day 2's dose	5 mg
	Plus one fourth day 3's dose	10 mg
	Plus one half day 4's dose	20 mg
	<u>Total</u>	<u>77.5 mg</u>

CQ: METHADONE HALF LIFE

1. Half life is
 - a. the time it takes for a full bottle of methadone to lose half its effectiveness.
 - b. the time it takes for ingested methadone to lose half its effectiveness.
 - c. The initial time commitment an addict in a 12 step program must agree to stay clean and sober
 - d. A chart depicting the average number of years a heroin addict will live compared with a non addict starting from the year the addict became addicted.

2. The half life of heroin (morphine) is
 - a. 2-4 hrs
 - b. 4-6 hrs
 - c. 6-8 hrs
 - d. 8-10 hrs.

3. The half life of methadone is
 - a. 10-16 hrs.
 - b. 12-20 hrs
 - c. 24-36 hrs
 - d. 40-60 hrs

4. Steady state is reached in how many half life's of a drug?
 - a. 2-3
 - b. 3-4
 - c. 4-5
 - d. 5-6

5. If a patient is given a dose of 40 mg of methadone on his first day of treatment, and is given 40 mg each day for 2 days more, how much methadone will still be actively working for the patient (assuming 24 hr half life) before the patient gets his second day dose 24 hours later?
 - a. 30 mg
 - b. 25 mg.
 - c. 20 mg
 - d. 10 mg

6. In the same patient as in 5 above, how much, if any, of day #1's dose will still be working for patient when he presents for day #3 dose?
 - a. 25 mg
 - b. 20 mg
 - c. 15 mg
 - d. 10mg
 - e. 5 mg
 - f. 0 mg

7. Same patient – everything the same – presenting for day #3 dose – how much from day #2 dose still available (excluding day #1 portion)?
- a. 25 mg
 - b. 20 mg
 - c. 15 mg
 - d. 10 mg
 - e. 5 mg
 - f. 0 mg
8. Same patient – presenting for dosing on day #3 – gets his #3 day dose of 40 mg - how much methadone is now in his blood stream to coat the opiate neuro receptors.
- a. 40 mg
 - b. 50 mg
 - c. 60 mg
 - d. 70 mg
 - e. 80 mg
 - f. 90 mg

GUIDELINES IN SEEKING A STABILIZING METHADONE DOSAGE

In approaching this topic, three basic factors will be addressed:

Pharmacodynamic Tolerance (“good tolerance”)

Methadone half life

Medication side effects and their import

- **Pharmacodynamic (“good”) Tolerance**

“Good “ tolerance refers to the down regulating of the sensitivity of the respiratory centers. It provides protection against respiratory depression death of the patient. It can best be achieved by slowly increasing the dose of a long acting opiate such as methadone.. It can never be achieved with any degree of certainty with short acting opiates due to the frequent fluctuations of drug peaks and troughs characteristic of short acting opiates. To digress for the moment, would any of us as physicians recommend to a 55 year old, sedentary male with multiple risk factors for heart disease, starting immediately a vigorous exercise program designed for a 17 year old, in shape, high school athlete? Of course we wouldn’t! We know that cardio-protective, exercise tolerance takes time to develop and is started slowly and built upon.. Why should we act as if developing tolerance to drug levels in the respiratory centers is any different? Do we really want to chance rapidly running up a patients dose to high levels before we have comfort that “good” tolerance has had a chance to develop? Please remember that the patient you are admitting for opiate admission did not come to your clinic already having “good” tolerance, unless the patient is a transfer from another methadone maintenance program.

- **Half Life**

At times, many of us act as if the methadone we order today will all be gone by tomorrow, and a new, stiffer dose will be necessary to keep our patient comfortable and happy. If any of us really do believe this, we best pay careful attention to what follows, and learn how methadone works its magic through the accumulation principle. Half life must not be forgotten when designing a dosing schedule to achieve a stabilizing dose. A stabilizing dose is that dose which will keep the patient free of abstinence symptoms for 24 hours, yet not be accompanied by overwhelming sedation nor a high. Since methadone half life is 24-36 hours and steady state for any drug is reached after 4-5 half lives, it will take 5-8 days before the full effects of any one dose level will be achieved.

Hypothetically, let us take a look at a patient who is given **30 mg.** of methadone as his very first dose, and requests going up slowly since he does not want to get too high, if he can avoid it, because of difficulty he experienced with methadone withdrawal in the past. Physician and patient agree to keep the dose unchanged for the period it will take to reach steady state in order to learn the full effect of this dose. Physician agrees to raise the dose sooner if patient experiencing too much discomfort. In his calculations, physician decides to use the easier to calculate half life which is 24 hours.

Methadone Calculated Available to the Neuroreceptors (Residuals methadone from earlier doses which contribute on a day by day basis to the days total dose will be higher with the longer half life, i.e. 36 hours, since less than 50% of the previous days dose will have been eliminated as it would have been in the 24 hour half life.

Day	1	2	3	4	5
Daily Dose in mg.	30	30	30	30	30
Residual(s) from former days doses in mg.		15	15 7.5	15 7.5 3.75	15 7.5 3.75 1.88
Total mg. Available	<u>30</u>	<u>45</u>	<u>52.5</u>	<u>56.25</u>	<u>57.50</u>

As can be seen, a non-escalating dose of methadone will nearly double the methadone available to the neuroreceptor by the time steady state is achieved. Apply this fact to the very real danger of drug accumulation should rapidly raising doses seeking stabilization be elected and occurring at a time when the patient has not yet developed "good" tolerance in the respiratory center.

Example Of A Conservative Approach To Induction: The authors of the "Opioid Maintenance Therapies" section of "Principles of Addiction Medicine", Second Edition present the observation that the majority of methadone maintenance patients can be stabilized at a dose between 60-120 mg, with some patients requiring less and others more. Since only a minority of patients stabilize at less than 60 mg, it is considered acceptable to seek the 60 mg level fairly quickly in the interest of patient comfort. This assumes patient opiate usage of at least moderate amounts. Lesser habits (less than ¼ gram of heroin per day or less that \$20 per day) would have an initial lower target than 60 mg.

- Patient John X: Usage - 1/2 gram of "good stuff" x's 4 months
 Orders written on admission day
1. Starting dose on 9/2/01 30 mg
 2. Raise dose 10 mg to 40 mg on 9/3/01
 3. Raise dose 10 mg to 50 mg on 9/4/01
 4. Raise dose 5 mg to 55 mg on 9/6/01
 5. Raise dose 5 mg to 60 mg on 9/8/01

From this point on, except in patients with very heavy habits or history in Aegis facility of the need of a high maintenance dose (150 mg or greater) in the recent past (discharge within past 3-4 months) doses could be raised at the 5-10 mg level at intervals of 3-5 days or more until stability reached.

It is recommended that dosing staff make daily inquiries of how dose is holding patient during the stabilization period. Should the patient report adverse side effects such as excess sedation and more raises have already been ordered, the physician should be contacted to see if he/she wish to cancel these raises.

It is further recommended that even in clinics where there is not a lot of physician coverage, the physician should see new maintenance admits at least weekly for 3 weeks to make his/her own judgment on patient progress towards stabilization.

Finally, physician should consider seeing patients 6 – 8 weeks after admission to fine tune the dose up or down , with the goal of being certain that opiate hunger has been assuaged and that opiate blockade probably achieved. Opiate blockade refers to the patient being unable to feel a high from heroin after methadone stabilization achieved.

- **Medication Side Effects And Their Import**

Most side effect issues seem to occur when drugs over and above methadone are being used by the patient.

GREAT CARE MUST BE TAKEN WITH DUAL DIAGNOSIS PATIENTS HAVING POLY PHARMACY MEDICAL REGIMENS AND THE SIDE EFFECTS OF THE PATIENT'S OTHER DRUGS

The above mentioned authors in “Principles of Addiction Medicine” comment that there are no specific drugs that interact with methadone in such a way that they would contraindicate methadone treatment. Despite this statement, common sense must prevail. Methadone induction is frequently attended by drowsiness, especially during the peak effect time. Tolerance to this drowsiness will occur in about 4-6 weeks and it should disappear. However, when methadone is used in combination with any of a great number of medications used in dual diagnosis problems, many of which cause drowsiness themselves, it would be difficult to establish that any mishap caused by drowsiness was not at least contributed to by methadone. It is also well established that certain anti-psychotic medications have their own, serious side effect profiles such as malignant narcoleptic syndrome. This makes extreme caution in dealing with these patients a must.

Recommendations:

1. Get a list of all physicians caring for the patient and medications prescribed.
2. Have releases signed to discuss the patient with all other physicians involved. If the patient will not cooperate with this request, they need not be accepted.
3. Make a thorough study of the side effect profiles of the outside medications, especially if the side effects overlap those of methadone.
4. Daily monitoring of patient by medically oriented staff during stabilization.
5. When such an admission seems unduly complex, confer with medical directors on how to proceed. If in doubt, postpone admission until all areas of concern satisfactorily addressed and reconciled. If the need for methadone treatment seems urgent, detox. rather than maintenance can be offered while the need for continued care by Aegis is evaluated.



ADDICTION VERSUS PHYSIOLOGIC DEPENDENCE – COUNSELOR INPUT

Addiction and dependence are not the same thing, even though they might both be present in the same individual. Whereas addiction is characterized by the compulsive use of a drug despite a multitude of adverse consequences to the individual caused by this compulsive use, dependence is often a normal, physiologic response to the repeated use of a drug. Repeated use is attended with the development of tolerance to the drug so that it takes more and more to get the same response. Commonly, when the drug is abruptly discontinued, a set of withdrawal symptoms occur.

The heroin addict suffers from both of the above. Before addiction sets in and the budding addict is still experimenting with the drug, the drug can be stopped without a great number of adverse consequences. The individual still has some control over his/her usage. At some, indeterminate point in time this ability to walk away is lost and the individual has become addicted. The brain has been changed. From this point forward, use becomes an overwhelming compulsion, and free choice no longer exists. The patient's job, freedom, and loved ones all are pushed aside by this compulsion. The addict now adapts a whole new set of values and behaviors based on acquiring and using the drug. When the drug cannot be obtained, physiologic abstinence syndrome sets in and the addict suffers agonizing symptoms.

Are all drugs of abuse attendant with both compulsive use and abstinence symptoms. No they are not. Cocaine certainly is highly addictive but does not have an abstinence syndrome nor cause physical dependence. Tobacco on the other hand is highly addictive and also is attended with distinct withdrawal symptoms.

The role of methadone in the opiate addict provides two benefits to the recovering individual. The first is the relieving of the signs and symptoms of physiologic withdrawal or abstinence syndrome. The second is that it supplies for reasons not yet known, a medium which allows the brain, damaged by heroin, to heal itself. If legalized, heroin could not duplicate this last effect and would not permit this healing.

As counselors, the realization that working with heroin addicts entails dealing with both the addict's damaged brain and the symptoms caused by this damage, as well as a vast number of learned, illegal and antisocial behaviors the addict used to obtain their drug. It has been established by scientific studies that the brain's restorative process takes several years to occur. Learned, antisocial behaviors are deeply engrained and must be patiently untaught and replaced by others more healthy. Altering behavior also takes a lot of time. Relapses are an expected part of recovery. Patience and persistence are essential for a good outcome. Bullying a patient with a still damaged brain only achieves further devious and antisocial behavior. On the other hand, belief that an ultra rapid recovery is happening in a patient just new to treatment is too often a ploy, and realistically represents the patient telling the counselor what he/she thinks the counselor wants to hear for possible patient gain.. To all counselors we urge that you recognize that the human being you are dealing with has a brain disease. Recovery can occur but you must be patient. It will take time.

CQ: ADDICTION VERSUS PHYSIOLOGIC DEPENDENCE

1. Addiction is characterized by all of the following except
 - a. compulsive use of a drug or activity
 - b. use of a drug despite adverse consequences in multiple areas including but not limited to health, family relations, job retention, and. personal freedom
 - c. always attendant with abstinence syndrome
 - d. adoption of new behaviors and new habits to support the addiction

2. Physiologic dependence is characterized by all but
 - a. the development of tolerance to a drug with attendant escalation of drug use
 - b. commonly has abstinence symptoms with abrupt withdrawal
 - c. in the non addict, abstinence syndrome can be minimized or avoided by a gradual taper from the drug over a time span far less than the addict would require
 - d. universally develops in all patients requiring high dose opiates over an extended time for treatment of legitimate, intractable pain, even after other modalities are found to relieve the pain.

3. All drugs of abuse cause in any user addiction, addictive behavior, physiologic dependence and an abstinence syndrome in all that use them

true false

4. Select the incorrect statement:
The role of methadone in treatment of opiate addiction includes
 - a. The relief of the abstinence syndrome
 - b. For reasons not fully understood, over time it allows the brain to heal.
 - c. Should methadone be unobtainable, substituting good quality heroin would permit this same healing of the brain.

5. Certain factors must be accepted in order for a counselor to be effective include all but
 - a. Recognition that a heroin addicts brain has been damaged and will require time to be restored. Methadone for reasons unknown has restorative qualities
 - b. Relapses are an expected part of recovery
 - c. Early, rapid improvement in behavior is suspect and often a ploy for self gain
 - d. Counselors are encouraged to threaten patients with lowered dosage or discharge from program to insure improvement in patient outcome.

CLASSES OF DRUGS COMMONLY SEEN IN NTPs
 (and eye changes they can cause during intoxication or under influence)

Class of Drug	Opiate	Stimulant	Sedative/Hypnotic*	Mixed**
Example	Heroin Vicodin Oxycontin	Cocaine Amphetamine Caffeine	Alcohol Valium Phenobarbital	Marijuana PCP
Eye effects when intoxicated.	pupils constricted (2.5 mm or less)	pupils dilated (5.5 mm or greater)	nystagmus*** horizontal and vertical	whites bloodshot(mj) hippus**** (PCP) Nystagmus (PCP) Blank stare (PCP) Roving eye (PCP)
Appearance of Patient	relaxed to nodding off	wired, energetic, talkative	appear sleepy uncoordinated slurred speech	MJ - giddy PCP disoriented. muscle rigidity (moon walk), sweating

***Sedative** – Relaxing action.

***Hypnotic** – Sleep producing.

****Mixed drugs** – Have both sedating and stimulating as well as possible other effects simultaneously. Example – a patient under the influence of marijuana commonly appears relaxed and giddy (sedative effect) while having a very past pulse rate of 120/min. or more (stimulant effect). Exercise peak performance is reduced at such times and a serious cardiac event might occur should such a person try to exercise vigorously.

*****Nystagmus** – A constant, involuntary, cyclical, movement of the eyeball in any direction. It can be elicited by the examiner holding his/ her finger in front of patient’s eye and slowly moving the finger side to side, up and down, or in circular direction while the patient is asked to track the finger movement. With nystagmus, the eye will make regular, rhythmic jerks back toward the center.

Example – when a patient is acutely under the influence of the sedative/hypnotic alcohol, horizontal nystagmus is present at a breath alcohol level of 0.10. Vertical nystagmus may be present at a breath alcohol of 0.30. This is commonly used by CHP officers.

******Hippus** – A quivering movement of the pupil.

Special note – one opiate will not produce pupil constriction when patient under the influence- **Demerol**.

CQ: CLASSES OF DRUGS COMMONLY SEEN IN NTPs

1. When acutely intoxicated with opiates such as heroin the pupils are
 - a. large (dilated)
 - b. medium
 - c. small (pinned)

2. When acutely under the influence of cocaine or amphetamines (stimulants) the pupils are
 - a. large (dilated)
 - b. medium
 - c. small (pinned)

3. When intoxicated with a sedative hypnotic the pupils are
 - a. large (dilated)
 - b. medium
 - c. small (pinned)

4. Nystagmus is seen with intoxication with
 - a. opiates
 - b. stimulants
 - c. sedative hypnotics

5. When alcohol intoxicated, horizontal nystagmus may be seen at a blood level of
 - a. 0.04
 - b. 0.06
 - c. 0.08
 - d. 0.10

6. When alcohol intoxicated, vertical nystagmus may be seen at a blood level of
 - a. 0.10
 - b. 0.20
 - c. 0.25
 - d. 0.30

7. The opiate known to not constrict pupils is
 - a. dilaudid
 - b. demerol
 - c. fentanyl
 - d. oxycodone

8. All of the following are common to intoxication with marijuana except
 - a. bloodshot eyes
 - b. rapid pulse
 - c. munchies
 - e. dilated pupils

9. Disorientation, muscle rigidity, moon walk, sweating suggest intoxication with
 - a. marijuana
 - b. PCP
 - c. speedball (heroin plus cocaine injected intravenously)
 - d. alcohol

10. Hippus is
 - a. quivering movement of the eyes seen in PCP toxicity
 - b. combined marijuana and alcohol intoxication

SOFT TISSUE INFECTIONS 2 – MILD TO DEADLY

What If:

- a. **Front desk person** observes a patient who usually appears normal and healthy enter waiting room limping and moving slowly. The patient goes directly to the nearest seat and lowers self into seat, grimacing and wincing while doing so. Once seated, the patient sits lopsided, seeming to place all weight on his right buttocks.

QUESTIONS*

What might be wrong with patient?

What should the front desk person do?

- b. Dispensing nurse on greeting patient at window notices patient appears pale, sweaty, and is favoring his left shoulder, trying not to move it. The following dialogue ensues

Nurse – You don't appear like you're feeling well today Frank, and what's wrong with your shoulder?

Patient – I tried to fix last night because I couldn't sleep, and when I missed the vein a couple of times I muscled my left shoulder. When I woke up this morning I felt crappy and my arm was hurting like crazy. It didn't really look that bad, just a little red where I muscled.

Nurse – How badly does it hurt?

Patient – It's the worst dang pain I've ever had! It's even worse than when I broke my knee cap last year!

QUESTIONS**

What must be suspected in any addict who has used and has these symptoms?

How should the nurse proceed?

- c. Counselor, who is running a little late, enters parking lot and parks not far away from one of her patients who is clumsily trying to lock his car with his left hand (she knows he is right handed because he has signed things for her). On approaching the patient to see if she can help, she asks him why he is using his left hand to lock this car. The patient holds up his right hand and the back of it is red and swollen.

QUESTIONS***

What's probably wrong with the patient's hand and how should the counselor proceed?

*, **, *** , potential answers to the above questions for group discussion will be given at end of hand-out.

The Soft Tissue Infections Most Common to Addicts

Most Common – Abscesses and Cellulitis

Abscess Characteristics

Localized inflammation and infection of skin and underlying connective tissues

Mild to Moderate pain and tenderness, dependent on location

Reddened

Warm to hot to the touch

Comes to a head over time (which permits lancing)

Discharges pus on opening – mixture of dead white blood cells, epithelial cells, and in addicts, chunks of tar.

Most common cause – **staph** organism but can be others

Treatment – antibiotics and lancing when abscess comes to a head, i.e. –becomes fluctuant or points - refers to a softening at a spot on the otherwise firm surface of the abscess.

Cellulitis Characteristics

Non-localized inflammation and infection of skin and underlying connective tissues- edges not usually well demarcated.

Mild to moderate pain and tenderness

Warm to touch, reddened and edematous (orange peel appearance)

Borders usually indistinct.

Does not come to a head

Frequently associated with lymphangitis (**blood poisoning** – red lines running upward towards the head from the cellulitis or some break in the skin).

Most common cause – Strep. Organism

Treatment – antibiotics.

Less Common but More Life Threatening- Necrotizing Fasciitis; aka Flesh

Eating Disease

Also included -frequently co-occurring Toxic Shock Syndrome

Necrotizing Fasciitis Characteristics

Severe pain and pronounced severe tenderness

Initial local finding often minimal with only slight reddening of skin but very rapidly progresses to dusky, mottled red swelling and developing large blisters filled with red or blue fluid. From there, as blood vessel become obliterated from the intense swelling the skin turns blue and friable, often with skin anesthesia. Systemic symptoms develop rapidly with **fever, chills, and toxic appearance**. Condition can deteriorate to multiple organ failure – **Toxic Shock Syndrome**.

Infection involves **deep and/or superficial fascia** as well as skin and connective tissue.

60 % of cases due to **exotoxin producing strep**, which can also precipitate **toxic shock syndrome**, and the balance for the most part from a mixture of **anaerobic organisms** (grow without oxygen) and **enteric or staph organisms**.

Treatment – immediate aggressive surgical exploration and debridement.

Characteristics of Toxic Shock Syndrome of A Strep Origin

Multiple systems involvement.

Fever

Hypotension

A Strep. blood culture

Renal impairment with elevated creatinine

Coagulopathy

Adult respiratory distress syndrome – acute onset of dyspnea with pulmonary infiltrates, hypoxemia

Hepatic inflammation with elevation sgot, sgpt

Answers to What If:

- * Probable buttocks or thigh acute abscess, possible low back problem
Alert back office staff or manager to evaluate patient before patient leaves clinic.
- ** Rule out Necrotizing Fasciitis
Advise patient something serious might be going on and insist on immediate medical evaluation. Involve other office staff as needed.
- *** Probable cellulitis or other infection. Counselor should request immediate medical evaluation of patient's hand – before dosing if needed- alerting other appropriate office staff as needed (incl. MD).

CQ: SOFT TISSUE INFECTIONS

1. The only personnel who need be aware of a change in a patients physical or mental status are the nurse and physician.
true false

2. When a previously healthy appearing patient noticeably favors his arm or walks into the clinic limping and takes great care sitting down, the probable cause is
 - a. a ruptured disk in the patient's neck or low back
 - b. an abscess or cellulitis from injecting arm or butt
 - c. they were just in an auto wreck
 - d. they just got an overseas injection

3. If the dispenser notices the patient in 2. above limping to the dosing window, he/she should best
 - a. be pleasant with patient but don't ask questions
 - b. advise patient in a non threatening way that his/her limp was noticed and politely ask what seems to be causing the limp and if there's anything staff can do to help. If patient volunteers that it is from injecting, recommend he/she see Aegis physician if physician available or recommend patient go to ER if he is not.
 - c. tell patient he/she will not be dosed until the patients counselor is notified and consulted about the limp.
 - d. refer the patient to the ER no matter what the cause of the limp.

4. The best tip-off for early diagnosis of a developing necrotizing fasciitis is
 - a. generalized muscle aching
 - b. blurred vision
 - c. very severe pain around recent injection site with minimal visible signs of inflammation
 - d. night sweats

5. As a general rule, an abscess will come to a head so that it can be drained and a cellulitis will not.
True false

6. The entry point for lancing an abscess is
 - a. any place that is reddened
 - b. at the least tender spot on the abscess
 - c. at the fluctuant spot which is a soft spot in the otherwise firm abscess
 - d. at a non reddened area, coming in at an angle in order to not spread the infection to other healthy tissue

7. The common term “blood poisoning” refers to
 - a. red streaking starting at an infection site and extending in a direction towards the heart
 - b. discovered by a blood test when a patient has a fever that cannot be accounted for
 - c. an addict expression for injecting bad dope
 - d. spread of a venereal disease

8. The most common cause of cellulitis is
 - a. virus
 - b. strep organism
 - c. staph exotoxin (poison)
 - d. allergic reaction to bacterial organism

9. Necrotizing fasciitis and Toxic shock are in most cases caused by toxins from the same type streptococcal organism
true false

10. When a patient presents with abscesses on both arms that require lancing, the same causative organism will always be found in each abscess
true false

INFECTIVE ENDOCARDITIS

Definitions

Endocarditis – Inflammation of the lining membrane of the heart, usually confined to the heart valves.

Infective Endocarditis – Caused by infectious microbes introduced into the blood stream – common in IV drug user – heroin or cocaine

Heart Valves - Trap door like structures that control blood flow from one heart chamber to another. When valves are damaged and do not close snugly, a leaky valve is created greatly altering the efficiency of one heart chamber or another. If a damaged valve heals too snugly it can create narrowing of the aperture through which the blood must flow creating back pressure on the emptying chamber.

Embolus – A blood clot which breaks loose from its site of origin, usually a damaged heart or blood vessel lining, only to lodge somewhere else in another blood vessel, often blocking the vessel it lodges in.

Septic Embolus – an embolus containing infectious microbes

Mechanism of Action

The infectious microbes causing infective endocarditis in the addict most commonly are those that live on the skin. They are introduced into the blood stream by injection or other means and tend to attack any damaged or previously damaged area of the heart or some malformation of the heart such as a congenital defect. Not uncommonly, they can lodge at the site of previous endocarditis. The undamaged heart can also be attacked.

More commonly in addicts the right side of the heart becomes involved and the tricuspid heart valve attacked. Inflammation of the valve lining causes the formation of vegetations which are infected blood clots. These vegetations can break loose and lodge in a great variety of other sites, setting up infection and other problems at these sites. The involved valve is rapidly destroyed and if left untreated, death is inevitable. Valve damage severely alters the stability of blood flow in the heart itself causing heart chamber enlargement and ultimate inability of the heart muscle to contract resulting in heart failure. Urgent surgery often is necessary to replace a damaged valve or clean out pockets of infection in the heart itself. These changes can come on acutely with very rapid destruction of heart valve (s) and sub-acutely with more gradual damage occurring.

Diagnosis

Both physical and laboratory diagnosis is very complex because of so many possible ways in which endocarditis can present. Involvement of the left heart and its valves can cause quite different symptoms than those of the right heart.

The only common denominators are fever, night sweats, fatigue, chills and weight loss. For this reason, any addict running a persistent fever should be hospitalized and evaluated for possible endocarditis.

Additional signs and symptoms which could be found include pleurisy like chest pains, a changing heart murmur, spleen enlargement, petechiae, splinter hemorrhages beneath finger nails, small and flat red spots on palms called Janeway lesions, purplish knots on pads of fingers and toes termed Osler's nodes, and clubbing of the fingers.

Valuable diagnostic studies include blood cultures (a must), ECGs, echocardiograms along with blood studies used in any infectious disease workup.

Prognosis- high morbidity and mortality rate

Treatment

- Antibiotics
- Open heart surgery
 - *Prophylactic antibiotics before elective surgical procedure where high bacterial count present such as oral surgery in high risk patients with history of heart valve damage or heart anomalies such as mitral valve prolapse.*

-

Staff Recommendation

Any addict reporting persistent fever, night sweats and fatigue, without other localizing symptoms must be considered a potential case of endocarditis and evaluation by a physician must be viewed as urgent.

9. Infection of the right side of the heart will cause different symptoms than those involving the left side.
true false
9. All of the below symptoms are common denominators in both left and right heart endocarditis except
- a. fever and night sweats
 - b. weight gain
 - c. fatigue
 - d. chills
10. Endocarditis has a high morbidity and mortality rate
true false
11. Any addict reporting persistent fever, night sweats, weight loss and fatigue should see the physician on an urgent basis or be referred for urgent medical attention.
true false

TUBERCULOSIS (TB)

Opening Comments

Tuberculosis kills more people world wide than any other infectious disease, including HIV and Malaria. 10 million new cases occur every year. 3 million die each year from the disease. It was hoped that TB could be stamped out in the early part of the second half of the 20th century, but these hopes were dashed when Aids appeared in earnest in the 1980s and poor host response allowed many resistant strains of tuberculosis to develop. The once powerful combination of Isoniazid and Rifampin, both of which could kill the TB organism, became ineffective due to these resistant strains. Fortunately, some new antimicrobials, rifapentine and Levaquin have proven effective against some of these resistant strain.

Sites of Disease

Although the principle target of TB is the **lungs**, it can also involve the following organs or structures:

Pleura (outer coverings of lungs and inner coverings of rib cage – causes pleurisy)

Lymph nodes of the neck (glands)_

Spine (Pott's disease of the thoracic spine – collapses vertebrae)

Kidneys

Meninges (brain and spinal cord coverings – causes meningitis)

Miliary (spreads to multiple organs around body_

Signs and Symptoms

Early

- weight loss
- fever to 103 and night sweats
- fatigability

A short time later

- bloody phlegm

Diagnosis

Positive PPD of 10 mm induration or more

Chest X-ray

No HIV – nodular lesions in top of lungs with cavitations

With HIV – nodular lesions in middle and lower lungs (rare cavitations)

Pos. PCR – rapid diagnosis if test available (similar of PCR of hep.C)

Pos. Sputum Culture for TB – Takes a week or more to get result

Acid fast smear (staining technique gives TB nickname of “acid fast”).

Transmission

Spread by droplets of moisture from a cough containing the microbes which can stay suspended in the air for several hours in a quiet room.

The rate of transmission is determined by three basic factors:

1. The amount of droplets and the amount of microbes per droplet.
2. The resistance of the potential new host. HIV persons at high risk.
3. Atmospheric conditions- quiet, stale air with no breeze or air exchange equipment to move the air allows droplets to remain around and infective for hours.

Protective Measures

1. UV lighting
2. Adequate air exchange equipment
3. Mask (equivalent of tight fitting dust mask, not tie on cloth)

Staging the Disease

TB 0 – no exposure, no infection

TB 1 – exposure, not infection, insignificant reaction to PPD.

TB 2 – infection, no disease, pos. PPD 10 mm induration or more

TB 3 – active disease

TB 4 - inactive disease, hx of TB or chest X-ray evidence of nodular disease

TB 5 – abnormal chest X-ray, unclear if active disease, awaiting results of sputum culture, can keep the classification for only 3 months

Treatment

Antimicrobials including isoniazid (INH), rifampin, PZA, ethambutol. Medications given by health care worker twice weekly to assure compliance. Pyridoxine (vitamin B6) to lessen chance of INH neuropathy in malnourished patients. INH must be monitored also for development of INH hepatitis (rare in patients under 35). Rifampkin can also be hepatotoxic, more so when used with INH.

Chemoprophylaxis with INH for patients with positive PPD (10 mm induration or more)

1. OK for younger patients under age 35
2. OK for high risk patients over 35 with PPD conversion in past 2 years
 - Jail inmates
 - Residents of nursing homes or long term care facilities
 - Homeless
 - Health care workers.
3. Those positive for HIV OK when PPD 5 mm induration.

CQ: TUBERCULOSIS (TB)

1. Tuberculosis kills more people each year than any other infectious disease including HIV and Malaria
true false
2. Tuberculosis is a disease only of the lungs
true false
3. All of the following are early signs of tuberculosis except
 - a. Bloody sputum
 - b. Fever with night sweats
 - c. Weight gain
 - d. Extreme fatigue
4. A positive PPD is 10 or more mm of redness
true false
5. A positive PPD is ___ mm or more of induration
 - a. 4 mm
 - b. 6mm
 - c. 8mm
 - d. 10mm
6. Each of the following influences transmission of tuberculosis except
 - a. amount of infected droplets in air
 - b. resistance of potential new host
 - c. stale air vs. good air exchange
 - d. diet
7. Droplets of moisture containing tuberculosis microbes can stay suspended in air for several hour where there is poor air exchange.
true false
8. Stage 3 TB is
 - a. exposure, no infection, insignificant reaction to PPD
 - b. infection, positive PPD, no disease
 - c. active disease
 - d. abnormal CXR, unclear if active, awaiting test results of sputum
9. Patients under age ___ are at significant risk to INH hepatitis and require monitoring.
 - a. 25 years
 - b. 30 years
 - c. 35 years
 - d. 40 years
10. Persons 35 yrs and older with PPD conversion within previous 2 years all considered candidates for treatment with INH due to high risk except
 - a. jail inmates
 - b. public transportation workers
 - c. homeless
 - d. health care workers



SEXUALLY TRANSMITTED DISEASE (STD) 1

PART ONE – Syphilis and the RPR

SYPHILIS - A contagious disease caused by a spirochete (corkscrew shaped bacteria) named *Treponema Pallidum* characterized by sequential clinical stages and years of latency. It can be **acquired** or passed on from mother to child at birth (**congenital**). It can attack many organs, **mimicking many diseases**.

STAGES

Primary – the spirochete penetrates the skin and within hours gets into the lymph nodes, spreading throughout the body. Initially at the site of entry it forms a small red bump which breaks down into a **painless ulcer**, found in the genital area of male or female or about the mouth or anal area. In females, commonly the ulceration is not very apparent and fails to draw attention to itself because of its painless nature. It can be hidden inside the vagina on the cervix. During the acute phase local lymph nodes swell but in a painless manner. The appearance of chancre and enlarged lymph nodes usually is within 3-4 weeks of contact with an infected person. Healing of the ulceration usually occurs within 3 to 6 weeks of their appearance. in untreated cases. Blood tests do not become positive for 3-6 weeks. Initial diagnosis can be made by examining exudates from the ulcer under a dark-field microscope (equipment not found in the average medical office).

Secondary – Rashes tend to occur 6-12 weeks after infection and are commonly seen on the front of the chest, palms and soles but don't itch. Persistent chancres occur in 25% of cases in the untreated and new chancres may form. Generalized, nontender lymph gland enlargement is often found along with enlargement of the liver and spleen. Grayish white patches may form on the mucus membrane linings about and in the mouth and anus/rectum. Wart like growths may form in body folds.. Patchy loss of hair may occur leaving a moth eaten appearance to the scalp. With all of the above patient may experience flu like aching and fatigue. Meningitis may develop with severe headache and stiff neck. Blood tests are positive in this stage. All of the above signs and symptoms may resolve without treatment over a period of months.

Latent – after all the manifestations of secondary syphilis have resolved, the disease goes underground with the organisms surviving but not causing disease. **Early latent** disease is estimated to be one year after resolution of early stage disease and the latent phase may last up to 4 years

Late Stage – about a third of untreated cases will develop this stage and the disease will attack the heart and blood vessels and/or the brain and other nervous system structures up to decades after the primary infections. Aneurysms, valvular damage, optic nerve damage, disturbances of hearing, sensation and cognitive impairment may occur.

Treatment – penicillin -dependent on stage of disease and organs attacked .

RPR – Rapid Plasma Reagin- non-treponemal test

The RPR is a blood test for syphilis. Both it and the VDRL (Venereal Disease Research Laboratory) are the most commonly used initial screening tests to detect this disease. RPR has the advantage of being automated and does not require heating which makes it the preferable test for office use. The VDRL is the gold standard for looking for syphilis in spinal fluid. Both tests detect the flocculation of antigen suspension. Antigen in this case would be the syphilis microbe. Flocculation refers to the clumping together of small particles to make a visible, larger particle.

Titres- titres refer to doing the test with progressive dilutions of patient serum. It measures the strength of the reaction.. As an example, a positive test after only one dilution would not represent a strong reaction and might represent a case of syphilis treated in the past. A positive test after 4 dilutions would indicate a strong test and would be seen in an early case of syphilis. A two fold drop in titre after treatment would suggest a good response to treatment. A rise in titre after former low titre might reflect reinfection with the treponema.

False Positives - because the antigen used in syphilis tests is found in other tissues, the tests may be reactive in persons without syphilis. The titre would not be higher than 1:8 in these cases

Examples of factors causing false positives

- Recent viral illness or immunization
- Genital Herpes
- HIV
- Malaria
- IV drug use

- Aging
- Autoimmune disorders
- Systemic Lupus Erythematosus
- Rheumatoid Arthritis

Confirmatory Tests When RPR Positive – Treponemal tests

- Fluorescent treponemal antibody (FTA) – very specific
- Microhemagglutination assay for TP – more sensitive in primary syphilis

CQ: SEXUALLY TRANSMITTED DISEASES – PART 1

1. Primary syphilis is characterized by all of the below except
 - a. a painless ulceration on the genitalia, mouth, or anal area
 - b. not immediately detectable by blood test
 - c. thick, yellowish urethral discharge
 - d. painless swelling of local lymph nodes

2. Very early detection can be achieved through examination of exudates from the painless ulcer using an ordinary microscope found in most physicians office.
 true false

3. Secondary syphilis is heralded frequently by a non itchy rash appearing on front of the chest _____ weeks after the initial exposure
 - a. 4-6
 - b. 6-12
 - c. 15-20
 - d. 20-26

4. Blood tests do not become positive until after the secondary phase is over
 true false

5. Other signs and symptoms of secondary syphilis may include all the following except
 - a. grayish-white patches on mouth and anus/rectum
 - b. total baldness
 - c. flu like symptoms with liver and spleen enlargement
 - d. meningitis symptoms with headache and stiff neck

6. Unless treated, all symptoms mentioned in 5 above will persist indefinitely.
 true false

7. After all signs and symptoms of secondary syphilis resolve, the disease goes underground. This is called _____ syphilis.
 - a. cured
 - b. phantom
 - c. latent
 - d. tertiary

8. Early latent syphilis lasts up to _____. Organism is alive but not causing symptoms.
 - a. 1-2 years
 - b. 2-3 years
 - c. up to 4 years

9. About _____ of untreated cases will reach late syphilis when the following organs may show signs of attack: heart and blood vessels, brain and nervous system , including vision, hearing and sensation
- d. 1/4
 - e. 1/3
 - f. 1/2
10. The RPR and VDRL blood tests are very selective and accurate for the diagnosis of syphilis and do not require confirmatory testing
- true false

SEXUALLY TRANSMITTED DISEASE (STD) - PART 2 (more common diseases)

GONORRHEA – Bacteria that invades

Urethra Cervix Rectum Throat Eyes

Symptoms (occur 2-14 days after intercourse.)

Men - Purulent, yellow-green discharge from penis with painful urination

Women – often only slight discharge – often not discovered until much later when infections ascends into uterus and fallopian tubes causing severe infection and pelvic peritonitis. This condition can cause female sterility since tubes can scar shut, not permitting egg to pass from ovary to uterus, or ectopic pregnancy.

Other complications – in men can narrow urethra through scarring – may get into blood stream spreading through the body, commonly setting up rapidly destructive, severe knee infection

Treatment- antibiotics in the penicillin family. Eye cases usually in newborns.

CHLAMYDIA – Most common STD in USA. caused by chlamydia organism

Invades male urethra and female cervix

Symptoms (occur 7-21 days after intercourse.)

Men – watery to muco-purulent penile discharge with mildly painful urination. Opening of urethra often reddened and stuck together in AM.

Women – yellowish vaginal discharge, often with painful urination and intercourse.

Complications

Men – descent into testes causing inflammation plus skin and eye irritation along with reactive arthritis (Reiter's syndrome)

Women – can also set up tube infection with secondary scarring and ectopic pregnancy. Can also cause newborn eye infection.

Treatment – Antibiotics

CHANCROID – Caused by bacteria which attacks skin of penis or lining of vagina creating painful ulcerations on these surfaces along with tender, swollen groin glands. (contrasted with syphilis which causes painless ulcerations) 3-7 days after intercourse.

Treatment – Antibiotics like erythromycin

GENITAL HERPES- Caused by herpes simplex virus- most common ulcerative disease in developed countries.

Symptoms - Development of painful, small blisters on penis or labia 4-7 days after intercourse. Blisters break down into small, red rimmed ulcers which often get crusted over and heal in about 10 days.

- Initial infections often accompanied by fever, aching, and other flu like symptoms. Can be complicated by meningitis symptoms.
- Subsequent attacks often preceded by tingling or itching in area.

Treatment - Anti-viral medications- acyclovir type

GENITAL WARTS – Also referred to as venereal warts - caused by human papillomavirus.

Symptoms - 1-6 months after intercourse, soft, minute, pink or gray polyps appear in the ano-genital area, and gradually enlarge. May become pedunculated and clustered. Surfaces resemble cauliflower.

Treatment - No good treatment to date. Cauterization, both electrical and chemical are of limited benefit. Injection of interferon into wart has had some success.

Complications – Must be followed because of associated cancer in both men and women, sometimes appearing after wart has disappeared after being treated.

CQ: SEXUALLY TRANSMITTED DISEASES – PART 2

1. Gonorrhoea is a sexually transmitted disease limited to the sex organs
true false
2. A painless ulceration on the genitalia is the usual presenting sign of gonorrhoea
true false
3. Gonorrhoea is commonly silent in women in its initial phases and does not become apparent until a much later time when the infections ascends into the uterus and fallopian tubes causing a serious pelvic infection which can produce sterility in the woman through blockage of the fallopian tubes with adhesions
true false
4. Gonorrhoea in the male may get into the blood stream and cause a rapidly destructive arthritis in the
 - a. elbow
 - b. knee
 - c. ankle
 - d. fingers
5. An STS, commonly requiring differentiation from Gonorrhoea because of a urethral discharge in men and vaginal discharge in women, plus some pain on urination, occurring 1-3 weeks after intercourse is most probably being caused by
 - a. syphilis
 - b. herpes simplex
 - c. chlamydia
 - d. vaginal yeast infection
6. Painful lymph nodes in the groin and painful ulcerations on genitalia occurring 3-7 days after intercourse is probably caused by
 - a. syphilis
 - b. chlamydia
 - c. gonorrhoea
 - d. chancroid organism
7. A tingling or itching sensation on the genitalia in men and women is probably heralding a recurrence of
 - a. herpes simplex virus infection of genitalia
 - b. syphilis
 - c. chlamydia
 - d. chancroid

8. Genital Warts caused by the human papilloma virus is dangerous in that it is frequently associated with cancer of genitalia in both men and women.
true false
9. Once the venereal wart has disappeared with treatment, the danger of cancer developing is gone.
true false
10. Injection of _____ into genital wart has met with some success
- a. penicillin
 - b. interferon
 - c. vitamin C

VIRAL HEPATITIS
(most common in types U.S.)

Type	A	B	C
Average Incubation (days)	25	75	50
Spread	fecal/oral (poor sanitation) (careless food handlers)	parenteral (blood to blood) Sexual transmission	parenteral
Carrier state	no	yes	no
Cirrhosis and Liver cancer	no	yes	yes
Vaccination	yes	yes	no
Immune globulin	yes	yes	no
Jaundice frequent	yes	yes (1/3 cases)	no
Severity of Acute Illness (+=mild,++++=severe)	++ to ++++	++ to ++++	+ to ++
Chronicity	no (can relapse)	yes- 5%	yes-75-80%
Epidemics	yes	no	no

Signs and Symptoms of Acute Illness of Moderate Severity or Worse

Initial loss of appetite, nausea, extreme fatigue, vague abdominal pains
Followed by: Dark urine, pale stools, and yellow jaundice

Chronic Viral Hepatitis Illness

Commonly symptom free until late in the illness when the liver has become scarred.
Then the following often appear:
Swelling of hands, feet, and lower legs, present in AM on awakening.
Fatigue, joint and muscle pains, loss of appetite, belly swelling.
Vomiting blood from ruptured esophagus veins a terminal occurrence.

Carrier State – carrying the virus in the body without evidence of active disease in the liver. Virus can be transmitted to others. Seen in some patients with hepatitis B who appear otherwise healthy.

CQ: VIRAL HEPATITIS
(limited to Types A, B and C)

1. The only hepatitis of the three that is capable of the asymptomatic carrier state
 - a. Hep A
 - b. Hep B
 - c. Hep C

2. No vaccination developed and available for
 - a. Hep A
 - b. Hep B
 - c. Hep C

3. No immune globulin for
 - a. Hep A
 - b. Hep B
 - c. Hep C

4. The least likely to develop jaundice during the acute phase
 - a. Hep A
 - b. Hep B
 - c. Hep C

5. The most likely to become chronic
 - a. Hep A
 - b. Hep B
 - c. Hep C

6. The most likely to occur in epidemics
 - a. Hep A
 - b. Hep B
 - c. Hep C

7. The only one spread by fecal/oral contact (poor sanitation, careless food handlers)
 - a. Hep A
 - b. Hep B
 - c. Hep C

8. The least likely to develop cirrhosis and liver cancer
 - a. Hep A
 - b. Hep B
 - c. Hep C

9. The type most likely to be spread by sexual contact because of the high viral load in all body secretions, including semen and vaginal secretions
 - d. Hep A
 - e. Hep B
 - f. Hep C

10. The most probable to die from ruptured esophageal varices with GI hemorrhage (a complication of cirrhosis)
 - g. Hep A
 - h. Hep B
 - i. Hep C

LONG TERM WITHDRAWAL (TAPER) GUIDELINES

Long-term withdrawal from methadone requires 3 basic components:

1. The interval between dose changes to allow the body to adjust to the change.
2. The amount of the change.
3. Options to turn to if the plan does not work, for whatever reason.

Basic Premise – the percent of the change is clinically more important in the way a patient tolerates a dose change than the actual numerical change itself.

Example - a dose change from 100 mg to 95 mg is a 5% change

- A dose change from 10 mg to 5 mg is a 50% change
- The latter would be more stressful.

Interval - 7-10 days should allow enough time to adapt to the new dose

Amount of Change

180 to 100mg - 10 mg reductions
180-170-160 etc.

100 to 40 mg – 5 mg reductions
100-95-90 etc.

40 to 22 mg – 3 mg reductions
22-19-16 etc.

22 to 6 mg – 2 mg reductions
22-20-18 etc.

6 to 0 mg – 1 mg reductions
6-5-4 etc.

Options (by physician order)

Hold – patient may hold at a certain dose until such time that he/she notifies the physician that he/she wishes to resume the taper.

Resume – restart the taper from the point it was held.

Increase – raise dose to a higher holding dose – increments not to exceed 10 mg at a time.

Adjust Interval – may be a solitary increase or decrease of interval or a new interval for the balance of the taper.

CQ: LONG TERM WITHDRAWAL (TAPER) GUIDELINES

1. Basic premise – Percent reduction is more critical than reduction amount
true false

2. Recommended interval between reductions (minimum time)
 - a. 5-7 days
 - b. 7-10 days
 - c. 10-15 days

3. Amount of reduction is dependent on how high the dose is at the start.
true false

4. Recommended inclusions in the taper guidelines should not include
 - a. Patient allowed to hold at a certain level if discomfort too great
 - b. Resuming taper should depend on patient request
 - c. Schedule should be adhered to at all costs
 - d. If change in interval requested, it must be determined if one time only change or change in all future intervals as well

5. Patient should be allowed to elect methadone maintenance at any time in the taper.
true false

WOUND BOTULISM

Opening Comment

Botulism is a paralytic disease most commonly thought of as a food poisoning due to improper canning or food preparation. It produces the most potent bacterial toxin known to man. It is caused by a spore forming bacteria called *Clostridium botulinum*. Spore formation is a protective measure some bacteria have to protect themselves from harsh environmental conditions by developing a hard shell around their vital components. Spores commonly are found in soil and in marine environments. When conditions are more favorable, the bacteria's hard shell breaks down and the bacteria becomes active, with part of this activity being the production of toxins.

Wound botulism occurs when wounds become contaminated with spores and the bacteria become activated. This form of botulism differs from food born botulism in that it has a much longer incubation period (10 days vs. 18-36 hours) and has few if any GI symptoms such as vomiting and diarrhea. Its spores find their way into black tar heroin.

What The Toxin Does

The botulism toxin does not work on the brain per se but exerts its damage on the junction of peripheral nerves and muscle, the myo-neural junction. It inhibits the production and release of the neurotransmitter, acetyl choline in the muscles and gut.

It starts about the head and works downward - a descending paralysis without sensory findings.

Signs and Symptoms - early

General demeanor - usually alert and oriented to time and place (brain not being attacked by toxin). No fever (afebrile)

Eyes – sagging upper eyelids (ptosis)
blurred or double vision (diplopia)
pupillary reflex depressed
pupils fixed or dilated (1/2 cases)

Ears - dizziness

Mouth- difficulty speaking (dysarthria), talk as if mouthful of marbles

Throat – dry sore throat
difficulty swallowing (dysphagia)
gag reflex suppressed

AND A SHORT TIME LATER

Chest - diaphragm paralyzed – cannot breath – respiratory support (respirator) and intubation required – need for tracheotomy common.

Treatment- hospitalization stat for ventillatory support and botulism antitoxin
antibiotics
danger of horse serum anaphylaxis may require desensitization
respiratory support may be required for months

CQ: WOUND BOTULISM

1. Botulism causes paralysis from
 - a. The top of the head to below the diaphragm
 - b. Tip of the toes to the waist line
2. Clostridium botulinum, the organism causing the disease, produces the second most potent bacterial toxin known to man
true false
3. The botulism organism is capable of spore formation which is a process of going into a hibernation like state, gathering all their essential parts within a hard shell, and reemerging when circumstances are more favorable to their well being
true false
4. Whereas most cases of botulism are felt to be due to poisoning of food by the organism due to improper canning of certain foods, wound botulism organisms are found as spores
 - a. On surface of certain leaves
 - b. In wild animal excrement
 - c. In soil and marine environment
 - d. In the nests of birds
5. The botulism toxin goes straight to the brain to cause its paralytic effects.
true false
6. Botulism inhibits the production and release of which neurotransmitter
 - a. serotonin
 - b. dopamine
 - c. acetyl choline
 - d. nor-epinephrine
7. Even though the body is progressively being paralyzed in a descending pattern, patients are alert and oriented to what's going on
true false
8. Which of the following is not one of the early happenings as botulism develops
 - a. drooping of eyelids
 - b. inability to speak correctly
 - c. loss of knee jerk reflex
 - d. suppression of gag reflex
9. When paralysis reaches the diaphragm, respiratory support is required
true false
10. When respiratory support is needed, it is usually for just a few hours
true false

MARIHUANA (CANNABIS)

Marihuana, to say the least, is a very controversial drug. A comparison of marihuana's properties presented in two, highly regarded addiction text books gives the reader two opposing viewpoints on the drug.. One of these books paints a doom and gloom picture about marihuana, listing a myriad of adverse effects caused by the drug. Its counterpart addresses the same issues, but refutes the conclusion that a great number of these adverse side effects have been caused by marihuana, listing reputable studies to support their position.

Earliest record of human cannabis use dates back to 2737 BC in the Chinese compendium of medicines under Emperor Shen Nung. For some, Cannabis lined the route to Hades, while other thought it led to paradise. Marihuana was even controversial than!

Where does that leave those of us who practice in the addiction field?

There is no question that there are certain consistencies about the properties of marihuana that are not in dispute. We best acknowledge these consistencies as facts, and utilize these facts in dealing with our patients who use the drug.. We must not express as fact those unproven qualities of the drug and perpetuate possible falsehoods. What follows is what we know, and conversely, what must still be considered open issues since science has not yet conclusively shown them to be true. .

What we know with a degree of certainty

1. A cannabinoid neurotransmitter (Anandamide) was discovered in 1992. Neuroreceptors are found in the cerebral cortex, lower brain, and the hippocampus.
2. After inhalation or ingestion, cannabis produces the following:
 - a. Dreamy state of relaxation where thoughts and ideas disconnected
 - b. Distortion of time, color, and spacial relations
 - c. Feeling of well being lasting 2-3 hours.
 - d. In the novice user, paranoia and/or panic may occur.
 - e. Pulse rate accelerates.
 - f. Mouth gets dry.
 - g. Conjunctiva reddens
 - h. Depth perception, timing and tracking become impaired (hazardous combination if driving or working with dangerous machinery).
 - i. Appetite increases
3. Adverse Physical Side Effects
 - a. In marihuana smokers – bronchitis, wheeze, cough, increased phlegm, decreased pulmonary function, pre-cancerous lesions in bronchial tissue.
 - b. THC secreted in breast milk
 - c. Withdrawal rarely a significant problem. If present, lasts but few days (anxiety, insomnia, tremors, chills).

- d. May in psychotic prone individual precipitate psychotic episode.
- e. No known cases of fatal overdose.
- f. In novice user, initial lowering of sperm count and testosterone. Tolerance to this develops so that in experienced users, sperm count and testosterone levels same in both marihuana users and controls.

OPEN ISSUES (unproven or refuted by other studies about marihuana use)

1. Cognitive function diminished – not confirmed in major studies.
2. No fetal harm in offspring of marihuana smoking mother- so far none have been shown.
3. Small babies – no studies have been able to factor out all other indiscretions mother partaking in. Therefore, no controls.
4. Fetal damage – no study able to confirm increased risk of congenital anomalies, retardation, or post-partum neuro behavioral problems.
5. Dependency producing – dependency which takes the form of dwelling on use of the drug at the expense of job and interpersonal relationships far less that with alcohol, cigarettes, cocaine, heroin.
6. Long term use causes mental and/or emotional deterioration – 3 major studies in Jamaica, Costa Rica, and Greece showed no evidence of this as well as no evidence of intellectual/ neurological damage, personality change, loss of will to work (amotivational syndrome) or unwillingness to participate in society. Amotivational syndrome defined as passivity, aimlessness, apathy, uncommunicativeness, lack of ambition.
7. Gateway hypothesis – one drug opens the way to trying other, more harmful drugs – unsubstantiated.
8. Leads to violence and crime – unsubstantiated – in fact, just the opposite occurs.
9. Leads to sexual debauchery – no evidence
10. Damages immune and reproductive systems – based on animal studies only – refuted by very large Caribbean and Greek study. Marijuana smokers not shown to be more prone to infectious disease or cancer. Example - heavy marihuana use in 60s and 70s has not turned up a generation of infection prone, cancer prone baby boomers.

Does marijuana cause problems, or do problems cause the use of marijuana?

Shedler and Block Berkeley Study – two Berkley psychologist did a long term study of 101 San Francisco children ages 5 to 18. They gave them personality tests at ages 7, 11, and 18 years of age. By the end of the study 69% had used marihuana and 39% used it once a week or more. Large minorities had also used cocaine, hallucinogens, prescription stimulants and sedatives.

Three main groups could be distinguished: 29 “abstainers”, who had used no illicit drugs, 36 “experimenters” who had used marijuana only once a month and had tried at least one more drug, and 20 “frequent users” who had smoked marijuana at least once a week and had used at least one other drug. 16 did not fit into one of these categories and were not included in the study.

Striking personality differences appeared in childhood among the three groups and long before any drug use began. The frequent users as early as age 7 got along poorly with other children and had few friends. They could not think ahead and lacked confidence in themselves. They could not be trusted and were indifferent to moral questions. At age 11 they were described as inattentive, uncooperative, and vulnerable to stress. At age 18 they were insecure, alienated, impulsive, undependable, self-indulgent, inconsiderate, and unpredictable in their moods and behavior. They felt personally inadequate and also victimized and cheated. Theirs were the lowest grades of the three groups.

Abstainers, at age 7, were inhibited, conventional, obedient, and lacking in creativity. At age 11 they were shy, neat, and orderly, eager to please, but lacking in humor and expressiveness. At age 18 they were considered tense, over controlled, moralistic, anxious and lacking in social ease or personal charm. Grades were average.

The happy mean was in the experimenters. They tended to be warm, responsive, curious, open, active and cheerful from age 7 on. In personal happiness they were the highest achievers in relationships with others and rational self control.

To find reasons for some of the differences, experiments when the children were 5 were revisited and interaction with the parents analyzed, when parent and child were working on an experiment utilizing a maze and blocks. Mothers of both frequent users and abstainers tended to be cold and unresponsive. They gave their children little encouragement but insisted they perform well. The experiments seemed unpleasant for both parent and child. Fathers of frequent users did not differ from experimenters, but fathers of abstainers were impatient, hypercritical, and domineering.

According to the authors, frequent users feel they have nothing to look forward to and go for the instant gratification of the drug. Their alienation and impulsiveness might have roots in their relationship with their mothers. Problems of the abstainers are equally serious but call less attention to themselves and therefore seem less troublesome. They possibly have internalized the harsh, authoritarian nature of their fathers. The least disturbed were the experimenters who would be least likely to require psychotherapy for their drug use

CQ: MARIHUANA (CANNABIS)

1. Marihuana is a well studied drug and all authorities are in agreement about its properties and effects on the human body
true false
2. Neuroreceptors for cannabis have been found in the brain in the cerebral cortex, lower brain and hippocampus
true false
3. After inhalation or ingestion of marihuana, all of the following may occur except
 - a. Distortion of time and color
 - b. A slow pulse rate
 - c. Feeling of well being lasting several hours
 - d. Mouth gets dry
4. Side effects of marihuana include all of the below except
 - a. Bronchitis with wheeze
 - b. Precipitation of psychotic episode in psychotic prone patients
 - c. Initial lowering of sperm count and testosterone in the novice user
 - d. Seizures
5. Cognitive function diminished in chronic users confirmed in all major studies
true false
6. No study has been able to confirm long term use causes mental and emotional deterioration
true false
7. Marihuana users have been conclusively shown to be more prone to infectious disease and cancer
true false
8. According to the Shedler and Block Berkeley Study, which group of marihuana user participants were least likely to require psychotherapy for their drug use
 - a. abstainers
 - b. experimenters
 - c. frequent users
9. It has been well substantiated that marihuana use leads to violence and crime.
true false
10. No study has confirmed increased risk of congenital anomalies, retardation, or post-partum neuro behavioral problems in marihuana users.
true false

HIV / AIDS

Simply Stated- HIV is the germ. AIDS is the disease caused by the germ.

How HIV Does Damage – Nucleic acids are a group of substances found in all living cells. The two best known ones are **Ribonucleic acid (RNA)** and **Deoxyribonucleic acid (DNA)**. In most instances, when cells are reduplicated, the RNA takes the blue print information for the formation of the new cell from DNA memory banks found in chromosomes in the cell nucleus (dealing with heredity and genetic factors) and messengers these blueprints to a building site. Another group of RNAs transports amino acids to the building site to begin building proteins for the new cell. In other words, DNA is the brains and the planner, and RNA the brawn.

Some viruses use RNA as the storage site for memory banks rather than DNA. Human HIV is one such virus. It belongs to the retrovirus family, Retro Viridae. It has a very nasty secret weapon. This weapon is an enzyme called reverse transcriptase (RT). When the HIV virus invades the human cell, this enzyme gives the HIV RNA the ability to change the DNA in certain human body cells which deal with the body's ability to fight infection to look like the memory bank of HIV virus. itself. From that point forward, messages sent from the altered human DNA are messages to reduplicate the virus, not a new cell resembling the human cell. This would be equivalent to a rowdy student who, after barging in and disrupting a class lesson, sends the teacher to the school principle who becomes rowdy himself, rules in favor or the rowdy student, and fills the teacher's class with more rowdy students.

Transmission - Contact with body fluids, plasma, or exudates that contain the virus, including blood, semen, vaginal secretions, breast milk, saliva, or wound drainage. It is not spread by casual contact or droplet infection. Mosquito vectors do not spread the disease.

Greatest Risk - genital intercourse, especially anal receptive,
- needle sharing.

Acute Infection- experienced by 50-90 % of newly infected persons, 2-6 weeks after initial exposure. Duration of the acute illness is 1-2 weeks and can vary from mild to severity requiring hospitalization. An initial large burst of viral replication occurs before the body is able to rally its immunity. HIV antibodies usually appear in 6-10 weeks.

Signs and Symptoms

Fever	headache
Lymphadenopathy	nausea/ vomiting
sore throat	liver and spleen enlargement
maculopapular rash	thrush infections
ulcerations	weight loss
muscle/ joint aches	central and peripheral neurologic signs
diarrhea	

May have false positive heterophile test suggesting infectious mononucleosis.

Diagnosis

1. ELISA screening. Western blot confirmation if positive.
2. Evaluation of risk behavior.
 - IV drug use
 - Male homosexual contact
 - Sexual contact with persons known to have had HIV or at high risk.
 - Multiple sexual contacts
 - Blood transfusion 1977 to 1985

Treatment – early diagnosis and treatment during the initial acute infection may markedly improve long term therapy.

Decisions and Activities

1. Initiating antiretroviral therapy- designing individualized treatment
2. Monitoring for adequacy or failure of treatment. HIV 1 RNA titre for viral replication, CD4 cell count and symptoms for immunology damage.
3. Secondary treatment if inadequate initial response
4. Evaluating readiness of patient to adhere to rigorous medication regimen.

Treatment Goal

1. Maximally reduce viral replication to below detectable limits with rise in CD4 count.
2. Minimize viral resistance to medication.
3. Minimize side effects of medications.

Opportunistic Infections Characteristic of AIDS

1. Pneumocystis carinii Pneumonia- begins when CD4 count 200 cells/ml.
2. Tuberculosis
3. Cryptococcal Meningitis
4. Toxoplasmosis Encephalitis
5. Herpes Virus Infections – simplex, Zoster, cytomegalovirus (CD4<100 cells)
6. Thrush of mouth, trachea, esophagus (CD4 around 400 cells)
7. Disseminated Mycobacterium avium Complex
8. Neoplasms
 - Invasive Cervical Cancer
 - Kaposi's Sarcoma
 - Non Hodgkins Lymphoma

Neurological Disorders

1. Cognitive/motor disorder
2. Dementia
3. Peripheral neuropathy.

Aids Related Weight Loss- common in all stages of HIV infection.

8. Which of the below is not a treatment goal for HIV
 - e. reduction of viral replication to below detectable limits
 - f. hold CD4 count steady or minimize reduction
 - g. minimize medication side effects
 - h. minimize viral resistance to medication

9. Which of the below is not considered an opportunistic infection for AIDS
 - i. Pneumocystis carinii pneumonia
 - j. Hodgkin's lymphoma
 - k. Kaposi's sarcoma
 - l. Toxoplasmosis encephalitis

10. HIV may cause a false positive heterophile test (test for infectious mononucleosis)
true false

CLUB DRUGS

(IN SOME CASES FORMERLY KNOWN AS DESIGNER DRUGS)

- **ECSTASY** (also known as MDMA)

Definition- a psychoactive drug with structural similarities to both amphetamines and psychedelic phenethylamine (mescaline)

History – first developed in Germany as an appetite depressant in 1912. Studied by both the U.S. Army in the 1950s for espionage/counter-espionage and by the CIA in the 1960 due to the growing counter culture movement. Used as a psychotherapeutic adjunct to increase empathetic rapport by underground psychiatrists in the 1970s. It re-emerged in the 1980s as a popular street drug for college age students which prompted the DEA to place it in schedule 1 (experimental drugs with no proven medicinal use). It then went underground without composition controls and complications ensued including sudden death from serotonin depletion.

How used – taken orally as a tablet, commonly at Rave concerts

Effects – increases heart rate and blood pressure and may lead into increase in body temperature that when undetected can cause cardiac and kidney failure. Very dangerous when combined with alcohol. Chronic abuse can cause long lasting toxicity to the brain. Can cause congenital abnormalities in infants whose mothers used the drug during pregnancy.

- **GHB** (gamma-hydroxybutyrate, also known as liquid ecstasy)

Description – a clear, odorless liquid acting as a central nervous system depressant. High overdose potential.

How used – slipped into drink of potential victim of date rape without their knowing it. Victim sedated, often to the point of helplessness. Victim has amnesia for the events that follow. When taken voluntarily, because of the inconsistencies of its manufacturing by amateurs, coma and respiratory arrest may develop. The individual may have to go through resuscitation of an unpleasant nature, but due to the amnesic effect, he/she cannot remember the events and the events therefore cannot act as a deterrent to use of the drug in the future.

- **ROHYPNOL** (Roofies)

Description – a benzodiazepine sedative like Valium with amnesia effects.

How Used – since the tablet is odorless and tasteless, it can be slipped into the beverage of an unsuspecting, date-rape victim without their awareness. The amnesic effect makes it difficult if not impossible for the victim to identify their assailant.

- **KETAMINE (Special K)**

Description – a veterinary anesthetic producing dissociative dream-like or hallucinatory effect. It is used as a liquid to be applied to marijuana or tobacco or as a powder to be snorted like cocaine

How used – smoked or snorted for a euphoric high.

- **METHAMPHETAMINE (Meth, Speed, Ice, Glass, Crystal, Crank)**

Description – a highly addictive stimulant that can be snorted, smoked, injected, or taken orally. It causes increased levels of activity, excited speech, and decreased appetite.

How Used – any of the above ways

Toxicity – Depletes dopamine and norepinephrine supplies in body. Can cause violent behavior, memory loss, psychotic behavior and cardiac damage.

- **LSD (lysergic acid diethylamide, acid, blotter, cubes, dots, L, Sugar)**

Description – a powerful hallucinogen ingested orally, usually on squares of blotter paper, sugar cubes, or pills that have absorbed the liquid drug.

Effect – produces profound abnormalities in sensory perception, including distortion of sound and sight, and emotional effects that create rapid mood swings ranging from intense fear to euphoria. Users cannot tell boundaries between things. Potency of LSD is 100x's that of magic mushrooms (Psilocybin) and 4000 x's that of Mescaline. Can have very unpleasant "bad trips" that can return as flashbacks for extended period of time.

CQ: CLUB DRUGS

1. This drug was used by the CIA in the 1960s due to the growing counter culture movement.
 - a. Crystal
 - b. LSD
 - c. Ecstasy
 - d. Heroin

2. Ecstasy has structural similarities to amphetamine and the psychedelic
 - a. LSD
 - b. Marihuana
 - c. Mescaline
 - d. Psilocybin

3. This drug is popular at Rave concerts but due to increased pulse rate, blood pressure and core body temperature can cause cardiac and kidney failure
 - a. GHB
 - b. Psilocybin
 - c. Special K (Ketamine)
 - d. Ecstasy

4. Roofies (Rohypnol) is commonly called the date rape pill and belongs to which family of drugs
 - a. Benzodiazepines
 - b. Barbituates
 - c. Opiates
 - d. Narcoleptic

5. This drug, also known as liquid ecstasy has high overdose potential and frequently requires unpleasant resuscitation with amnesia for the event so that there is no deterrent for future use (no bad memory).
 - a. Rohypnol
 - b. GHB
 - c. LSD
 - d. Crystal

6. A veterinary anesthetic which can be smoked with marihuana or snorted like cocaine
 - a. LSD
 - b. Ketamine
 - c. Ecstasy
 - d. Meth

7. This drug depletes dopamine and norepinephrine in the body and can produce a prolonged euphoric high

- a. Speed
 - b. LSD
 - c. Ecstasy
 - d. Liquid Ecstasy
8. This powerful hallucinogen produces profound sensory distortions. It is not
- a. 100 times more potent than magic mushrooms
 - b. 4000 times more potent than mescaline
 - c. capable of producing rapid mood swings
 - d. free of unpleasant side effects
9. Meth, Speed, Ice, Glass, Crystal, Crank are all used to name
- a. Ecstasy
 - b. Methamphetamine
 - c. Amphetamine
 - d. Heroin
10. Inability to tell boundaries between things is characteristic of being under the influence of
- a. GHB
 - b. Meth
 - c. Roofies
 - d. Acid

SUBSTANCES ALTERING METHADONE EFFECTS

Rule of Thumb – drugs or other substances which acidify the urine speed up elimination of methadone through the kidneys, thereby shortening its duration of action. Similarly, drugs and other substances that alkalinize the urine slow down elimination of methadone and therefore prolong its duration of actions.

- Examples:*
1. The ulcer medication Tagamet makes the urine more alkaline. Therefore, it makes methadone last longer.
 2. Cranberry juice acidifies urine and is commonly recommended for patients with recurring bladder infections to help prevent recurrences. This would shorten methadone's effectiveness.

Drugs Increasing Plasma Levels or Increasing Methadone Effectiveness

1. amitriptyline (Elavil, Limbitrol, Triavil) used for depression and anxiety
2. cimetidine (Tagamet) – mentioned in above example.
3. diazepam (Valium) for anxiety and stress
4. ethanol (wine, beer, whiskey)
5. fluvoxamine maleate (Luvox) – antidepressant and compulsive disorders
6. ketoconazole (Nizoral tablets) anti fungal agent
7. urinary alkalinizers (Bicitra, Polycitra) – to prevent acid forming kidney stones.

Drugs Lowering Plasma Levels or Lowering Methadone Effects

1. barbiturates (Phenobarbital, Butabarbital, Seconal) for anxiety or sleep.
2. carbamazepine (Tegretol) for seizures or some types chronic pain
3. ethanol (wine, beer, whiskey)
4. phenytoin (Dilantin) for seizures
5. rifampin (Rifadin, Rifamate, Rifater, Rimactane) tuberculosis antibiotic
6. urinary acidifiers (vitamin C, K-Phos) for calcium type kidney stone formers
7. tramadol (Ultram) for pain (decreases opiate levels in general)

Drugs Not to be Used with Methadone Because They Can Precipitate Withdrawal

1. Naltrexone (ReVia) for treatment of alcoholism or opiate blockade
2. Opiate Agonist/Antagonists – (Buprenex, Stadol, Dalganr, Nubain, Talwin)
These drugs have both pain relieving qualities as well as opiate antagonist properties.
3. nalmeferne, naloxone (Revex, Narcan) – reverse opiate effects.

Additional Factors Impacting Methadone Metabolism

1. Psychoactive medications such as sedatives (Valium) and antidepressants (Elavil) can increase the drowsiness felt in some instances with methadone.
2. Protease is an enzyme which breaks down protein into its amino-acid components. Protease inhibitors are used as anti-infective agents in the treatment of HIV. Like methadone, protease inhibitors are metabolized by the liver and certain of them, ritonavir and indinavir inhibit methadone metabolism to the point that they can cause a 50% increase in serum concentration of methadone. Saquinavir does not appear to have this effect.

3. Hepatitis B and C may alter methadone metabolism in the liver and produce unexpected blood levels- up or down.
4. Acetaminophen (Tylenol) is inherently toxic to the liver and prolonged or heavy use may alter methadone metabolism.
5. Grapefruit juice (not orange juice) may increase methadone effect when the two are regularly taken together. The precise reason is not known but it is believed grapefruit juice inhibits certain liver enzymes, possibly through its flavinoids.
6. Tagamet is sometimes used to offset the increased metabolism of methadone caused by the antiseizurals Dilantin and Tegretol.
7. Methadone metabolism has been known to vary according to ethnicity; i.e. differences have been noted between African Americans, Asians and Caucasians.
8. For unknown reasons, some persons are naturally aberrant metabolizers and “burn off” methadone at up to 4 times faster than others.

CQ: SUBSTANCES ALTERING METHADONE EFFECTS

1. As a rule of thumb, drugs and other substances which acidify the urine _____ elimination of methadone in the kidneys and those that alkalinize the urine _____ its elimination.
 - a. speed up, slow down
 - b. slow down, speed up

2. Which of the following does not increase plasma level or effectiveness of methadone?
 - a. Tagamet
 - b. Elavil
 - c. Luvox
 - d. ReVia

3. Which of the following does not lower plasma level or effectiveness of methadone?
 - a. Tegretol
 - b. Rifampin
 - c. Valium
 - d. Ultram

4. Which of the drugs below is not contra-indicated when patient on methadone
 - a. Ampicillin
 - b. Nubain
 - c. ReVia
 - d. Narcan

5. A patient on methadone and tegretol will hold his/ her dose better if they also use high dose cranberry juice.

true false

6. For unknown reasons, some patients are rapid metabolizers of methadone and their dose will not hold them 24 hours.

true false

7. _____ juice will help hold a patient's dose longer whereas _____ will have the opposite effect.
 - a. orange, grapefruit
 - b. grapefruit, orange

8. Which of the following drugs may help offset the effects of Tegretol and Dilantin on methadone metabolism?
 - c. Phenobarbital
 - d. ReVia
 - e. Tagamet
 - f. Ethanol

9. Great caution must be used during the stabilization phase of methadone maintenance for patients on psychoactive medications including anti psychotics and some antidepressants because
 - a. They interfere with the enzymes that regulate the metabolism of methadone
 - b. Their side effects, especially sedation, may be cumulative with the sedating quality of methadone and overly sedate the patient

10. Methadone metabolism has been known to vary according to ethnicity.
true false

URINE DRUG SCREENING

Types of Tests

Screening Tests

1. **Thin Layer Chromatography (TLC)** –least sensitive of all screens. Can easily miss marihuana, PCP, LSD, MDA, MDMA, mescaline and fentanyl. Requires subjective reading by the technician for determining results – a potential source of error.
2. **Radioimmunoassay (RIA)** - antibodies seek out specific drugs. Compounds structurally similar to sought drug can cross react giving false positives.
3. **Enzyme immune assay (EIA)** – acts similarly to RIA. It is more sensitive for most drugs than TLC and at lower drug concentrations.
4. **Enzyme Multiplied Immunoassay Technique (EMIT)** -most commonly used screening test. Measures only drug metabolite. Therefore requires confirmation with another test in positives

Confirmatory Test

1. **Gas Chromatography- Mass Spectrometry (GC/MS)**

This test is **the gold standard** for confirmation of screening tests. It provides very specific identification of drugs.

When a Screening Test is Positive - When a screening test is positive, it is confirmed either with another screening test or GC/MS. The latter is the more accurate but also the more expensive.

Test Panels of Abused Drugs Performed by Laboratories

<u>Required*</u>	<u>Commonly Performed</u>	<u>Not Commonly Done</u>
Amphetamines	Barbiturates	LSD
Cannabinoids	Benzodiazepines (Valium)	Fentanyl
Cocaine	Methadone	Psilocybin (Mushrooms)
Opioids	Propoxyphene (Darvon)	MDMA (Ecstasy)
Phencyclidine-(PCP)	Methaqualone (Qualude)	MDA
	Ethanol (alcohol)	Club Drugs

* *Testing required for certification by DHHS/SAMHSA National Laboratory Certification Program. Department of Transportation (DOT) standards.*

Cut Off Point – a predetermined point dependent on drug concentration below which a drug will not give a positive reading. It is set high enough to pick up recent use (within 48-72 hours) but not pick up small amounts of drugs that have a long half life and are stored in the tissues for a long period of time. It is also set high enough that casual exposure to a drug, such as a person being in a room where there is a high concentration of marihuana smoke, will not cause a positive test if the person is not smoking the drug themselves.

Special Considerations

Alcohol – The breathalyzer is mandated by the Department of Transportation (DOT) for alcohol determinations. As discussed under classes of drugs, a breathalyzer reading of 0.10 will be accompanied by horizontal nystagmus, and a reading of 0.30 with vertical nystagmus.

Marihuana (Cannabis, THC)- having a great affinity for fatty tissues, marihuana can remain stored in fat for extended periods and be slowly released.. These stores will usually cause marihuana urine levels below the cut off point of screening which is 50 ng/mL. In chronic, heavy users, high levels have been reported for as long as 70 days.

Marinol is a legal prescription drug for THC used to treat nausea from chemotherapy and for appetite stimulation in patients with AIDS..

Cocaine – false positives for cocaine do not exist since what is measured is the metabolite of cocaine, **benzoyl ecognine**. There is, however a topical anesthetic used in emergency rooms, by ophthalmologists, by dentist, and by ENT specialists called TAC. This is a mixture of tetracaine, adrenalin and “cocaine”. Other anesthetic drugs with the “caine “ suffix will not give a positive test for benzoyl ecognine.

Amphetamines – a great number of over the counter medications such as pseudoephedrine and phenylpropanolamine have chemical structures similar to the amphetamines and will test positive for them on screening tests. However, only amphetamine and methamphetamine and their metabolites will test positive with the GC/MS test. There are, however, a great number of prescription medications that will give positive GC/MS results since they contain amphetamine and methamphetamine. To name a few: Dexedrine and Desoxyn (amphetamines), plus those that break down to methamphetamine, such as Benzphetamine and Selegiline.

Among non-prescription medications, only the Vicks nasal inhaler causes a positive GC/MS test for methamphetamines. Methamphetamines come in two forms. Those that refract light to the right- the most psychoactive form- called dextro or d-forms and those that refract light to the left, called levo or l-methamphetamine. The methamphetamine in Vicks refracts light to the left. Some labs routinely check for d-l (chiral) separation on all tests that are positive for methamphetamine. If less than 80% of l-methamphetamine is present, Vicks cannot be accepted as the cause by DOT standards.

Opiates- Ingestion of poppy seeds and poppy seed pastes, because they are products of the same plants that yield morphine and codeine, can cause questionable positives as to the cause of the positive. This is not the case if the lab can isolate a heroin metabolite 6 monoacetylmorphine (also called 6AM, 6 MAM, and MAM). This problem can be eliminated if labs raise their cut-off levels to 2,000 nanograms/mL. Federal testing call only for testing morphine and codeine. Other prescription opiates such as hydrocodone (Vicodin), Dilaudid, and Hydromorphone, which do not contain nor metabolize to morphine or codeine cannot explain a positive test.

Clinically, it is important to remember that when checking for opiates that do not contain or metabolize to morphine or codeine (examples- hydrocodone found in Vicodin and Lortabs, or oxycodone found in Percocet or Oxycontin), the specific opiate must be requested to be checked on the lab order sheet, i.e. hydrocodone, oxycodone etc.

Shy Bladder – Federal standards (DOT) state that a person who cannot supply an adequate amount of urine for study may be given up to 40 oz of fluid and three hours to produce a specimen. If at the end of this time the patient has not produced a specimen, the patient is requested to have this condition evaluated by a physician of patient choice and a report forwarded to the facility. From this information a decision is made how to treat the patient thereafter. Acceptable diagnoses: urinary tract dysfunction, pre-existing and documented psychological condition.

Dilution, Substitution, or Adulteration – “High Times”, a drug oriented tabloid keeps users informed how to escape detection in drug test.

Dilution - diluting the urine sample collected so that the drug concentration falls below the cut off point. This ploy usually fails because it is difficult to keep the specimen at the right temperature. The temperature of the urine specimen should be determined within 4 minutes of collection. If this temperature falls outside the 90-100 degree limit, the patients temperature should be taken . If patient temperature not within 1.8 degrees Fahrenheit of the specimen, an observed specimen is immediately taken and both specimens submitted to laboratory.

Dilution can also be attempted before collection by drinking a large amount of liquid before the specimen is taken. In this case urine temperature would be acceptable, but the sample would be reported as “dilute”. Dilute is a specific gravity of 1.003 and creatinine of less than 0.2 Gm/dl A dilute specimen calls for an observed specimen at the next scheduled collection time.

Adulteration of Specimen – Additives that have been used in the past to mask a dirty urine, to mention but a few, include Urinade, MaryJane Superclean (a detergent), and Klear (potassium nitrite) . These will be reported as “specimen unsuitable for testing” and calls for an observed urine.

CQ: URINE DRUG SCREENING

1. The least sensitive of all screening tests is
 - a. Thin layer chromatography
 - b. Radioimmunassay
 - c. Enzyme immune assay
 - d. Enzyme multiplied immune assay

2. When confirming a positive screening tests, only the Gas Chromatography-Mass Spectrometry (GC/MS) may be used.
true false

3. Which is the inaccurate statement about cutoff point?
 - a. Is set to pick up small amounts of drug which have long half life
 - b. Is based on drug concentration below which point the test will be negative.
 - c. Most commonly it is set to pick up drugs used within past 48 to 72 hours.
 - d. Is set high enough that casual exposure will not cause a positive test.

4. A breathalyzer test for alcohol of 0.30 will commonly be accompanied by vertical nystagmus in the patient.
true false

5. High levels of marihuana in heavy users has been reported as long as ____ days later
 - a. 25
 - b. 40
 - c. 55
 - d. 70

6. False positive cocaine results commonly result from use of head cold medications
true false

7. Only _____ will test positive for methamphetamine using GC/MS
 - a. Pseudoephedrine
 - b. Vicks nasal inhaler
 - c. Dexedrine
 - d. Phenylpropanolamine

8. 6 Mam will help establish than an opiate positive was caused by poppy seed ingestion
true false

9. In the standard urine drug screen, hydrocodone (Vicodin), oxycodone (Percocet), and Dilaudid will not be reported as a dirty because they do not break down to Morphine or Codeine
true false

10. When a patient tries to disguise a dirty urine by drinking large amounts of water in hopes they will dilute the urine to below the cut off point of the test, it will cause an abnormally low specific gravity. The urine is considered altered when specific gravity is _____ or less.
- a. 1.005
 - b. 1.003
 - c. 1.001

LABORATORY & OTHER DIAGNOSTIC STUDIES **(THEIR INTERPRETATION)**

Mandated for Admissions

RPR (Rapid Plasma Reagin)- the screening test of choice for the venereal disease Syphilis. Syphilis is caused by a corkscrew shaped bacteria named Treponema Pallidum, and is usually transmitted sexually, although it can be passed from pregnant mother to fetus. It can cause multisystem organ damage including but not limited to damage of the brain, heart and blood vessels. If undetected and untreated, it can persist and do damage throughout a patient's life time. The RPR is not highly specific and false positive tests are not uncommon, especially in those with increased globulin proteins which are the proteins used by the body for formation of antibodies against diseases. Elevations of these proteins are common in heroin addicts due to the high rate of liver and other chronic diseases in this population. Positive RPR confirmation is done by testing for antibodies specific for the treponema organism itself, a more expensive procedure. The two most common tests used for this purpose are the fluorescent treponemal antibody- absorbed (**FTA-ABS**). and the microhemagglutination assay for T. pallidum (**MHA-TP**). **RPR Titre** is a test used to measure activity of the disease (high titre found in active disease) and/or response to treatment (lowering of titre after treatment) and is performed by repeatedly testing of progressive dilutions of patient serum until the RPR test is no longer positive,

PPD – (Tuberculin protein purified derivative) – skin test for presence of tuberculosis (TB) antibodies. A positive test does not mean that an active infection is present. It calls for the performance of a chest X-ray. Suspicious chest X-ray findings in turn call for sputum (coughed up mucus) cultures to confirm the diagnosis of this disease.

False positive PPDs are commonly found in immigrants coming from countries where BCG (Bacille Calmette-Guerin) shots are given to immunize against TB. BCG shots characteristically leave a scar found on top of the shoulder similar in appearance to the scar formed after a smallpox vaccination is given. Scar location is important here since Smallpox vaccination scars are found further down the arm over the deltoid muscle. or on the outside of the thigh in women. Some states in Mexico give the BCG injection which is an important consideration in areas having a high, Mexican immigrant population.

Of note, the BCG shot is not felt to be a significant deterrent to acquiring TB.

Mandated For Ongoing Methadone/LAAM Maintenance Treatment

Urine Drug Screens – these screens include the standard drug screens as determined by the Department of Transportation (DOT) as well as testing for methadone and methadone metabolite. DOT screens were designed to search out illicit drugs, not prescription drugs, although prescription drugs can cause a positive result. Examples of these misleading results would be a patient using codeine for pain causing a positive opiate screen, or a patients use of a decongesting cold preparation containing epinephrine analogues causing a positive amphetamine screen. In the former, codeine is in the same class of drugs as heroin, i.e. the opiate class, and in the latter case, epinephrine like drugs are in the same class of drugs as the

amphetamines, i.e. the stimulant class of drugs. As a general rule, drug screens have cut-off levels in terms of drug concentration high enough to detect recent use and not accidental exposure. Concentrations below the cut-off will not register a positive. Drug dosage can cause misleading negative results if the dose is not high. As an example, methadone and methadone metabolite should be present in patient urines when doses are maintained at 25 mg of methadone/ LAAM or above. Doses below this level will on occasion be negative for methadone, methadone metabolite, or both.

Methadone found without metabolite may not be treated as a dirty from a legal point of view due to current regulations. It must, however be viewed as a suspicious finding, especially in those patients receiving take-homes. The concern here is that the possibility exists that one or more of the take homes might not be being used by the patient themselves, but rather sold on the street. A little is retained by the patient and poured into a requested urine sample to give the appearance that the patient is using his take homes.

In those patients not having take homes, a finding of methadone alone could represent urine tampering in that the patient might very well be using someone else's urine and trying to pass it off as their own. The methadone could have been collected at an earlier time by spitting a portion of a dose into a cup or some other type container if the dispensing nurse was not paying close attention to the patient ingesting the methadone or if the nurse was distracted. The methadone would then be added to the falsified urine..

Methadone metabolite found alone in a patient with take-homes and no reason to suspect rapid metabolism is also viewed with some degree of suspicion and suggests a passage of at least several days since patient's last methadone ingestion. Here, one again questions if some of the take-home supply could possibly have been diverted.

Methadone Metabolite alone might be a quite innocent finding in a patient, with or without take homes, in those with clear cut pictures of accelerated methadone metabolism, with or without contributing medications known to increase methadone metabolism.

Methadone and methadone metabolite both absent in patient on doses over 25 mg is considered a dirty. In patients on take homes this could occur due to such things as:

- a. Out and out diversion of the take homes
- b. Patients trying to flush out an illicit substance by ingesting a very large amount of water hoping to wash out an illicit substance or hoping to dilute the urine so much that the concentration of the illicit substance(s) falls below the cut off point for detection. In the process, methadone and methadone metabolite also fall below their cut off point. The lab will pick up on this because the urine will have very little color and a low specific gravity (i.e. low density)
- c. Using someone else's urine to avoid detection of an illicit substance.
- d. Ultra rapid metabolism of the methadone in which case patient should have all the signs and symptoms consistent with this condition including dose wearing off very early, and occasionally, with drowsiness occurring several hours after dosing. Ultra rapid metabolism could also be the explanation for patients with or without take homes, and on doses over 25 mg,. who fail to show methadone and methadone metabolite in the urine.

Urines reported as not examinable by the lab refer to urines deliberately contaminated with an adulterant by the patient and are automatically considered dirty.

Elective Labs Pertinent to Opiate Addict Populations-(**normal values for tests are approximate and disease conditions suggested by abnormalities are representative only, with no attempt made to be comprehensive with either**)

CBC (complete blood count) – includes the following:

- **RBC** (red blood cell count) – RBC function – to carry oxygen to body tissues - normal values roughly 4-5 ½ million/microlitre. – below 4 million suggests anemia. Variations in size and shape of RBCs seen with different types of anemia.
- **WBC** (white blood cell count) – WBC function – infection fighting and immunity – normal values 5-10 thousand – counts over 10 thousand suggest bacterial infection – counts less than 5000 suggest viral infection. 2 numerically predominant types of WBC:
- **Polys** which ingest (eat) invading organisms and substances and **Lymphocytes** which immobilize invaders by forming antibodies. There are a lesser number of other WBC cell types which need not be discussed here.
- **Hb** (Hemoglobin)- an iron compound found in the nucleus of the RBC which has the capability to carry oxygen and which gives the RBC its red color. Normal value 12-16 gm/deciliter with men generally having higher counts than women. Low hemoglobin also implies anemia.
- **Differential smear-** a stained blood smear used to determine the proportions of types of WBCs to one another, evaluate the size and shape of RBCs, and estimate the number of **platelets** (clotting elements). The average proportion of polys to lymphs is roughly 70/30. In acute bacterial infections the poly % rises and the lymph % decreases on the smear. In viral infections the lymph % tends to increase and the poly % decrease. In end state liver disease (advanced scarring of the liver) the platelet count drops.
- **HCT** (hematocrit) – the packing down of RBCs in a collection tube by means of the centrifuge – helps determine the average size of RBCs when evaluating anemias. Average HCTs range between 42-52 % of sample volume, with women running lower % than men. In acute blood loss both HCT and Hb will show marked decreases.
- **Indices** are both measured and computed measurements of average RBC cell size, volume, and hemoglobin amount.. Macrocytosis indicates a larger than average cell and microcytosis a smaller than average cell. Hyperchromia implies greater than average hemoglobin per cell and hypochromia, lesser than average. Indices give clues to the origin of anemias and can be useful in other ways such as identifying patients with possible chronic alcohol abuse. In these cases. an index called the mean corpuscular volume (MCV) can be elevated.

Blood Chemistries- These are measurements of products of normal bodily functioning. When found outside normal ranges, disease may be present. The word “may” is used here since extremes of activity may cause elevations of some chemistries in perfectly healthy people. An example of this would be an enzyme study called the CPK. This enzyme can be found in both the heart as well muscle tissue. It will be elevated after a person has a heart attack, and also when a perfectly healthy person runs a marathon. In the first case the enzyme goes up

due to liberation of increased CPK due to heart muscle damage, and in the second, due to breakdown of muscle tissue due to extreme usage. As a side note, this illustration should point out that basing diagnoses solely on the basis of lab results is fool hardy. A careful medical history must be performed to put any lab result into perspective.

Blood chemistries are usually (but not exclusively) done as a group. When a group of chemistries are done all at one time through the use of an analyzer, they are frequently referred to as an **SMA** (Sequential Multiple Analyzer) followed by a number which reflects how many chemistries are to be performed; example – SMA 12 will measure 12 chemistries, SMA 24 will analyze twice that number.

What follows will be studies representative of chemistries performed in an SMA. The list of studies will not be exhaustive, nor will the information given about each test. be in great detail. This outline should be viewed as an overview.

Glucose (blood sugar) performed on an empty stomach (fasting), two hours after eating (two hour post prandial- abr. 2HPP), or randomly.

Normal values Fasting – 75-115 mg/dL, over 140 mg/dL = **Diabetes Mellitus**
Normal value 2HPP - below 140 mg/dL, 140-200= impaired gluc. Tolerance
Over 200= Diabetes Mellitus

Hypoglycemia (low blood sugar)– occurs when glucose drops below 50 mg/dL. This is a common complication when diabetes treated with insulin. Since the brain's only fuel is glucose, hypoglycemia can cause shock, seizures and coma, all of which can be life threatening.

Normal values for random glucose range from 75-125 mg/dL.

Blood Urea Nitrogen (BUN) and Creatinine- both of these chemistries measure kidney filtration. When the kidneys begin to fail the BUN rises. As the kidney failure becomes very advanced, the creatinine rises. Creatinine elevation is a very poor prognostic sign.

Normal values BUN – 10-20 mg/dL
Normal values Creatinine – less than 1.5 mg/dL

Blood Proteins -Albumin, Globulin, and A/G ratio

Albumin – Albumin is a large protein which has two primary functions:

- a. Because of its size it increases the osmotic pressure within the blood vessels to prevent leakage of the fluid part of the blood into surrounding tissues. Osmosis works on the basis that denser substances or fluids attract fluids to themselves more than less dense sources.
- b. It serves as a piggy-back carrier of certain substances which are not water soluble throughout the blood vessel system

Globulin – Smaller protein known best for the part they play in forming antibodies in the body's immune system.

CQ: LABORATORY INTERPRETATION 1

1. All of the below are true of the RPR except
 - a. is a screening test for Syphilis
 - b. can be tested after repeated dilutions of serum to establish an RPR titer which can be used to evaluate active infection and response to treatment.
 - c. Is a definitive test and does not require confirmation when positive.
 - d. Is not a definitive test and does require confirmation when positive.

2. All of the above are true for the PPD except
 - a. A positive test indicates a patient has an active disease
 - b. False positive tests occur with patients who have received BCG injection to immunize against TB
 - c. A newly positive test calls for a chest X-ray

3. Department of justice drug screens were designed to seek out primarily illicit drugs of abuse and prescription drugs which get abused.
true false

4. Drug screens for cocaine are frequently positive when patients take head cold preparations such as pseudoephedrine
true false

5. Both methadone and methadone metabolite might be reported as negative when patient dose is below 20 mg.
true false

6. The presence of methadone but not methadone metabolite on a urine drug screen is not considered dirty by regulatory standards, but from a pragmatic point of view is suspicious of urine tampering.
true false

7. Low platelet counts which can represent evidence of probable end state liver disease can be found when lab is reviewed as a part of the test called CBC
true false

8. BUN and Creatinine are tested as a package to detect brain damage.
true false

9. Bilirubin is a pigment which when produced to excess in the body can cause yellowing of the skin and whites of the eyes (jaundice). Of note, yellowing of the skin alone is probably not jaundice.
true false

10. Pick the incorrect statement below.

- a. albumen contributes to the osmotic pressure in the blood vessels helping to hold fluid in these vessels
- b. albumen acts to carry non water soluble substances through the blood vessels in a piggy back manner.
- c. albumen is used by the body as an infection fighter
- d. in the healthy person, albumen and globulin proteins are in a ratio to one another with the albumen being the great number.

CQ: LABORATORY INTERPRETATION 2

1. “Brittle Bones and Kidney Stones” in this expression usually refers to a high output of calcium controlling parathyroid hormone, usually caused by a parathyroid tumor, which pulls calcium from the bones raising blood calcium levels and causing the formation of calcium type kidney stones and weakened bones.
true false
2. Alkaline Phosphatase elevations usually are caused by two conditions below but not by the third which is
 - a. bone disease such as metastatic cancer to bone from prostate cancer
 - b. bile drainage disease such as occurs when a tumor block the common bile duct
 - c. pancreatic tumor induced hyperinsulinemia
3. Select the incorrect statement dealing with electrolyte and fluid balance in the body
 - a. 2/3s of body water is inside the cells and 1/3 outside
 - b. Sodium is the principal positively charged ion in the extracellular fluid
 - c. Electrolytes are named electrolytes because of their ability to conduct electrical impulses when in solution
 - d. Chloride is the principal positively charged ion inside the cells
4. Uric acid is an end product of purine metabolism. Purines are the proteins within the nucleus of a cell including RNA and DNA. When uric acid present to excess it causes an arthritis called gout (big toe most commonly involved) and gall stones.
true false
5. GGT by itself is the liver enzyme which specifically marks alcohol liver disease
true false
6. In alcoholic hepatitis the ratio of AST (SGOT) to ALT (SGPT) is greater than 2. This combined with an elevated GGT (at least twice value of alkaline phosphatase) strongly support the alcoholic hepatitis diagnosis
true false
7. Extra sensitive TSH and free T4 are 98% specific in determining status of thyroid gland
true false
8. HBsAG (hepatitis B surface antigen) is positive early in the disease and implies infectivity. If it persists after the patient becomes free of symptoms and anti-HBs does not develop, patient is an asymptomatic carrier of the disease or has chronic Hepatitis B
true false
9. Routine screens for hepatitis should include two of the below but not
 - a. HBsAG
 - b. Anti-HCV
 - c. HDV
10. Type 1 genotype of Hep C responds well to interferon , but type 2&3 do not
true false

COUNSELOR'S QUIZ ANSWERS

true=a false=b

TOPICS	PAGE #	1	2	3	4	5	6	7	8	9	10
MM/How & Why	5	c	c	a	c	c	a	c	d	b	d
MM/Split Dosing	9	c	a	a	a	b	c	c	b	b	a
Mth Half Life	12	b	b	c	c	c	d	b	d		
Guidelines StbDose	17	b	c	b	b	a	a	a	a	d	a
Addiction/Phys Dep	19	a	d	b	c	d					
Class Drugs	21	c	a	b	c	d	d	b	d	b	a
Soft/Tissue/Infect	26	b	b	b	c	a	c	a	b	a	b
Infective Endocarditis	30	c	a	c	b	a	b	b	a	a	b
TB	34	a	b	c	b	d	d	a	c	c	b
STD #1	37	c	b	b	b	b	b	c	c	b	b
STD #2	41	b	b	a	b	c	d	a	a	b	b
Viral Hepatitis	44	b	c	c	c	c	a	a	a	b	c
Long Term Taper	47	a	b	a	c	a					
Wound Botulism	50	a	b	a	c	b	c	a	c	a	b
Marihuana	54	b	a	b	d	b	a	b	b	b	a
HIV/AIDS	57	a	b	b	a	c	b	c	b	b	a
Club Drugs	61	c	c	d	a	b	b	a	d	b	d
Sub/Alt/Mth/Effects	65	a	d	c	a	b	a	b	c	b	a
Urine Drug Screening	70	a	b	a	a	d	b	b	b	a	b
Lab 1	76	c	a	b	b	a	a	a	b	a	c
Lab 2	78	a	c	d	b	b	a	a	a	c	b