



DRUG SCREENING IN PRIMARY CARE

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Urine Drug Tests: Ordering and Interpretation

Some differences and discrepancies-I will point out

"THE PHYSICIAN MUST NOTE WHEN THE PATIENT LAST TOOK A PRESCRIPTION MEDICATION (TO DETERMINE THE LIKELIHOOD OF A POSITIVE TEST RESULT)"

"OTHER MEDS CAN CROSS REACT SO SHOULD KNOW WHAT MEDS ARE TAKEN CONCURRENTLY"

"INGESTION OF POPPYSEEDS WILL NOT CAUSE A POSITIVE URINE DRUG TEST"

"IMMUNOASSAYS ARE NON-SPECIFIC"



WHY DO WE DRUG SCREEN?

❖ EMPLOYMENT

- ❖ AGENCIES SUCH AS FMCSA, RAILROAD, FAA, NUCLEAR POWER, REASONABLE SUSPICION
- ❖ POST ACCIDENT, POST OFFER, RANDOM

❖ MEDICAL MONITORING (MONITOR COMPLIANCE/DETECT USE OF NON-PRESCRIBED/ILLICIT SUBSTANCES)

- ❖ DRUG TREATMENT PROGRAM
- ❖ CHRONIC OPIOID THERAPY/OTHER MEDICAL TREATMENT PROGRAM

❖ SPORTS PARTICIPATION

❖ MILITARY DUTY

❖ LEGAL SITUATIONS

IMPORTANT TO GET IT RIGHT-KNOW HOW TO ORDER AND INTERPRET

- ❖ IMPLICATIONS TO JOB
- ❖ IMPLICATIONS TO PAIN MANAGEMENT
- ❖ IMPLICATIONS TO TREATMENT PROGRAM
- ❖ IMPLICATIONS FOR SPORTS PARTICIPATION
- ❖ IMPLICATIONS TO REPUTATION/LEGAL STATUS

MANY GUIDELINES AND RECOMMENDATIONS ON WHO/WHEN/WHY TO TEST

- ❖ AMERICAN PAIN SOCIETY
- ❖ CDC
- ❖ STATE /BWC
- ❖ FMCSA/DOT, FAA, SAFETY SENSITIVE POSITIONS

WHAT TO TEST???

Detection windows

- ❖ URINE- (1-5 days)
- ❖ SERUM – (<24 hours)
- ❖ SALIVA –(1-2 days)
- ❖ SWEAT –(1-2 days)
- ❖ HAIR – (3 months)

URINE

- ❖ MOST COMMON/LEAST EXPENSIVE/SPLIT SPECIMAN EASILY AVAILABLE
- ❖ EASY TO COLLECT (OFFICE/POINT OF CARE)
- ❖ KNOWN WINDOWS OF DETECTION WITH ADEQUATE SENSITIVITY/SPECIFICITY
- ❖ LABORATORY CERTIFICATION PROGRAM FOR FEDERAL TESTING-RELIABLE
- ❖ 45 ML IN 3 HOURS AFTER 40 OUNCES OF WATER (SHY BLADDER)

SERUM

- CONCENTRATIONS VARY WITH URINE AND SERUM (HYDRATION STATUS AND FUNCTION OF HOW QUICKLY A PERSON METABOLIZES)
- MOST CLOSELY CORRELATES WITH RECENT USE BUT SHORTEST WINDOW OF DETECTION
- INVASIVE/\$\$\$
- LESS LIKELY TO TAMPER-USUALLY NO COC SITUATION
- CAN DETECT ALCOHOL USE

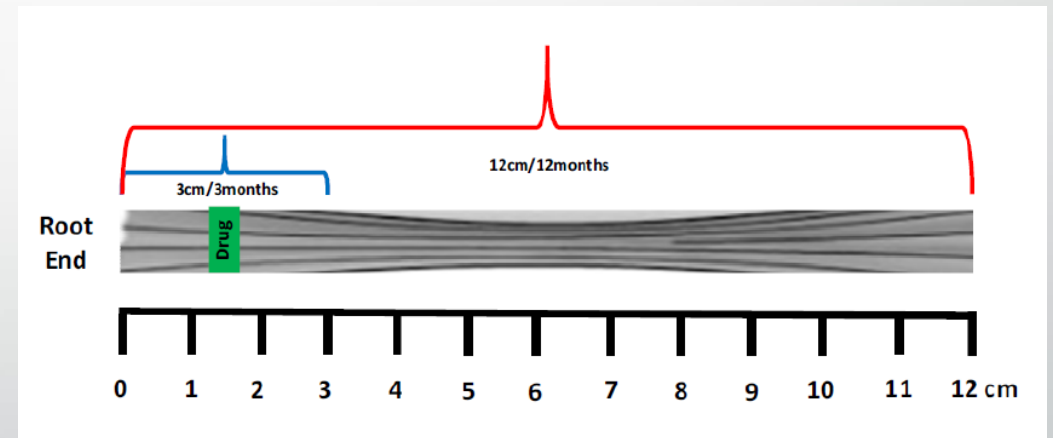
HAIR

PASSIVE DIFFUSION/EMBEDDED INTO HAIR/VIA SECRETIONS OF
APOCRINE/SEBACEOUS GLANDS

- LESS INVASIVE UNLESS NO HEAD HAIR....PUBIC/AXILLARY???
- 1.5 INCHES FROM VERTEX IS ABOUT 90 DAYS (.4MM/DAY OR 1CM/MONTH IS THE ACCEPTED AMOUNT OF GROWTH)
- LESS LIKELY FOR ADULTERATION/SUBSTITUTION (WEAVE/EXTENSIONS)
- LESS IS KNOWN ABOUT SCIENCE/DETECTION WINDOWS
- MORE EXPENSIVE DUE TO TECHNOLOGY
- DIFFICULT TO COLLECT: NO BODY HAIR, SOMETIMES NOT ENOUGH OBTAINED, HANDLING WITH GLOVES,

HAIR

- HAIR COLOR INFLUENCES DEPOSITION
 - BLACK>BROWN>YELLOW
- DETAILED CONCENTRATION STUDIES LACKING: HOW MUCH MUST A USER USE TO DETECT? RECENT USE IS NOT DETECTED



SALIVA

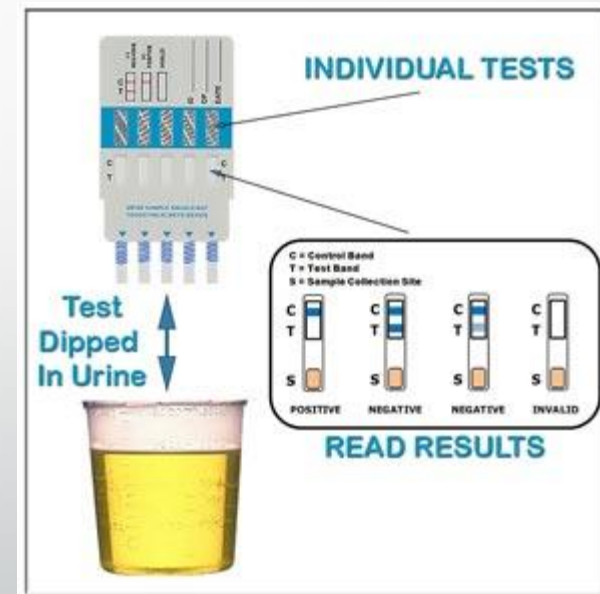
- PASSIVE DIFFUSION FROM PLASMA-DEPENDENT ON ORAL FLUID PH AND DEGREE OF PROTEIN BINDING OF DRUG
- THCA NOT DETECTABLE BECAUSE IT IS HIGHLY PROTEIN BOUND PASSIVE BUT THC CAN BE DETECTED DIRECTLY FROM BUCCAL CELL ABSORPTION
- BENZODIAZEPINES LOW SENSITIVITY DUE TO HIGH PROTEIN BOUND
- LESS INFORMATION KNOWN ABOUT RESULTS
- ALL OBSERVED SO LESS POSSIBILITY OF ADULTERATED/SUBSTITUTED
- SHORT DETECTION WINDOW

SWEAT

- ????????

URINE DRUG SCREEN- STEP ONE

- ❖ INITIAL SCREENING (EITHER AT A LAB OR POC)
 - ❖ IMMUNOASSAY/MEETS FDA REQUIREMENT
 - ❖ KNOW WHAT YOUR TESTING/MUST BE SPECIFIC
 - ❖ **NONSYNTHETIC DETECTION VS SEMISYNTHETIC**
 - ❖ BENZODIAZEPINES (**VALIUM/RESTORIL VS XANAX/ATIVAN/KLONOPIN**)
 - ❖ INEXPENSIVE
 - ❖ RAPID RESULTS



URINE DRUG SCREEN- STEP 2

- ❖ CONFIRMATORY TESTING (AT A LAB)/FORENSIC TESTING
 - ❖ HELPS TO DEFINE A TRUE/FALSE POSITIVE
 - ❖ RESEARCH UNEXPECTED NEGATIVE RESULTS-BE AWARE OF CUT OFF VALUES
 - ❖ GAS OR HIGH PERFORMANCE LIQUID CHROMATOGRAPHY (MASS SPEC)
 - ❖ NOT TIMELY-CAN TAKE UP TO 1 WEEK FOR CONFIRMATION
 - ❖ \$\$\$ BECAUSE IT IS MORE ACCURATE

INTERPRETATION

- ACTIVE AND INACTIVE METABOLITES ARE UTILIZED
- OVERLAPPING PATHWAYS
- ONE RESULT MANY POSSIBILITIES
- CROSS REACTIVITY CAN OCCUR WITH IMMUNOASSAY (POC)
- NEGATIVE RESULTS CAN BE JUST AS CONCERNING AS POSITIVE



+/- OR ?

- **NEGATIVE**-does not necessarily mean “no drug in sample”
- **POSITIVE** –meets forensic criteria above the cut off

DIVERSION/ALTER/TAMPERING

INGEST THINGS

ADD THINGS

SUBSTITUTE SOMETHING



SYNTHETIC URINE IS THE BEST WAY TO PASS A DRUG TEST

SPECIMAN ADULTERATED

- CONTAINS A SUBSTANCE NOT EXPECTED IN HUMAN URINE
- CONTAINS A SUBSTANCE EXPECTED IN HUMAN URINE BUT AT A CONCENTRATION THAT IS NOT CONSISTENT WITH HUMAN URINE
- $\text{pH} < 4$ or ≥ 11
- CAN GIVE DONOR OPPORTUNITY TO PROVE (THEY HAVE THE BURDEN OF PROOF)

SUBSTITUTED SPECIMEN

- LOOK AT SPECIFIC GRAVITY **AND** CREATININE-OUTSIDE OF PHYSIOLOGIC RANGE
- \leq TO 1.0010 OR \geq 1.0200 **&** CREATININE $<$ 2MG/DL
- DONOR CAN BE GIVEN OPPORTUNITY TO PROVE (BURDEN OF PROOF)

INVALID SPECIMAN

- CONTAINS AN UNIDENTIFIED ADULTERANT OR ANOTHER SUBSTANCE THAT PREVENTS THE LABORATORY FROM COMPLETING THE TEST
- DOES A MEDICAL EXPLANATION EXIST?
- TOLECTIN, FLAGYL, CIPRO, URISTAT
- DEGREDDATION DUE TO HEAT/IME

NEGATIVE DILUTE SPECIMAN

(SG >1.0010 BUT <1.0030 & Creatinine >/= to 2 but < 20

- CREATININE 2-5 MG/DL (UNDER DOT DIRECT OBSERVATION REQUIRED)
- CREATININE >5 BUT <20 MG/DL (UNDER DOT IS MAY BE AUTHORIZED BUT NOT REQUIRED)
- IF POSTIVE DILUTE: TREAT AS A POSTIVE

DISCUSSION ABOUT THE RESULTS

- ❖ WHO TO SPEAK TO IF IT IS A MINOR (SPORTS/SCHOOL)
- ❖ OFFER A **SPLIT SPECIMEN** IF IT WAS OBTAINED
- ❖ OFFER DONOR TO GIVE A VALID MEDICAL EXPLANATION AND IT IS UP TO THE INTERPRETING DOCTOR TO ACCEPT OR NULL



OFFER DONOR TO GIVE A VALID MEDICAL EXPLANATION AND IT IS UP TO THE INTERPRETING DOCTOR TO ACCEPT OR NULL

- ❖ SOMEONE ELSE'S MEDS
- ❖ FOREIGN COUNTRY WHERE IT IS LEGAL (DETERMINE IF LEGITIMATE MEDICAL EXPLANATION)
- ❖ MARINOL FOR (+) THC
- ❖ COCAINE FOR ENT/OPHTHALMOLOGY/SURGERIES
- ❖ SOURCE FOR VALID/NON VALID REASONS: ROBERT B SWOTINSKY AND DONNA R. SMITH. *THE MEDICAL REVIEW OFFICER'S MANUAL, 5TH EDITION, TABLE 11-3, PP151-52*

OFFER DONOR TO GIVE A VALID MEDICAL EXPLANATION AND IT IS UP TO THE INTERPRETING DOCTOR TO ACCEPT OR NULL

- SEXUALLY TRANSMITTED
- DEER OR CHICKENS GRAZED ON HEMP/MJ
- SPIKED BROWNIES AT A PARTY
- CBD OIL
- PASSIVE INHALATION

MARIJUANA/THC

❖ 2ND HAND SMOKE/PASSIVE

❖ CBD OIL

❖ RX FOR VALID MED

❖ (MARINOL/EPIDIOLIEX)



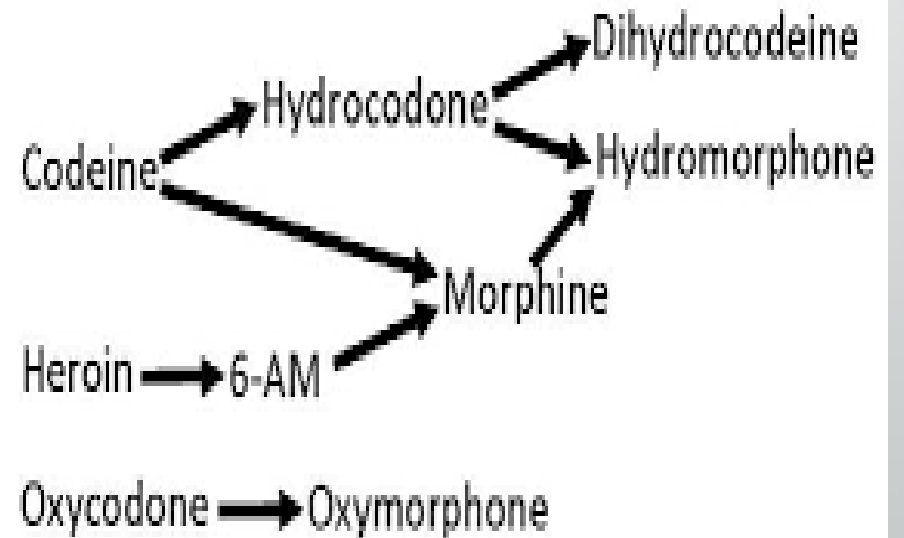
AMPHETAMINE/METHAMPHETAMINE

- ADDERAL (AMPHETAMINE SALTS) VYVANSE OR DEXEDRINE IS MOST COMMON REASON
 - (NOT RITALIN/CONCERAT=METHYLPHENIDATE)
- ISOMERS OF METHAMPHETAMINE CAN HELP
 - (*d* or *l* ISOMERS CAN HELP DETERMINE-SOME LABS AUTOMATICALLY DO OTHERS YOU NEED TO REQUEST)
 - USE OF VICKS NASAL INHALER OR SELEGILENE?
 - EXAMINE RATIO OF *d* to *l* ISOMERS- (*l/d* =80/20 or 50/50)

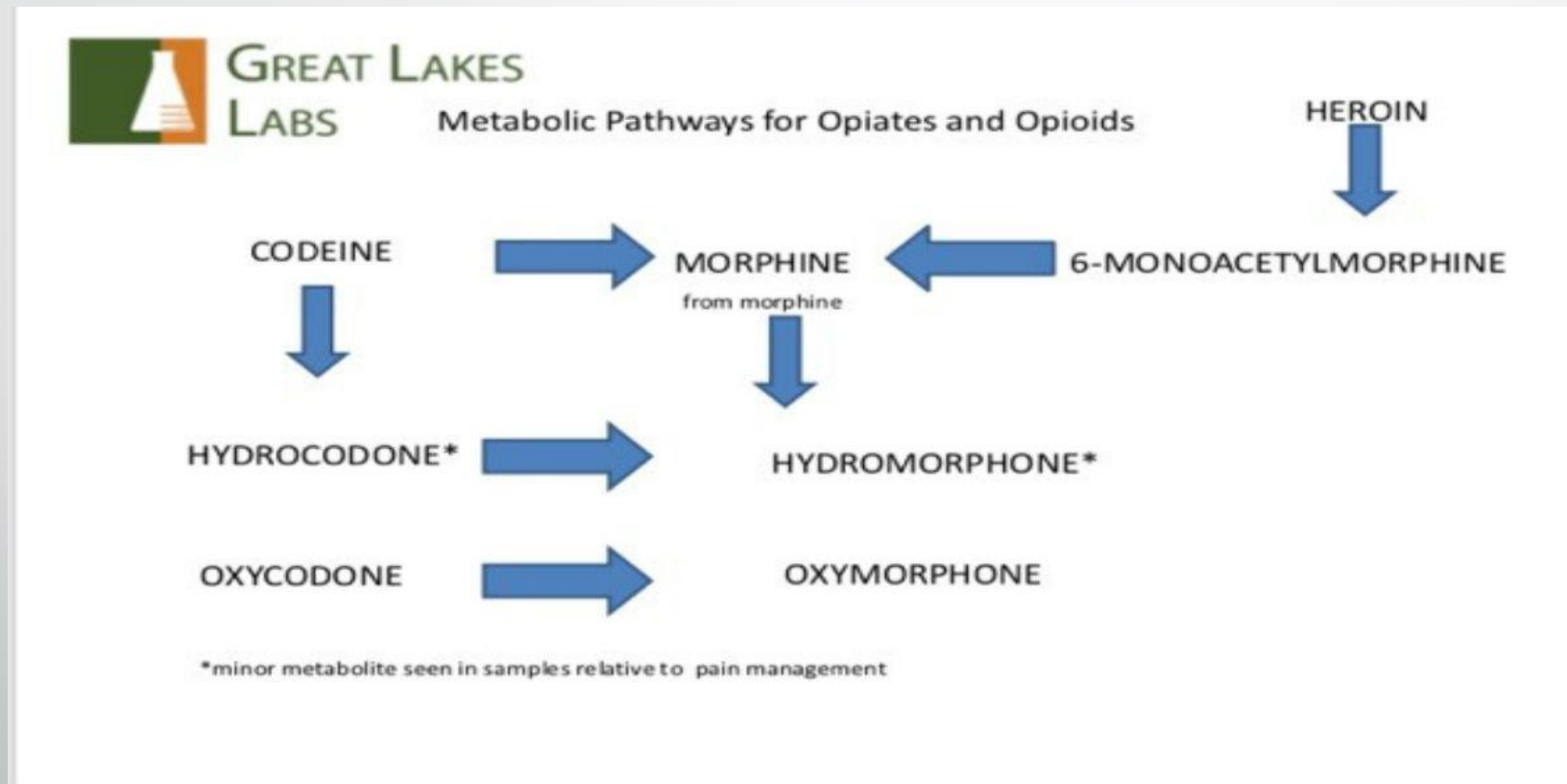
OPIOIDES: MORPHINE, CODEINE, 6-AM

- ONLY EXPLANATION FOR 6-AM IS HEROIN AND SHOULD HAVE MORPHINE IN SAMPLE AS WELL BUT MIGHT BE BELOW CUT OFF
- MORPHINE OR CODEINE > 15,000 NG/DL
- MORPHINE OR CODEINE > 2000 BUT LESS THAN 15,000 (MAY BE DIETARY)

Opiate/Opioid Metabolism



SYNTHETIC OPIATES



OTHERS

- BUPRENORPHINE/SUBOXONE
- METHADONE
 - -USED TO PREVENT WITHDRAWAL SYMPTOMS
 - MAINLY TEST FOR COMPLIANCE OF PROGRAM
 - NOT PART OF USUAL DRUG PANELS

- FENTANYL
 - EXCRETED IN URINE OVER A 3-4 DAY PERIOD
 - CAN USE **NORFENTANYL** AS A MARKER OF USE (LONGER DETECTION)
 - NOT PART OF USUAL DRUG PANELS
 - \$\$ DUE TO SHORT DETECTION WINDOW/SPECIALIZED TECHNIQUES

BENZODIAZEPINES

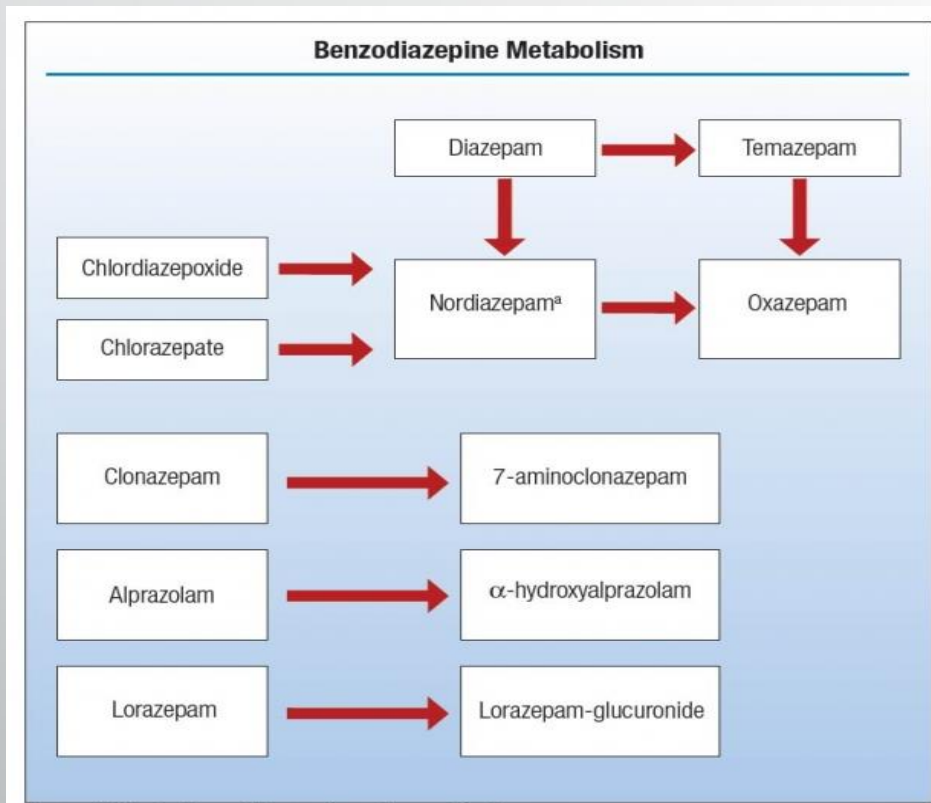


Figure 1: Illustrations of benzodiazepine metabolism.

Arrows indicate metabolic pathways

*Nordiazepam is also a metabolite of halazepam, medazepam, prazepam, and tetrazepam

- CAREFUL TO INTERPRET BENZODIAZEPINES-MANY PATHWAYS
- AMBIEN/LUNESTA ARE NOT BENZOS

BATH SALTS/SYNTHETIC CANNABINOIDS



COCAINE

- NO PRESCRIPTION PRODUCTS
- LIMITED MEDICAL USES IN US AS TOPICAL/VASOCONSTRICTIVE
- METABOLITE BENZOYLECOGNINE
- NO OTHER ANESTHETICS THAT END IN "CAINE" WOULD CAUSE A POSITIVE
- PASSIVE EXPOSURE IN UNVENTILATED ROOM



FEDERAL TESTING/DOT

- RECENT CHANGES-NOT ONLY TEST THE BIG 5 BUT ALSO SYNTHETIC
 - PCP, MJ, COCAINE, AMPHETAMINE/METH, OPIATES
 - ADDED SYNTHETIC
- MANDATED THE MRO DUE A FITNESS FOR DUTY IF (+)-EVEN IF VALID MEDICAL EXPLANATION-5 DAY RULE
- MAY GET CALLS/REQUESTS

CONSIDER THE SITUATION FOR WHAT TO TEST

- SPORTS RELATED
 - ANABOLIC, STIMULANTS, CANNABOIDS
- EMPLOYMENT RELATED
 - WORK PLACE PROBLEMS (ANESTHESIA, NURSES, POLICE, FIRE)
- DRUG TREATMENT PROGRAM
 - SUBOXONE, METHADONE

COST

- WHO PAYS
- VARIES BASED ON TEST/GEOGRAPHIC REGION AND LAB
- SPECIMAN TO BE TESTED (HAIR, MORE SPECIFIC)
- WHAT ARE YOU TESTING? SCREEN OR CONFIRMATORY
- A POPULAR HEALTH CARE COST WEBSITE LISTS A FAIR PRICE FOR URINE OF \$128
 - WITH A RANGE OF \$62-\$308
 - MEDICARE REIMBURSEMENT \$13-\$72