

# BEHAVIORAL SCIENCE

- **Bipolar I** is characterized by manic and depressive episodes but could be by a manic episode alone.  
**Bipolar II** is hypomania and depression .. never manic
- Id says: "I want it!"  
Superego says: "you know you can't have it!"  
Ego is the mediator between the two and deals with the conflict.
  - the ego id and superego operates on an unconscious level.  
the id is all your instincts ,the things that you would do if you did not have a super ego who will say stop so the super ego is ALL THE MORAL VALUES THAT A PERSON WILL HAVE LIKE IF YOU WANT TO STEAL SOMETHING (ID)THE SUPEREGO WILL SAY NO IT IS BAD (IT IS NOT MORAL)  
The ego links both of them. The ego controls the expression of the id so it can adapt to the external world.

## ➤ **Hardy-Weinberg Law**

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Developed in 1908, the Hardy-Weinberg law is an algebraic formula to estimate the frequency of a dominant or recessive gene in a population based on the frequency with which the trait or condition is found in that population.

The derivation takes several steps, but the final formula is...

$$p^2 + 2pq + q^2$$

...in which...

§ p = frequency of the dominant allele in a population

§ q = frequency of the recessive allele in the population, and

$$p + q = 1$$

Using the frequency for a condition known to be inherited in either an autosomal-recessive or autosomal-dominant manner, the frequency of the genes involved can be assessed. This can be important information in designing and delivering programs to screen for specific mutant genes in targeted populations.

An Example: Cystic Fibrosis

Cystic fibrosis is a recessive condition that affects 1 in 2,500 Caucasian babies. What is the frequency of the gene responsible for cystic fibrosis in the Caucasian population?

If...

§ we say that affected individuals have the aa genotype, and  
§ the frequency of the aa genotype is indicated by  $q^2$  in the Hardy-Weinberg equation  
...then...

§  $q^2 = 1/2,500$  and  $q$  equals the square root of  $1/2,500$ , or

§  $q = 1/50 = 0.02$

The frequency of the cystic fibrosis allele in the Caucasian population is therefore 2% (0.02).

Since...

§  $p + q = 1$

...then...

§  $p = 1 - 0.02 = 0.98$

The frequency of the "normal" allele in the Caucasian population is therefore 98% (0.98).

Lastly, since...

§  $2pq$  = frequency of heterozygotes or carriers

...then in this example...

§  $2pq = 2 \cdot 0.98 \cdot 0.02 = 0.04$

That is, 1 in 25 Caucasians (0.04) are carriers of the cystic fibrosis gene.

These numbers differ in other subpopulations (such as racial or ethnic groups) of the world.

It is important to note that with random mating, no selection or mutation there will be no change in gene frequencies. The recessive trait does not die out, and it is possible that in fact the recessive trait may be very much more common than the dominant trait!

## ➤ SAMPLE PROBLEMS

### Hardy-Weinberg Problem

- 1) If 9% of an African population is born with a severe form of sickle-cell anemia (ss), what percentage of the population will be more resistant to malaria because they are heterozygous (Ss) for the sickle-cell gene?

- Ans.  $9\% = .09 = ss = q^2$

(¶)  $s = q = \text{Square root of } .09 = .3$

$p = 1 - .3 = .7$

$2pq = 2 (.7 \times .3) = .42 = 42\%$  of the population are heterozygotes (carriers)

2) After graduation, you and 19 friends build a raft, sail to a deserted island, and start a new population, totally isolated from the world. Two of your friends carry (that is, are heterozygous for) the recessive cf allele, which in homozygotes causes cystic fibrosis.

A. Assuming that the frequency of this allele does not change as the population grows, what will be the instance of cystic fibrosis on your island?

B. Cystic fibrous births on the island is how many times greater than the original mainland. The frequency of births on the mainland is .059%.

- **Ans.**

A. There are 40 total alleles of the 20 people of which 2 alleles are cystic fibrous causing.

$2/40 = .05$  the  $\uparrow$  of the cystic fibrous allele

thus  $cc$  or  $q^2 = (.05)^2 = .0025$  or .25% of the population will be born with cystic fibrous.

B.  $0.25/.059 =$  about 4 times greater occurrence

### Hardy-Weinberg Problem 3

This is a classic data set on wing coloration in the scarlet tiger moth (*Panaxia dominula*). Coloration in this species had been previously shown to behave as a single-locus, two-allele system with incomplete dominance. Data for 1612 individuals are given below:

White-spotted (AA) = 1469 Intermediate (Aa) = 138 Little spotting (aa) = 5

Calculate the following frequencies:

( )A =

( )a =

( )AA =

( )Aa =

( )aa =

Solution to Problem 3

( )A =  $(2 * (1469) + (138)) / (2 * (1469 + 138 + 5)) = .954$  or 95.4% Q: How did we arrive at this data?

( )a =  $1 - .954 = .046$  or 4.6%

( )AA =  $(.954)^2 = .910$  or 91%

( )Aa =  $2 (.954)(.046) = .087$  or 8.7%

$$(\_)aa = (.046)^2 = .002 \text{ or } .2\%$$

Ans. genotype	Number	A	a	Total
AA	1469	2*1469(2938)	0	2938
Aa	138	138	138	276
aa	5	0	2*5(10)	10
Totals	1612	3076	148	3224

now let's count frequency

$$\text{Frequency of A} = 3076/3224 = 95.4\%$$

$$\text{Frequency of a} = 148/3224 \text{ (or } 1 - A = 1 - 95.4\%) = 4.5\%$$

> Another good sample problem on H-W Equation:

In a certain place in Europe, it was found out that the prevalence of a newly discovered autosomal recessive disorder is 1/100. What is the carrier frequency of this disease?

Ans. 0.18 using Hardy-Weinberg

Explanation: Prevalence is  $= q^2 = 1/100 = 0.01$

so  $q = 1/10 = 0.1$

carrier frequency  $= 2pq$

$p = 1 - q = 1 - 0.1 = 0.9$

carrier  $= 2 * 0.1 * 0.9 = 0.18$

So the carrier frequency is 0.18

#### ➤ TYPE 1 vs. TYPE 2 ERROR

In Type 1 error, null hypothesis is rejected when it is actually true. Is it the same as false negative error??? In one note it was given as false positive.

Pl clarify

thanks

- Ans. It's not the same.

The sensitivity of a test is a measure of its ability to detect the presence of a disease in those who

truly have the disease (true positive)

- The specificity of a test is a measure of its ability to detect the absence of a disease in those who

truly have no disease (true negative)

- I find a simple explanation of type I vs type II here:

➤ > I just want to share - - I asked this from my review class: what's the difference between type I (alpha) and type II (beta) error ?

Our mentor answered us with a question from qbank:

A group of researchers mistakenly conclude from a poorly designed experiment that acetaminophen cures the common cold. They have committed what error?

Answer: Type I error

Explanation: First we know that..

null hypothesis (H<sub>0</sub>): no difference

alternative hypothesis (H<sub>1</sub>): there is difference

Type I error is rejecting the null hypothesis, when in fact it should not be rejected. Therefore, the study has really “no difference” or the study is really “not significant.” But since he made the type I error, the researcher thought that it “has difference” or “it is significant.”

In type II error, null hypothesis is not rejected, when in fact it should be rejected. Therefore, the study really “has difference” or the study is really “ significant.” But since he made the type II error, the researcher thought that it has “no difference” or it is “not significant.”

-> To change the question above to make a type II error:

A group of researchers mistakenly conclude from a poorly designed experiment that acetaminophen has no effect on the common cold. They have committed what error?

Answer: Type II error

## ➤ **Part I (ETHICS)**

### ➤ **RULES OF ETHICS** (Posted by SMART DOC from IP 202.141.238.2 on August 13, 2002 at 08:40:490).

HOW TO DEAL WITH A DYING PATIENT:

- 1) Tell the patient EVERYTHING. There is no excuse for not doing so. If you know, the patient knows.
- 2) DO NOT GIVE FALSE HOPE
- 3) Allow the person to talk about his feelings
- 4) Kept he patient involved in social activities
- 5) Avoid social isolation

GENERAL RULES:

- 1) “Substituted judgment”: when a patient cannot make a decision, the decision is made based on what is thought WOULD BE that person’s choice. The decision is finally made by who is most likely to represent the patient’s own wishes (not necessarily who is closest next of kin).
- 2) “Best interest standard”: trying to determine what a never-competent patient would have wanted is practically impossible.

When you are not clear about the patient’s wishes, you should make the decision as a dispassionate, rational observer: do what a rational person would do. It is not your personal preference is. DO WHAT MOST PEOPLE WOULD WANT in this circumstance. “What would a jury of 12 people do if they knew what I know?”

Who makes the decision is not really important: anybody using the best interest standard should arrive to the same decision.

You must set aside your personal preferences: like strong religious beliefs (that is considered irrelevant)

As a general rule, parents cannot withhold treatment from their children. Yet, in Infant Doe's case, they did. In this case, the best interest standard rule was applied.

3) Patients decide over their own bodies: The patient ALWAYS MAKES THE DECISION.

This was decided over the ROE vs WADE case in 1973, the case that made abortion legal. The issue will never be over abortion in the USMLE, but it illustrates the principle that governs medicine in the US: the patient always decides, and the only thing a doctor can do is lay out the possibilities.

SPECIFIC RULES:

Rule #1: Competent patients have the right to refuse medical treatment, no matter what.

Rule #2: Assume that the patient is competent unless clear behavioral evidence indicates otherwise.

-Drunk, schizophrenia, Alzheimer's: these are all medical dg. DIAGNOSIS SAYS NOTHING ABOUT THE LEGAL COMPETENCE OF A PERSON!!!

Competency can ONLY be decided by a COURT OF LAW: it is not a medical dg, it is not a blood alcohol level!

Clear behavioral evidence of incompetence:

Attempted suicide

Patient is grossly and evidently psychotic and dysfunctional

Patient's physical or mental state prevents communication

However, when in doubt, assume competency!

Rule #3: Decision-making should occur in clinical setting if possible, without going to court. Normally, the USMLE will want YOU to make the decision: try to avoid the answer that says "go to court", unless it is clearly stated that the guardian (ex: parent of a sick child) is NOT acting in the patient's best interest. And that is only if the case is not an emergency: if it can wait going to court.

Rule #4: When surrogates make decisions for a patient, they should use the following criteria and in this order:

- 1) Patient expressing wishes in the past: what historically did the patient say in the past? (wish for organ donation expressed to relative, for example)
- 2) What would the patient want? : Substituted judgment
- 3) Best interest standard: what would most people want

Rule #5: If patient is incompetent, physician may rely on advance directives

Directives that a patient can leave for his doctor before becoming incompetent:

- Can be oral directive from patient to his doctor: does NOT necessarily have to be a written document.
  - Can be living will: expression in writing, notarized, by the patient.
  - Health powered attorney: person that was named by the patient to represent him. TREAT THIS PERSON AS THE PATIENT HIMSELF, IN TERMS OF DECISIONS: this person is the VOICE of the patient: a health powered attorney BEATS ALL OTHER CHOICES ON THE USMLE (it is the patient talking to you).

Rule #6: Feeding tube is a medical treatment and can be withdrawn at the patient's request. A competent patient has the right to refuse hydration and nutrition. Period.

In the case of anorexia nervosa: if the patient is a minor: not legally competent. If NOT a minor: go to court.

Refusing food and water: may seem close to euthanasia, but on the exam this is accepted.

Rule #7: Do nothing to actively assist the patient to die sooner. Do not ACTIVELY do anything (as opposed to number 6)

Rule #8: the physician decides when the patient is dead.

Futile treatment: means a treatment that is not AND WILL NOT improve anything. Still, if the patient or the family want the treatment to continue: it is not YOUR decision, it is the patient's or the patient's family.

In case of clear cortical death: even if the family is hoping for a special doctor to arrive, for a special treatment to come: CALL THE DEATH.

Rule #9: Never abandon a patient: even if they can't pay you, even if you don't like the patient. If you simply CANNOT continue to be the doctor to this patient: you need to arrange that he will have care and make sure that they are getting it.

Never, ever threat to abandon your patient (not even if you are doing it to make sure they follow treatment).

Rule #10: Always obtain informed consent: before you do ANYTHING!!!

Informed consent can be oral.

The patient can revoke written consent orally, at any moment

Of the patient signs "consent" without reading it: it is NOT INFORMED CONSENT

Informed consent: means that the patient understands:

- 1) Nature of the procedure
- 2) Purpose or rationale
- 3) Benefits of treatment or procedure
- 4) Risks
- 5) Availability of other alternatives

“GAG CLAUSES”: you work for an institution that tells you not to discuss certain procedures or possibilities. THEY ARE ILLEGAL.

Exceptions to informed consent:

- 1) Emergency situation
- 2) Waiver by the patient: the patient says it's OK not to know what is going to happen (exploratory surgery, drug undergoing trial to know side effects)  
DO NOT ASSUME YOU HAVE A WAIVER UNLESS THE USMLE TELLS YOU.
- 3) Patient is incompetent
- 4) Therapeutic privilege: doctors have the right and obligation to deprive the patient of their autonomy in the interest of the patient and other people. Ex: patient on PCP, violent and dangerous: put him on restraints!

Rule #11: Special rules apply with children

Rule #12: Parents cannot withhold life- or limb-saving treatment from their children

Rule #13: For the purposes of the USMLE, issues governed by laws that vary widely across states cannot be tested

Rule #14: Good Samaritan Laws limit liability when physicians help at accidents

Rule #15: Confidentiality is absolute

Rule #16: Patients should be given the chance to state DNR (Do Not Resuscitate) orders, and physicians should follow them

Rule #17: Committed mentally ill patients retain their rights

Rule #18: Detain patients to protect them or others.

Rule #19: Remove from patient contact health care professionals who pose risk to patients

Rule #20: Focus on what is the best ethical conduct, not simply the letter of the law  
I looked it up:

Rule # 8 says this:

- if there are no more treatment options (if the patient is cortically dead), and the family insists in treatment?: if there are no options and there is nothing the physician can do, it is his duty to stop the treatment. (The USMLE wants you to be able to make decisions when the patient is DEAD)
- - if the physician thinks treatment is futile and the patient won't improve, but the patient (or surrogate) insists on continued treatment: then treatment must continue.



Rule # 17:

Committed mentally ill adults legally are entitled to the following:

- they must have treatment available
- they can refuse treatment
- they can command a jury trial to determine sanity

They lose only the civil liberty to come and go  
they retain their competence for everything UNLESS A COURT OF LAW DECIDES  
they are incompetent.

The underlying rule here is that no matter what the psychiatric diagnosis is, treat the patient as you would any other competent person (unless they show signs of clear incompetence, stated on #2)

rule #20: Focus on what is most ethical. USMLE wants you to pick the answer where there are no doubts that it is the most ethical thing to do. In other words, don't worry about being fired, sued or that your hospital may go to shreds if you do the "right thing". ACT NOT AS A LAWYER WOULD, BUT AS MOTHER THERESA WOULD.

There is also something interesting that they pointed out: what do you do if you find out a colleague or fellow resident is having a substance abuse problem? Who do you talk to?

RULES:

- talk to the colleague and REMOVE him from patient care
- if there is a direct employer or supervisor (like your residency program director) : TELL THE SUPERVISOR. Failure to do so will endanger patients, and will ALWAYS be the wrong answer on the USMLE.

What they meant was: the best way to get someone to treatment is if their employer forces them to: if they are afraid to lose their job. So don;t waste time talking to the person or the family or anyone: go to the supervisor.

## **Part 2 (ETHICS)**

### **Ethical Terms**

#### **Autonomy**

The principle of autonomy, or self-determination, entails respecting the choices and wishes of persons who have the capacity to decide and protecting those who lack this capacity. This principle would be used when a physician who has discussed preferences about life-sustaining treatment with a woman who has just been diagnosed with metastatic breast cancer is then guided by those wishes.

## **Beneficence**

The principle of beneficence advises physicians to benefit patients and protect their interests, whereas the principle of nonmaleficence encompasses the oft-quoted phrase, "Above all, do no harm." Physicians must balance the risks and benefits of any proposed treatment. An example of beneficence would include a physician who refuses to provide a prophylactic mastectomy for a patient who fears cancer but does not have any unusual risk factor for the disease.

## **Justice**

The principle of justice entails providing persons with that to which they are entitled and treating similar cases similarly. Together, the principles comprise the foundation of ethical principlism, the dominant approach in bioethics today.

## **Informed Consent**

The ethical foundation on informed consent can be traced to the promotion of two values: personal well-being and self-determination. To ensure that these values are respected and enhanced, patients who have the capacity to decide their care must be permitted to do so voluntarily and must be provided all relevant information regarding their condition and alternative treatments, including possible benefits, risks, costs, other consequences and significant uncertainties surrounding any of this information.

Informed consent is a two-part process involving disclosure by the health care professional and a decision by the patient. If health care professionals support a patient's right to make informed choices, they must respect the patient's decision regarding whether to accept or decline treatment. The consent form provides written documentation of the patient's decision but it is not a substitute for a thorough discussion between their physician and the patient.

**Three elements of informed consent** must be considered. These elements include (1) the information to be discussed, including the nature of the intervention described in sufficient detail, (2) the patient's comprehension, (3) the patient's decisional capacity and (4) the voluntary nature of the decision. The physician should carefully discuss the proposed purpose of the intervention, including how any knowledge gained from the procedure will change the treatment course or outcome. The likely risks of the proposed intervention must be fully disclosed together with a discussion of their severity and likelihood. The likely benefits of the proposed intervention should be explained.

## **Life-Sustaining Treatment**

Life-sustaining treatment may include but is not limited to a mechanical ventilator, renal dialysis, chemotherapy, antibiotic therapy and artificial nutrition or hydration. Physicians, ethicists and lawyers widely agree that withdrawing or withholding life-sustaining treatment is legally and ethically permissible under appropriate circumstances. In fact, ethical and legal principles require that physicians respect the decision to forego life-sustaining treatment by a patient who has decisional capacity. However, if a physician is morally opposed to the patient's treatment preferences, the physician may transfer care to another physician who is more comfortable with the patient's wishes.

In addition, a competent patient may make his wishes known in advance of losing the ability to make health care decisions, such as a living will. In such cases, physicians are morally and legally required to follow these health care preferences to the extent permissible by law.

### **Medical Futility**

Situations in which a patient's underlying diagnosis or diagnoses impart a terminal or poor prognosis thus rendering specific medical interventions unhelpful and possibly detrimental.

### **Medical Treatment Options**

#### **Cardiopulmonary Resuscitation (CPR) in Older Persons**

The indications for CPR have changed considerably since its inception in 1960. Initially a treatment for sudden death in the setting of an acute myocardial infarction, CPR has become a procedure utilized in death from any cause. In the absence of a Do Not Resuscitate (DNR) order, CPR is often done by default, despite a growing body of literature that indicates CPR is often ineffective, particularly in persons dying of non-cardiac, multi-system diseases.

Several studies have evaluated the efficacy of CPR in older persons. In frail older persons who are dependent in their activities of daily living, CPR is usually not effective. Less than 2% of patients living in nursing facilities who receive resuscitation survive. Those who do survive are often more debilitated than before the cardiac arrest. The outcomes of older adults in the community who have a cardiac arrest are equally poor.

Functionally, active older persons with primarily cardiac disease, who suffer a witnessed arrest in the hospital, may fare better. Hospitalized older patients suffering cardiac arrest have a survival rate of 26%. Some patients are more functionally dependent after the arrest. When people begin to develop functional disability and accrue chronic illnesses, their survival drops precipitously, regardless of age.

### **Artificial Feeding Near the End of Life**

Food is an essential requirement of life and without it death is certain. The symbolic nature of food is very powerful and firmly rooted in our culture and religious beliefs. As such, the decision to not provide food is often a difficult one.

The delivery of food through artificial means is a medical therapy. It may be instituted, withdrawn or refused like any other medical treatment. However, a person must declare clearly that they do not want artificial feedings. This statement can be as simple as: "If I were to become so ill that I could not talk meaningfully with my family and the hope of me regaining that ability was small, I would not want artificial feeding." It is useful to have statements like this included in the Health Care Proxy form (HCP), or to state in the form that your health care agent knows your wishes regarding artificial feeding. If a person feels strongly that they would always want to have artificial feeding, they should make sure their health care agent knows their wishes (and if they have a HCP they should note this on the form).

Much of the information about what happens to people when they decide to forego artificial feeding comes from the hospice and oncology literature. People working in hospice have noted

that their patients suffer very little because of not eating. Dying patients who choose not to have foods delivered by artificial means, do not suffer from hunger and thirst. Patients that do experience hunger and thirst, can have their symptoms relieved with mouth care, and small amounts of food and fluids that they chose to eat.

Studies in the oncology literature have shown that cancer patients have a higher mortality and morbidity who when they receive aggressive artificial feeding, in comparison to those that do not. In patients with strokes who are fed with gastrostomy tubes, the median time of survival is only 53 days (range 2 - 528 days), with only 12% of the patients surviving for more than three months. No study has shown that dying patients live longer or are more comfortable as a result of artificial feeding. Enteral tube feedings are not without side effects. One of these side effects is aspiration pneumonia, which occurs in 50% of patients. When feeding tubes are used in patients with confusion or dementia, self extubation is common and often results in the use of restraints.

**Some rules of thumb to consider:**

Dying patients should choose what they want to eat, when they want to eat and the amounts of food that they want to eat.

For some patients, the act of eating is still important even though they may eat only very small amounts of the food presented to them.

Almost all dietary restrictions should be lifted in older adults especially for dying persons.

Food should be fed but never forced.

Education of family and caregivers concerning artificial feeding is very important.

Food should never be withheld from a dying patient who desires it.

Artificial feeding has substantial risks, especially aspiration and self-extubation, that often results in the use of restraints.

To date, no studies have demonstrated that artificial feeding improves morbidity or mortality in dying patients.

None of the predominant religions in the USA demand that artificial feeding be administered to dying patients. All are firm however, that food never be withheld from a patient who wants it, or with the intent to cause pain or death.

Severe anorexia and loss of thirst is often part of the dying process, no matter what the cause.

Organ function slows and metabolic processes shut down.

➤ **Re: DNR**

Do Not Resuscitate (DNR), without any qualification means no cardiopulmonary resuscitation. It does not mean terminate treatment, or refrain from simple health-supporting or even life-saving procedures. With DNR orders in place, a patient would still be given medication and might even undergo surgery. What if the patient is choking, and in need of a simple intervention to save his life. Nothing is implied by DNR that says we should not perform the Heimlich maneuver. Do it.

➤ Recall:

- 1. Two nominal - Chi square
2. Two interval - Pearson correlation
3. One nominal and one interval - T-test
4. mathematical based literature review- Meta analysis

**NEUROTRANSMITTER DISTURBANCE IN DIFFERENT DISEASES (Ref. P 130 FA) -**

- **Schizophrenia** increase in **dopamine** and serotonin
- **Depression** decrease in dopamine, **serotonin (5HT) and norepinephrine**
- **Anxiety** decrease in GABA (remember anti-anxiety drug such as benzodiazepines acts on GABA receptors) and serotonin and increase in norepinephrine
- **Mania** increase in dopamine
- **Alzheimer** decrease in ACh
- **Parkinson's Disease** – decrease dopamine
- **Huntington's Disease** – decreased GABA, decreased ACh

**> US-PREVENTIVE SERVICE TASK FORCE**

PRE-SERVICE-----SEX-----AGE

physical-exam:-

BP-----M/F-----18 +----q 2YRS

CL- BREAST EXAM--F---50-69---q 1-2YRS

LABS-TESTS:-

PAP-SMEAR-----F---18-65 YRS----q 3 YRS

STOOL FOR OCCULT BLOOD---M/F--50+ YRS---ANNUALLY.

SIGMOIDOSCOPY---M/F--50+YRS q ? YRS

MAMMOGRAPHY---F---50-69 YRS--q 1-2 YRS

CHOLESTROL---M---35-65 YRS---q ? YRS

---F---45-65 YRS

IMMUNIZATIONS:-----

TETENUS-DIPHTHERIA BOOSTER

M/F---18+ YRS---q15-30YRS

INFLUENZA-VAC---M/F--65+ YRS--ANNUALLY

PNEUMOCOCCAL VAC--M/F---65+YRS--ANNUALLY.

COUNSELLING----M/F----18+YRS----AT ROUTINE VISIT

(SOURCE- CMD 2003)

Note: PNEUMOCOCCAL VACCINE SHOULD BE GIVEN ONCE AFTER 65 YRS, NOT ANNUALLY. (CDMT 2003)

➤ **RE: COMPETENCY**

- Assume the patient is competent **unless** clear behavioral evidence indicates otherwise.
- Drunk, Schizophrenia, Alzheimers = all COMPETENT

**-INCOMPETANT:**

1. ATTEMPTED SUICIDE
2. PATIENT IS GROSSLY AND EVIDENTLY PSYCHOTIC AND DYSFUNCTIONAL
3. PATIENT'S PHYSICAL OR MENTAL STATE PREVENTS COMMUNICATION...

CAN EVERYONE TRY TO THINK OF EXAPMPLES OF 1, 2, AND 3!

are the following competant or not?

minor with anorexia nervosa?

Adult with anorexia?

Mentally retarded?

Autistic?

Personality disorder?

Murderer?

Drug addict (presently under influence of drug?)

- minor with anorexia , is still a minor, parents decide  
adults with anorexia, competent  
MR, not competent  
autistic , not competent  
personality disorder, if gross enough, incompetent, also if has history of suicide , then definatLy not competenT  
murderer, competent to make decisions for himself, unless, gross abnormal behaviour observed  
addict, under the inflence not competent.
- Hey guys ,I have seen a q about MR that u shouldNOT consider all of them noncompetent!It depends on situation and some legal documents r needed(from court)that shows he/she is incompetent.
- I think that mental retardation is Competant- they live by themselves, and can function in society.  
But what about Autimsm- i think Incompetant because they cannot communicate.

## BEHAVIORAL SCIENCE QUESTIONS

- 1) A 60-year-old man with a 5-year history of stable angina pectoris sustains a head injury in an automobile accident and dies. The family is contacted and consents to an autopsy. Microscopic examination of a section of heart muscle would most likely reveal which of the following pathologic findings?
- A. Coagulative necrosis of the subendocardial muscle
  - B. Dense scar localized to the distribution of one coronary artery
  - C. Focal fibrosis and subendocardial myocardial vacuolization
  - D. Heavy neutrophilic infiltrate adjacent to a large area of coagulative necrosis
  - E. Transmural coagulative necrosis
- Ans. B.  
Necrosis require 8-12 hours to form (reject A and E)  
Neutrophils will be there in 4-6 hours (reject D).  
C doesn't connect with stable angine at all. But may be a cause of arrhythmia.
- 2) A 72-year-old man is admitted to the hospital after suffering a stroke. His family comes to visit him the next day only to discover that he does not recognize them. When visited by the team of doctors, the patient seems to be able to recognize voices and sounds, but claims that he has never seen his wife and son before. He seems confused because when they talk to him their voices are just like the ones of his family members. Which of the following is the most likely diagnosis?
- A. Anosagnosia
  - B. Confabulation
  - C. Conversion disorder
  - D. Ganser syndrome
  - E. Prosopagnosia
- Ans. E, prosopagnosia....inability to recognise faces,due to destruction of part of occipital lobe adjucent to area 21,22 of temporal lobe.
- 3) A 49-year-old patient is evaluated for suicidal ideation after he is found laying on train tracks by police. The man is disheveled and malodorous and states that he has "reached the end" and would rather die. He admits to depressed mood, anhedonia, poor energy and appetite; he feels miserable and regrets what he has done with his life and wants to put an end to it. He states he has felt this way since age 26, after he was discharged from the military. The man indicates that his life was "great" until he increased his drinking, which caused a divorce at age 30. He has had two arrests for driving under the influence. He was in jail for 6 months after he had an accident while drunk that resulted in public property damage. He remembers that he initially felt sick in jail, with sweating, vomiting, shaking, and he experienced a seizure. He then improved after a few days and felt better during the rest of his imprisonment without any depression. Which of the following criteria most strongly suggests alcohol abuse?
- A. Desire to cut down
  - B. Recurrent drunk driving
  - C. Seizure after withdrawal

D. Suicidal ideation

E. Tolerance

- Ans. C?

- 4) A 10y/old boy was noted for his extreme fear of water during his first day of swimming lessons. The teacher helps the child sit on the edge of the pool and splash the water with his feet. She then goes one step further and shows him how to wet his knees. It takes her an hour to have him float on the water while holding his hand. What technique has the teacher used to help the child conquer his fear of water?

A. Classical conditioning

B. Desensitization

C. Extinction

D. Flooding

E. Operant conditioning

- Ans. B?

- 5) The mother of a 6-year-old boy brings him to see the local pediatrician complaining that the boy is enuretic from 4 to 5 times a week. She reports that the problem began in the past few months after she gave birth to a baby girl. Breast-feeding for the new baby has been difficult and has consumed a great deal of her time each day. She says that the boy is very embarrassed about his enuresis and is afraid that the other children where he goes to school will find out and make fun of him. She asks the physician help and advice. The physician's best course of action would be to do which of the following?

A. Arrange to interview the boy about his condition

B. Direct her to have a serious discussion with her son about whether anything is bothering him

C. Prescribe a course of imipramine for the boy

D. Refer the mother to a seminar on breast feeding

E. Send the boy to a child psychologist for counseling

F. Suggest that the mother block out some special time each day and give exclusive attention to her son

G. Tell the mother that the boy's problem is normal and temporary, and will soon pass if left alone

- Ans. F?

- 6) A nurse on an inpatient internal medicine ward comes to see the attending physician. While drawing blood for routine laboratory tests ordered by the medical staff, the nurse inadvertently stuck herself with a hypodermic needle, in which were several drops of the patient's blood. The nurse is anxious, and wants the physician to order that the patient's existing blood sample be tested for HIV. The physician is aware that the patient has a history of homosexual encounters, although neither the physician nor the nurse are aware of the patient's HIV status. At this point, the physician should do which of the following?
- A. Assure the nurse that the probability of contracting HIV by this method is relatively low, but that she should be more careful in the future
- B. Convene a meeting of the nursing staff and ask if anyone on the ward is aware of the patient's HIV status



- C. Order the test, as the nurse requests
  - D. Review the patient's chart and medical history for clinical signs consistent with HIV infection
  - E. Talk to the patient and order the test only if the patient gives his permission
  - F. Tell the nurse that you will order the test if she can obtain the patient's permission.
- Ans. C or E?

- 7) A 36-year-old married woman complains to her physician that she is having trouble sleeping. A detailed history shows that her insomnia is sporadic and seems to be connected to cyclical stressors related to her working environment. The physician prescribes alprazolam to be taken "as needed." The next day, the physician receives a distressed call from the patient. With anger in her voice, she tells the physician that the "pharmacist said that taking this medication might cancel out the effects of my birth control pills." At this point the physician's next response should be which of the following?
- A. "I'm sorry. This is my fault. The problem is not very likely given the dose level I prescribed and your only occasional use, but I should have discussed this issue with you before."
  - B. "It's not the pharmacist's job to be tinkering with your medications. I suggest you have the prescription filled somewhere else."
  - C. "It's really such a small chance that it is not worth worrying about."
  - D. "Really, it's nothing to worry about. I'll call the pharmacist and work it out."
  - E. "Really, there is no problem here. Pharmacists just like to show what they know."
  - F. "The pharmacist is being overly cautious. As long as you take both medications as I prescribed them for you, you will have no problem."
  - G. "Well, if you don't like the drug I prescribed, what would you rather have?"
  - H. "You seem angry about this. Tell me more about what you are feeling right now"
- Ans. A?
- 8) A 41-year-old married woman of Asian decent becomes pregnant with her first child. During the course of routine prenatal care, the woman undergoes a series of tests checking on her health and the health of the fetus. The results of the tests suggest the woman is in good health, but strongly indicate that her child will be born with Down syndrome. When informed of this result the woman becomes visibly upset and begins to cry. "How could this happen to me?" she says, "God must be punishing me!" At this point the physician's best reply would be which of the following?
- A. "I don't think God has anything to do with this. This sort of thing just happens some of the time."
  - B. "I know it is hard to hear this kind of news, but let me assure you that you are still young enough to have other children."
  - C. "Let's take a moment to reflect and pray together for guidance."
  - D. "Sometimes God works in mysterious ways that we can not understand. We just have to try to keep our faith."
  - E. "Take some deep breaths and try to relax. When you collect yourself, we can talk about how you want to proceed."
  - F. "Tell me a bit more about why you think God is punishing you."

G. "The chances for Down syndrome are simply higher when a woman your age becomes pregnant. That's why we run these tests."

H. "The real issue before us is, how do you want to proceed? Do you want to carry the child to term or explore other options?"

- Ans. E or H?

9) A 24 year old woman comes to see her male physician complaining of pain and stiffness in the left lower quadrant of her back. During the physical examination to locate the extent and severity of the pain she says, "Wow, you've got great hands, Doc. Just having you touch me helps me feel better." As the patient is getting dressed, she asks the physician if he is married, and then asks if he ever dates his patients. The physician is unmarried, is attracted to the woman, and would like to see her socially. At this point his best action would be to do which of the following?

A. Begin to see the patient socially as long as she understands that it must be kept separate from the medical relationship

B. Explain that as long as she is his patient, no social relationship is possible

C. Have the patient sign a liability waiver and begin to see her socially

D. Refer the patient to a colleague and begin to see her socially

E. Refer the patient to a colleague and refuse to see her socially

F. Refer the patient to a colleague, wait six months, and then begin to see her socially

G. Tell the patient that he will not pursue any social relationship with her, but that he would like to continue to be her physician

- Ans. B?

10) A 64-year-old married man is admitted to the hospital complaining of abdominal pain. Symptoms are consistent with cancer of the colon, and an MRI reveals a large abdominal mass. The patient consents to surgery, and the mass is removed along with 1/3 of the patient's colon. The report from the pathologist confirms that the mass was cancerous and, further, that the tumor had extended through the colon wall, and metastasis is likely. Under the circumstances, the physician estimates life expectancy at less than one year. The patient has not yet been informed of either the extent of the cancer's spread or his projected life expectancy. As the physician enters the patient's room to inform the patient of the negative prognosis, the patient is sitting with his wife and teenage daughter. After introducing himself, the best thing for the physician to say would be which of the following?

A. "I have some bad news. Would you like to discuss it in private or would you like to have your family present?"

B. "I have some things to discuss with you in private. Would you mind having your family wait outside?"

C. "I'm glad that your family is here. Can any of you recall whether any of your close relatives have ever had cancer?"

D. "I'm glad that your family is here with you. I have some things to discuss with you."

E. "This is the part of my job that I hate the most. I came here today to tell you that the cancer has very likely spread."

F. "Well, let's get right to it. I'm afraid that I have some bad news."

G. "We need to talk about your condition. Would you like your family to be present?"

- Ans. B or G?

- 11) A 34-year-old man comes to see his physician complaining of sore throat, stuffy nose, and difficulty sleeping at night. The physician diagnoses him with a sinus infection and writes him a prescription for a course of a common antibiotic. On the last day of the prescribed course of antibiotics, the man calls his physician and leaves a message saying that he is feeling better, but does not feel fully recovered. He asks, in his message, that the physician call the local pharmacy with a refill of his prescription for an additional 7 days so that "I can really kick this thing." After he receives the message, the physician's best course of action would be to do which of the following?
- A. Call the local pharmacy and ask to have the prescription refilled
  - B. Call the patient and tell him that he will be fine and does not need any further medication
  - C. Call the patient back and explain that antibiotics cannot be extended beyond the normal course without the risk of side effects
  - D. Call the patient back and talk with him about his condition, and, if all seems well, call the pharmacy to order that the prescription be refilled
  - E. Call the patient, schedule a follow-up appointment and reevaluate the patient's condition
  - F. Have the office nurse call the patient to schedule a follow-up appointment

- Ans. E

- 12) Which of the following diseases should be reported to the Department of Public Health?

- A. Candida albicans infection
- B. Condyloma acuminatum
- C. Gonorrhea
- D. HIV infection
- E. Streptococcal pharyngitis

- Ans. C?

- 13) A 22-year-old, married woman presents with pain in her lower right abdomen. Her abdomen is tender to palpation and there is rebound tenderness. The patient reports nausea, and has a temperature of 38.3 C (101 F). A diagnosis of acute appendicitis is made, and the patient consents to, and is scheduled for immediate surgery. Prior to the surgery, the woman tells the surgeon that she is a practicing Catholic, and says that she will pray for the successful completion of the surgery. Surgical examination of the appendix reveals that it is normal and without inflammation. Examination of the abdominal cavity reveals that the true underlying cause of the patient's pain is an ectopic pregnancy on the right side. At this point, what action should the surgeon take next?
- A. Close the incision, wait until the patient recovers from anesthesia, and seek full informed consent before proceeding
  - B. Consult the chief of surgery
  - C. Consult with the local Catholic chaplain about how to proceed based on the woman's expressed religious beliefs.
  - D. Seek permission to operate on the ectopic pregnancy from the woman's spouse
  - E. Surgical intervention to deal with the cause of the pain

- Ans. I think it should be D. In nonemergency, answer is A.?

- 14) A primary care physician (Dr. Green) in a community of 100,000 people enters an examination room to find a new patient sitting on a chair just inside the door. Although the patient had been instructed by the nurse to remove her clothes and have a seat on the examination table, the patient remains fully clothed, including her shoes. The patient glances up briefly when the physician enters the room and closes the door, and then returns her gaze to stare at the floor. She says nothing. At this point, the best thing for the physician to say next would be which of the following?
- A. "Didn't the nurse ask you to remove your clothes?"
  - B. "Hello, I'm Dr. Green. How are you feeling today?"
  - C. "I see that you are still dressed. Is there something you want to talk with me about?"
  - D. "OK. Hop up on the table and let's have a look at you."
  - E. "So, what brings you to see me today?"
  - F. "You seem a little depressed. Why don't you tell me about it?"
  - G. "You seem very quiet. I'll just sit here for a moment while you collect your thoughts."
- Ans. B?

- 15) A 16-year-old girl comes to see her physician for a standard physical examination prior to attending summer camp. The examination is unremarkable. The girl falls within the normal range for height and weight. The physician notes that she has had menses for the past 4 years. As the girl is getting dressed, the physician sits and completes the required forms for the camp. When handed the completed forms, the girl thanks the physician and says, "Just one more thing. Could you also give me a prescription for birth control pills? I'm going to camp with my boyfriend and want to be prepared. And please, please, don't tell my parents!" The physician's most appropriate reply would be which of the following?
- A. "Before I write you that type of prescription, I'd like to examine your boyfriend first."
  - B. "How long have you been having sexual relations with your boyfriend?"
  - C. "I can only give you a prescription like that if I have your parents' permission. Let's set up a time to talk with them."
  - D. "I wish you would reconsider. Sex before marriage can be very complicated."
  - E. "I'll be glad to give you the prescription, but I want you to discuss things with your parents first."
  - F. "I'll be happy to give you a prescription, but let's talk about some important issues first."
  - G. "I'll make a decision about the prescription after I have a discussion with you and your boyfriend. When should we schedule that?"
  - H. "I'm pleased that you are responsible enough to be prepared. I'll be happy to give you the prescription and see no reason to tell your parents."
- Ans. C or F?

- 16) A 76-year-old man of Korean descent goes to see his primary care physician complaining of chest pains, difficulty breathing, and general fatigue. When interviewed, he answers the physician's questions respectfully in a soft voice with little eye contact. When questioned about any pain, he indicates that it is always with him. Subsequent

examination and testing leads the physician to suspect that the patient might have lung cancer. When the possibility is mentioned to the patient, he becomes very quiet, stares at the floor and says softly, but distinctly, "I do not think I want to know this if it is true." At this point the physician's best reply would be which of the following?

- A. "I know cancer can seem a bit frightening, but modern advances in treatment give us some options you may not be aware of."
- B. "I understand the custom of your culture is not to discuss these things, but I'll need you to work with me so we can beat this."
- C. "I understand your hesitation, respected Grandfather. I will work with your family if that is what you direct."
- D. "I'm sorry, but I will need your cooperation as we arrange treatment. I will need to tell you and you will have some decisions to make."
- E. "If it is your wish, I will not tell you. Whom in your family should I talk to in your place?"
- F. "In this country, patients have to be told everything. I'll let you know when we have more definitive information."
- G. "Let's wait until we know something definitive and then we can talk about things further."
- H. "OK, I'll respect your wishes and not tell you."
- I. "Tell me a bit more about why you do not want to know."

- Ans. H or A?

- 17) A 25-year-old HIV-positive woman gives birth to a 6-pound baby boy at a local health clinic. The woman has received no prenatal care. She is ecstatic about the birth, holds the child closely, and talks softly to the child every chance she gets. Tests performed to assess the child's HIV status return positive results. When told of these results, the new mother appears unfazed, and says that she will just have to be an even better mother to "help the child through this." She requests a consultation with a breast-feeding counselor because she says, "I want to make sure I do this right." The physician tells her that breast-feeding is not advisable, to which she replies, "I know that breast-feeding is best, and I want the best for my baby." The physician's best reply would be which of the following?
- A. "I'm pleased that you are taking your responsibilities so seriously. I'll arrange an appointment with the breast-feeding counselor for you myself."
  - B. "If you insist on breast-feeding your child, the courts will remove the child from your custody."
  - C. "If you really love your child, you will do what is best and not breast-feed."
  - D. "It is important that you listen to me carefully. Breast-feeding increases the risk to your child. You must not do it."
  - E. "It's wonderful to see how happy you are. We can talk a bit more about these things after you've had some rest and have recovered from the birth."
  - F. "Let me explain. A positive test when the child is this young is not definitive. But if you breast-feed your child, you greatly increase the chances of your child contracting HIV."
  - G. "Yes, breast-feeding is best in most circumstances, but given your HIV status, I strongly advise against it."

- Ans. F?

- 18) A 55-year-old male begins group therapy. After the first session, he befriends one of the other clients, and begins telling her how extraordinarily intelligent and talented the facilitator is. At the next session, he and the facilitator disagree. After the session, he tells his fellow group member that the facilitator is utterly incompetent and that they should sue for malpractice. This is an example of
- A. displacement
  - B. fixation
  - C. reaction formation
  - D. regression
  - E. splitting
- Ans. E?

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## EPIDEMIOLOGY

### Glossary

**Accuracy:** the extent to which a measurement or study result correctly represents the characteristic or relationship that is being assessed.

**Acquired immunodeficiency syndrome (AIDS):** a disease characterized by a marked reduction in CD4+ T lymphocytes and associated defects in immune response caused by the human immunodeficiency virus (HIV).

**Acute:** a disease of short duration.

**Acute myelogenous leukemia (AML):** a heterogeneous group of disorders, also known as acute nonlymphocytic leukemia, each of which involves the uncontrolled proliferation of primitive blood-forming cells.

**Adjustment:** a procedure for overall comparison of two or more populations in which background differences in the distribution of covariables are removed. (See also Standardization.)

**Age adjustment:** a procedure used to calculate summary rates for different populations in which underlying differences in the age distributions are removed. (See also Age standardization.)

**Age-specific rate:** a rate (usually incidence or mortality) for a particular age group.

**Age standardization (direct):** a procedure for obtaining a weighted average of age-specific rates in which the weights are selected on the basis of a standard age distribution (eg, the population of the United States in 1940).

**Allele:** an alternate form of a gene or a genetic locus that differs from other forms in its specific sequence of nucleotides; certain alleles may affect the structure and function of the corresponding protein coded for by that gene, in turn affecting the susceptibility to a particular

condition.

**Alpha error:** see Type I error.

**Alzheimer's disease:** the most common form of dementia in many populations, first described in 1907 by Alois Alzheimer; affected individuals have characteristic abnormalities in their brains, including neurofibrillary tangles and plaques with a protein fragment, -amyloid, at their core.

**Analytic epidemiology:** activities related to the identification of possible determinants of disease occurrence.

**Analytic study:** a research investigation designed to test a hypothesis, often used in reference to a study of an exposure-disease association.

**Antibody:** a protein, often produced in response to exposure to an antigen, that binds to the antigen and thereby stimulates its inactivation by the immune system.

**Antigen:** a protein, usually foreign in origin, that is capable of generating an immune response in a host animal.

**Antigenic drift:** mutation of a pathogen (eg, influenza A), such that the surface antigens differ from those of previously existing strains.

**Apgar score:** a system of evaluating the health status of a newborn using five indicators, each assigned a maximum of two points; the score is named after its originator, Dr. Virginia Apgar.

**Arithmetic mean:** see Mean.

**Arteriosclerosis:** hardening of the arteries.

**Association:** the extent to which the occurrence of two or more characteristics is linked either through a causal or noncausal relationship.

**Asymptomatic persons:** individuals who have a particular disease but do not manifest abnormalities of function, appearance, or sensation typically associated with that disease.

**Atrophy:** abnormal wasting of tissues, organs, or the entire body.

**Attack rate:** the proportion of persons within a population who develop a particular outcome within a specified period of time.

**Attributable risk percent:** the percentage of the overall risk of a disease outcome within exposed persons, related to the exposure of interest.

**Autoimmune disorder:** a disease state in which affected individuals produce antibodies against their own cells or tissues.

**Benign:** a mild illness; when applied to an abnormal growth of cells (viz, neoplasm), it connotes a slowly progressing defect that is not invading adjacent tissues (in contrast to the rapid growth and invasive behavior of a malignant neoplasm).

**Beta error:** see Type II error.

**Bias:** a nonrandom error in a study that leads to a distorted result.

**Biological marker:** a measurable characteristic that helps to classify either level of exposure to a risk factor or susceptibility to (or presence of) a disease.

**Birth cohort effect:** an unusual age-specific rate (either incidence or mortality) within cross-sectional data that reflects the shared experience of persons born in specific years (birth cohort).

**Blinding:** assignment of treatment to individual subjects in a way such that subjects only (single blinding) or both subjects and treating physicians (double blinding) do not know the actual treatment allocation.

**Borrelia burgdorferi:** a spirochete that is borne by a particular deer tick and when transmitted to humans can cause Lyme disease (a systemic illness characterized by a skin rash, joint pains, and, in advanced cases, cardiac and neurologic manifestations).

**Bronchoscopic examination:** the insertion of an instrument (viz, bronchoscope) to help



visualize the trachea and bronchi and to facilitate the collection of specimens from these tissues.  
**Cancer:** a heterogeneous group of diseases characterized by the abnormal, uncontrolled growth of cells, which are capable of crossing normal anatomic boundaries to invade other tissues and even spread to remote anatomic sites.

**Candidate region:** a physical location on a chromosome believed to contain a potential disease susceptibility gene and identified by a genomewide scan and subsequent linkage analysis.

**Case:** a person who has a disease of interest. (See also Incident case and Prevalent case. )

**Case-control study:** an observational study in which subjects are sampled based on the presence (cases) or absence (controls) of the disease of interest. Information is collected about earlier exposure to risk factors of interest.

**Case fatality:** the proportion of persons with a particular disease who die from that disease within a specified period of time.

**Causality:** the extent to which the occurrence of a risk factor is responsible for the subsequent occurrence of a disease outcome.

**Cerebral palsy:** a disorder manifested by speech disturbances and lack of muscular coordination that arises from damage to the brain of a newborn before, during, or shortly after birth.

**Cerebrovascular accident:** a deficit in the delivery of oxygenated blood to the brain that may occur because of a blood clot or a hemorrhage; a synonym for a stroke.

**Chance node:** an element in a decision analysis that represents a point at which specified outcomes are determined on the basis of probability.

**Cholesterol:** a steroid that is abundant in animal tissues and is necessary for normal function; elevated levels of total cholesterol circulating in the blood of a host are associated with increased risks of cardiovascular disease.

**Chronic:** a disease of long duration.

**Chronic obstructive pulmonary disease (COPD):** an abnormal and long-standing reduction in airflow in and out of the lungs, typically caused either by chronic bronchitis or emphysema.

**Clinical scenario:** one of two or more alternative paths of management available in a decision analysis.

**Clinical trial:** an experimental study that is designed to compare the therapeutic benefits of two or more treatments.

**Cluster:** a group of cases of a disease closely linked in time, place of occurrence, or both.

**Cochrane Collaboration:** an international organization dedicated to promoting well-informed health care decisions by preparing, maintaining, and ensuring accessibility to current, rigorous, systematic reviews of the benefits and risks of health care interventions. The organization is named in memory of Archie **Cochrane**, a physician epidemiologist who advocated using the best available evidence to guide health care decisions.

**Coefficient of determination:** the square of the correlation coefficient; it represents the proportion of total variability in an outcome that can be explained by the predictors in a regression model.

**Cohort:** a group of persons that shares a common attribute, such as birth in a particular year or residence in a particular town, and is followed over time.

**Cohort study:** an observational study in which subjects are sampled based on the presence (exposed) or absence (unexposed) of a risk factor of interest. These subjects are followed over time for the development of a disease outcome of interest. (See also Prospective cohort study and Retrospective cohort study. )

**Common-source exposure:** contact with a risk factor that originates in the shared environment



of multiple persons.

**Concordant results:** the same outcome status for two or more individuals, as in a pair-matched case-control study in which both the case and the control are exposed (or unexposed).

**Confidence interval:** a range of values for a measure that is believed to contain the true value within a specified level (eg, 95%) of certainty.

**Confounder:** a variable that distorts the apparent relationship between an exposure and a disease of interest.

**Confounding:** a systematic error in a study that arises from mixing of the effect of the exposure of interest with other associated correlates of the disease outcome.

**Control:** in a case-control study, a subject without the disease of interest. (See also Adjustment.)

**Control group:** a population of comparison subjects in an analytic investigation.

**Coronary artery disease:** complete or partial blockage of the blood vessels that bring oxygenated blood to the heart muscle (myocardium), usually arising from atherosclerosis; if the reduction in blood flow is severe, a myocardial infarction may result.

**Correlation coefficient:** a statistical measure of the relatedness of two variables; it can range from -1 (perfectly related inversely to each other) to +1 (perfectly related in the same direction to each other). When the variables are unrelated to each other, the correlation coefficient has a value of zero.

**Correlation study:** a hypothesis-generating investigation in which the values of two or more summary characteristics are associated across different population groups.

**Cosegregation:** the tendency of alleles on the same chromosome to be inherited together.

**Cross-sectional study:** an analytic investigation in which subjects are sampled at a fixed point or period of time, and the associations between the concurrent presence or absence of risk factors and diseases are then investigated.

**Crude mortality rate:** the rapidity with which persons within a given population die from a particular disease, without adjustment for the underlying age distribution of the population.

**Cumulative incidence:** the risk of developing a particular disease within a specified period of time.

**Cutoff point:** a value on an ordinal or a continuous scale of measurement used to distinguish categories. For example, values above this threshold may be classified as "abnormal" and values below this point may be classified as "normal."

**Death rate:** see Mortality rate.

**Decision analysis:** a formal probabilistic process for making clinical decisions that incorporates information on medical options, anticipated likelihoods of various outcomes, and the uncertainty associated with clinical information.

**Decision diagram:** a flow chart used in decision analysis that identifies the clinical management choices, probabilities of events, and likelihoods of outcomes.

**Decision node:** an element of a decision tree that represents a choice between two or more competing alternative management approaches.

**Decision tree:** see Decision diagram.

**Dementia:** a condition characterized by impaired short- and long-term memory, along with disturbances of other cognitive functions, such as speech and the perception of spatial relationships.

**Dependent variable:** see Outcome variable.

**Descriptive epidemiology:** activities related to characterizing patterns of disease occurrence.

**Diabetes mellitus:** a disorder of carbohydrate regulation caused by either a markedly reduced or absent production of insulin by the pancreas (Type I ) or a decreased sensitivity to the effects of insulin in the peripheral tissues (Type II ).

**Differential misclassification:** incorrect categorization of the status of subjects with regard to one variable (eg, exposure) that is influenced by other characteristics of interest (eg, disease status).

**Discordant results:** different outcome status for two or more individuals, as in a pair-matched case-control study, when one subject in a pair is exposed and the other individual is unexposed to the risk factor of interest.

**Disease outbreak:** a sudden, unexpected increase in the occurrence of a disease within a relatively limited geographic area.

**Diuresis:** an abnormally elevated volume of urine production.

**Dizygotic twin:** fraternal twins resulting from the fertilization of two separate ova by two separate spermatozoa; the members of this pair are no more similar genetically than are two nontwin siblings.

**Dose-response relationship:** an exposure-disease association in which the risk of developing a disease varies with respect to the intensity or duration of exposure.

**Eclampsia:** the occurrence of one or more seizures that cannot be attributed to an underlying neurologic condition (such as epilepsy or a cerebral hemorrhage) in a patient with preeclampsia.

**Ecologic fallacy:** an association between summary characteristics across populations without actual linkage of the characteristics within individual persons.

Ecologic study: see Correlation study.

**enzyme-linked immunosorbent assay (ELISA);** it can be used to test for antibodies to an infectious agent.

**Emerging infectious disease:** an infection that has newly appeared within a population or has existed but is rapidly increasing in incidence or geographic range.

**Empiric treatment:** in the context of infectious illness, the initiation of an antibiotic treatment against a spectrum of suspected potential pathogens, in the absence of a documented specific pathogen(s).

**Endemic rate:** the usual rate of occurrence of particular events within a population.

**Eosinophilia-myalgia syndrome:** a condition characterized by muscle pains and, in some patients, joint pains, skin thickening, hair loss, or intestinal disease, accompanied by an abnormally elevated level of eosinophil cells in the blood.

**Epidemic:** a dramatic increase above the usual or expected rate of occurrence of particular events within a population.

Epidemiology: the study of the distribution and determinants of disease within human populations.

**Escherichia coli O157:H7:** a strain of bacteria that is a cause of the hemolytic uremic syndrome, which occurs in humans who consume food products contaminated with this pathogen.

**Etiology:** the cause(s) of a disease or the study of disease causation.

**Evidence-based medicine:** the integration of current best evidence from research with clinical expertise, pathophysiologic knowledge, and patient preferences, used to make health care decisions.

**Excess risk:** the extra risk of the occurrence of a particular disease among persons exposed to a risk factor of interest. (See also Risk difference. )

**Exclusions:** persons who are eliminated from an analytic study because they do not satisfy the

eligibility (inclusion) criteria.

**Expected utility:** a numerical value that represents the average result if the decision maker follows a particular path in a decision analysis.

**Exposure:** contact with or possession of a characteristic that is suspected to influence the risk of developing a particular disease.

**External validity:** the extent to which the conclusions of a study can be correctly applied to persons beyond those who were investigated. (See also Generalize. )

**False negative:** a test result that is normal (negative) despite the true presence of the disease of interest or a study result that incorrectly fails to identify a true effect. (See also Type II error. )

**False positive:** a test result that is abnormal (positive) despite the true absence of the disease of interest or a study result that incorrectly suggests an effect, when, in truth, the purported effect does not exist. (See also Type I error. )

**Familial aggregation:** the extent to which the occurrence of a particular disease tends to cluster within families.

**Fixed effects model:** a statistical approach to combining information from multiple sources in which it is assumed that the investigated relationship is constant across sources and any differences in individual results are attributable entirely to random variation.

**Follow-up study:** see Cohort study.

**Food-borne disease:** an illness that is caused by the ingestion of food or food products, often arising from contamination of the food with microbes or other toxic materials.

**Framingham Heart Study:** a landmark prospective cohort study of risk factors for cardiovascular disease initiated in 1950 among residents of Framingham, Massachusetts.

**Generalize:** the ability to extrapolate study results from the study subjects to other persons who were not investigated.

**Genetic epidemiology:** the use of epidemiologic techniques to study hereditary determinants of disease in human populations.

**Genetic (linkage) map:** a type of map of the genome in which markers are identified on the chromosomes and the relative distances between these markers are estimated by the frequency with which the markers are inherited together.

**Genome:** the full complement of genes on all chromosomes.

**Genomewide scan:** an approach to localizing candidate regions for genes contributing to the susceptibility for a specific disease by analyzing the extent to which the disease occurs in members of affected families in association with markers at known locations throughout the genome.

**Genotype:** the genetic constitution of an individual; may be used in reference to the particular allele(s) present at one or more gene loci.

**Glucosuria:** an abnormally elevated level of glucose in the urine, as may occur in diabetes mellitus.

**Granulocyte:** a mature granular white blood cell, which includes neutrophils as well as other types of cells.

**Granulocytopenia:** a condition marked by an abnormally low number of granulocytes in the blood, and which may predispose the host to infection.

**Hantavirus:** a virus named for a river in South Korea, where human infection was first recognized; this pathogen is capable of causing a hemorrhagic fever and a separate pulmonary syndrome in infected human hosts.

**Hematologic:** of or relating to the blood or blood-forming tissues.

**Heterogeneity:** the statistical property of variation in an investigated relationship across individual studies or across subgroups within a particular study.

**Historical cohort study:** see Retrospective cohort study.

**Historical controls:** subjects in a clinical study who were previously treated with the standard therapy before the new experimental treatment was introduced.

**HIV:** see Human immunodeficiency virus.

**Homogeneity:** the statistical property of lack of variation of an investigated relationship across individual studies or across individual subgroups within a particular study.

**Human immunodeficiency virus:** the cause of the acquired immunodeficiency syndrome (AIDS) and other HIV-related disorders.

**Hyperglycemia:** an abnormally high level of glucose in the blood, as may occur in untreated patients with diabetes mellitus.

**Hypertension:** an abnormal elevation in blood pressure.

**Hypoglycemia:** an abnormally low level of glucose in the blood, as may result from an overly aggressive administration of insulin in patients with diabetes mellitus.

**Hypothesis-generating study:** an exploratory investigation designed to formulate questions that are evaluated in subsequent analytic studies.

**Hypothesis-testing study:** an analytic investigation in which one or more specific refutable suppositions are evaluated.

**Hypoxia:** an abnormally low level of oxygen in the arterial blood.

Immunity: a state in which a host is not susceptible to a particular infection or **disease**.

**Inbreeding study:** a study in which the degree of selective breeding among members of a particular group is assessed with respect to risk of developing a particular disease.

**Incidence density:** see Incidence rate.

**Incidence rate:** the rapidity with which new cases of a particular disease arise within a given population.

**Incident case:** a person who is newly diagnosed with a disease of interest.

Incubation period: the time interval between contact with a risk factor (often an infectious agent) and the first clinical evidence of the resulting illness.

Independent variable: a factor that is suspected to influence the outcome of an analytic study.

**Index case:** in a disease outbreak, the first affected individual to be identified; in genetics, see Proband.

Information (or observation) bias: a systematic error in a study that arises from the manner in which data are collected from participants.

Informed consent: the process of providing a patient with information about the risks and benefits of a proposed treatment plan and then securing the patient's (or if the patient is a child, the guardian's) agreement to undergo the planned intervention recognizing the risks and benefits.

Insulin: a peptide hormone produced in the pancreas and secreted into the blood, which delivers it to target organs to help regulate glucose utilization, protein synthesis, and formation and storage of lipids.

**Intention to treat:** analysis of the results of a clinical trial based on initial treatment assignment regardless of whether the subjects completed the full course of treatment.

**Internal validity:** the extent to which the conclusions of a study are correct for the subjects under investigation.

**Ketosis:** a condition characterized by the enhanced production of ketone bodies, as may occur in the metabolic abnormalities associated with diabetes mellitus.

**Latent period:** time between exposure to a risk factor and subsequent development of clinical manifestations of a particular disease.

**Lead-time bias:** apparent increase in the length of survival of patients with a disease as a result of earlier detection of the disease through the use of a screening procedure.

**Length-biased sampling:** preferential detection of less aggressive forms of a disease through the use of a screening procedure.

**Life expectancy:** the expected, or average, duration of life for persons in a particular population, under the assumption that current age-specific mortality patterns continue to apply.

**Likelihood:** the probability of the occurrence of a specified event.

**Likelihood ratio:** the probability of a particular test result for a person with the disease of interest divided by the probability of that test result for a person without the disease of interest.

**Likelihood ratio for a negative test result:** the probability of a negative test result for a person with the disease of interest divided by the probability of a negative test result for a person without the disease of interest.

**Likelihood ratio for a positive test result:** the probability of a positive test result for a person with the disease of interest divided by the probability of a positive test result for a person without the disease of interest.

**Linkage:** the proximity of multiple genes or genetic markers on the same chromosome, which is related to the probability that a certain combination of alleles at these sites will be inherited as a linkage group or haplotype.

**Linkage analysis:** a statistical technique used to identify candidate regions for genes based on the examination of the closeness of association between the inheritance within affected families of the condition of interest and markers at known locations throughout the genome.

**Linkage disequilibrium:** an excess or deficiency of certain combinations of alleles from genes or markers that are located on the same chromosome; alleles at tightly linked sites often are inherited together, and, therefore, linkage disequilibrium may help to identify the location of a particular susceptibility gene that is inherited as part of a linkage group with genes or markers at known locations within the genome.

**Longitudinal study:** see Cohort study.

**Malignancy:** the property of being malignant, often used interchangeably with the term cancer.

**Malignant:** a severe disease that is resistant to treatment (eg, severe hypertension); the term often is used in relation to the behavior of cancers.

**Marker:** in genetics, an identifiable physical location on a chromosome or deoxyribonucleic acid (DNA) segment useful in mapping genes and in performing linkage analysis.

**Matching:** a procedure for sampling comparison subjects based on whether key attributes (ie, matching factors ) are similar to those of subjects in the index group.

**Mean:** the arithmetic average of a distribution of values; calculated as the sum of the individual values divided by the number of observations.

**Meconium:** the first intestinal discharges of a newborn; if passed prior to delivery, it may serve as a sign of fetal distress, and if aspirated by the newborn, may give rise to acute pulmonary distress.

**Median:** a measure of central tendency of a distribution; calculated as the mid-point of the distribution when individual values are ordered from the smallest to the largest.

**Median survival time:** the duration of time from diagnosis to death that is exceeded by exactly 50% of subjects with a particular disease.

**Medical outcome:** See Outcome.

**Meta-analysis:** a statistical combination or integration of the results of several independent research studies that are considered to be combinable.

**Metabolic acidosis:** an abnormally high level of acid and low level of bicarbonate in the blood and other tissues resulting either from an accumulation of acids from metabolic processes (as in diabetes mellitus) or from an abnormally high loss of bases from the body (as in diarrhea or renal disease).

**Misclassification bias:** incorrect characterization of the status of subjects with regard to a study variable, leading to a distorted conclusion. (See also Information bias. )

**Mode:** a measure of central tendency of a distribution; it is the value that occurs most frequently within the distribution.

**Monozygotic twin:** genetically identical individuals arising from the division of a single fertilized ovum.

**Morbidity:** a state of illness produced by a disease.

**Mortality:** death, usually in reference to death caused by a particular disease (viz, cause-specific mortality ).

**Mortality rate:** the rapidity with which persons within a given population die from a particular disease.

**Mycobacterium:** a genus of bacteria, a member of which is M tuberculosis, also known as tubercle bacillus, the pathogen responsible for tuberculosis in humans.

Myocardial infarction: a sudden diminution in the delivery of oxygenated blood to the heart muscle (viz, myocardium ), most commonly caused by partial or complete blockage of one or more of the coronary arteries.

**Natural history:** the progression of a disease through successive stages, often used to describe the course of an illness for which no effective treatment is available.

**Negative predictive value:** the probability that a person with a negative (normal) test result actually does not have the disease of interest.

**Neoplasm:** a new growth that arises from the abnormal proliferation of cells; the proliferation may be benign or malignant (viz, cancer ).

**Nephropathy:** a disorder of the kidney; among diabetics, the disorder arises because of damage to the small blood vessels of the kidney, which can lead to failure of the kidneys in an advanced stage.

**Neutropenia:** the presence of an abnormally low level of neutrophils in the blood, placing the host at increased susceptibility to infection.

**Neutrophil:** a mature white blood cell in the granulocyte series necessary for normal host defense responses.

**Nondifferential misclassification:** incorrect categorization of the status of subjects with regard to one variable (eg, exposure) that is unrelated to another characteristic of interest (eg, disease status).

**Nosocomial infection:** an illness caused by exposure to a pathogen during hospitalization of the host.

**Notifiable disease:** a disease for which regular, frequent, and timely information on individual cases is considered necessary for the prevention and control of the disease.

**Null value:** the point on the scale of a measure of association that corresponds to no association (eg, 1 for the risk ratio and the odds ratio and 0 for the risk difference and the attributable risk percent).

**Observation bias:** see Information bias.



**Observational study:** a nonexperimental analytic study in which the investigator monitors, but does not influence, the exposure status of individual subjects and their subsequent disease status.

**Odds:** the probability that a particular event will occur divided by the probability that the event will not occur.

**Odds ratio:** the odds of a particular exposure among persons with a specific disease divided by the corresponding odds of exposure among persons without the disease of interest.

**Opportunistic infection:** an illness caused by a microorganism that is capable of causing disease only in a host whose resistance is lowered below normal levels.

**Outbreak:** see Disease outbreak.

**Outcome:** clinical events that result from patient management decisions (eg, morbidity, complications, quality of life, or mortality).

**Outcome variable:** in an analytic study, the response of interest (eg, development of disease).

**Pandemic:** an elevated occurrence of a disease across a wide geographic area, affecting a substantial proportion of the population.

**Pathogen:** an agent responsible for the development of a particular disease.

**Pathophysiology:** derangement of function associated with a disease process.

**Pedigree:** the family members of a proband, identified with respect to their biological relationship to the proband and whether they are known to have the disease of interest.

**Penetrance:** the proportion of individuals with a particular genotype that exhibits the same phenotype under similar environmental conditions.

**Perinatal asphyxia:** an abnormally reduced level of oxygenation of a fetus during labor and delivery, or shortly thereafter.

**Person-time:** a unit of measurement used in the estimation of rates that reflects the amount of time observed for persons at risk of a particular event.

**Person-to-person spread:** propagation of a disease within a population by transfer from an affected person to susceptible persons.

**Person-years:** a common unit for measuring person-time; one person-year corresponds to one person being followed for one year, or, alternatively, two persons each followed for one-half year, and so forth.

**Person-years of life lost:** a measure of total life expectancy lost within a particular population because of premature death.

**Phenotype:** a category or group to which an individual may be assigned on the basis of one or more characteristics observable clinically or by laboratory assessment that reflect genetic variation or gene-environment interactions.

**Placebo:** an inert substance.

**Placebo effect:** occurs when persons affected with a specific illness demonstrate clinical improvement when treated with an inert substance.

**Polymerase chain reaction:** a laboratory technique for rapidly synthesizing large quantities of a particular portion of genetic material.

**Population at risk:** persons who are susceptible to a particular disease but who are not yet affected.

**Population-based study:** an analytic study in which subjects are sampled from the general population.

**Positive predictive value:** the probability that a person with a positive (abnormal) test result actually has the disease of interest.

**Posttest odds of disease:** the estimated probability, after the administration of a diagnostic test,

that a patient has the disease of interest divided by the probability that the patient does not have the disease of interest.

**Posttest probability of disease:** the estimated likelihood, after the administration of a diagnostic test, that a patient has the disease of interest.

**Power:** see Statistical power.

**Precision:** the extent to which a measurement is narrowly characterized. Statistical precision is inversely related to the variance of the measurement.

**Predictor variable:** see Independent variable.

**Preeclampsia:** the abnormal occurrence of hypertension accompanied by either an abnormal collection of fluid in body tissues or abnormally increased levels of protein in the urine, or both, due to pregnancy.

**Premature death:** a death that occurs earlier than would be expected in the absence of a particular disease.

**Pretest odds of disease:** the estimated probability, prior to the administration of a diagnostic test, that a patient has the disease of interest divided by the probability that the patient does not have the disease of interest.

**Pretest probability of disease:** the estimated likelihood, prior to the administration of a diagnostic test, that a patient has the disease of interest.

**Prevalence:** the proportion of persons in a given population that has a particular disease at a point or interval of time.

**Prevalent case:** a person who has a disease of interest that was diagnosed in the past.

**Proband:** the first affected individual who brings his or her family to the attention of a researcher or clinician for the purposes of medical care or investigation.

**Prognosis:** the predicted rate of progression of a disease process and its likely outcome(s).

**Prognostic factor:** an attribute anticipated to be related to the progression and outcome of a disease process.

**Proportion:** one quantity divided by another quantity in which the population in the numerator is a subset of the population in the denominator. The possible values of a proportion range from zero to one.

**Prospective cohort study:** a cohort study in which exposure status and subsequent occurrence of disease both occur after the onset of the investigation.

**Publication bias:** a distortion in conclusions derived from published studies because of the selective factors associated with the likelihood of publication, including whether the findings were positive and statistically significant, and the potential proprietary interests of sponsors.

**Random effects model:** a statistical approach to combining information from multiple sources in which it is assumed that the investigated relationship varies across individual sources, in addition to the influences of random variation in estimates.

**Randomization:** procedure for assigning treatments to patients by chance.

**Rate:** the rapidity with which health events such as new diagnoses or deaths occur. (See also Incidence rate and Mortality rate. )

**Rate ratio:** the rate of occurrence of a specified health event among persons exposed to a particular risk factor divided by the corresponding rate among unexposed persons.

**Ratio:** one quantity divided by another quantity, in which the population in the numerator is not a part of the population in the denominator. The possible values of a ratio range from zero to positive infinity.

**Recurrence risk:** in genetic epidemiology, the risk of developing a particular disease



experienced by relatives of a subject with that disease.

**Relapse:** the return of the manifestations of a disease after a period of diminished manifestations.

**Relative risk:** see Risk ratio.

**Reliability:** the extent to which multiple measurements of a characteristic are in agreement.

**Remission:** elimination or reduction in the number or severity of the manifestations of a disease, which may be transient or permanent.

**Response variable:** see Outcome variable.

**Retinopathy:** a disorder of the retina of the eye; among diabetics the disorder arises from damage to the small blood vessels of the retina and can lead to blindness.

**Retrospective cohort study:** a cohort study in which exposure status and subsequent development of disease both occur prior to the onset of the investigation.

**Risk:** the probability that an event (eg, development of disease) will occur within a specific period of time.

**Risk difference:** the risk of the occurrence of a particular disease among persons exposed to a given risk factor minus the corresponding risk among unexposed persons.

**Risk factor:** an attribute or agent suspected to be related to the occurrence of a particular disease.

**Risk ratio:** the likelihood of the occurrence of a particular disease among persons exposed to a given risk factor divided by the corresponding likelihood among unexposed persons.

**Sample:** a subset of a target population that is chosen for investigation.

Screening: the use of tests to detect the presence of a particular disease among asymptomatic persons prior to the time that the disease would be recognized through routine clinical methods. The Surveillance, Epidemiology and End Results (SEER) Program of the National Cancer Institute; it consists of 11 population-based cancer registries in various locations within the United States.

**Segregation analysis:** a complex statistical technique used to assess whether a particular disease has, at least in part, a genetic origin, and, if so, the most likely mode of inheritance.

**Selection bias:** a systematic error in a study that arises from the manner in which subjects are sampled.

Sensitivity: the probability that a person who actually has the disease of interest will have a positive (abnormal) test result.

**Sensitivity analysis:** (1) in systematic reviews, including meta-analyses, the evaluation of the pattern of results across subgroups of studies to characterize possible sources of heterogeneity and their respective influences on the overall summary effect; (2) in decision analysis, use of different values for an uncertain likelihood to determine whether the preferred course of action remains unchanged.

**Sentinel case(s):** the initial person(s) affected by a particular illness during an outbreak.

**Seroconversion:** change in a person's status from not having evidence of infection (such as antibodies) in the serum to having such evidence.

**Seronegative:** absence of evidence of infection in a person's serum (synonym: antibody negative).

**Seropositive:** presence of evidence of infection in a person's serum (synonym: antibody positive).

**Sib-pair analysis:** statistical analysis for many genetic linkage studies attempting to locate susceptibility genes for a particular disease in which the fundamental unit of analysis is a pair of

siblings.

**Specificity:** the probability that a person who actually does not have the disease of interest will have a negative (normal) test result.

**Squamous cell carcinoma:** a malignant neoplasm (cancer) arising from stratified squamous epithelium, but that may also occur in sites in which glandular or columnar epithelium normally occur.

**Standardization:** an analytic procedure for obtaining a summary measure for a population by applying standard weights to the measures within subgroups of the population.

**Statistical power:** the ability of a study to detect a true effect of a specified magnitude. The statistical power corresponds to  $1 - \text{Type II error}$ .

**Statistical significance:** the likelihood that a difference as large as or larger than that observed between study groups could have occurred by chance alone in a sample of the size investigated. Usually, the level of statistical significance is stated as a P -value (eg,  $P < 0.05$ ).

**Stroke:** a sudden derangement in function, as in sunstroke or heat stroke; often used in relation to a sudden neurologic deficit that occurs because of insufficient delivery of oxygenated blood to the brain, as may occur following a blood clot or hemorrhage.

**Subacute:** a rate of progression of a condition that is intermediate between acute and chronic.

**Surveillance:** ongoing observation of a population for rapid and accurate detection of changes in the occurrence of particular diseases.

**Survival:** the likelihood of remaining alive for a specified period of time after the diagnosis of a particular disease.

**Systematic error:** see Bias.

**Systematic review:** a synthesis of medical evidence on a topic, in which the synthesis has been prepared using strategies to minimize errors.

**Terminal node:** in a decision tree, an element that represents the outcome for a particular clinical scenario.

**T lymphocyte:** a white blood cell that is responsible for cell-mediated immunity in the host.

**Transmission:** the process by which a pathogen passes from one source of infection to a new host.

**True negative:** a test result that is normal (negative) when the disease of interest is actually absent.

**True positive:** a test result that is abnormal (positive) when the disease of interest is actually present.

**Tuberculosis:** an infectious illness caused by *Mycobacterium tuberculosis*, characterized by a brief initial illness; in a minority of cases, a chronic active illness, primarily affecting the lungs, will occur months to years following infection.

**Tumor:** a swelling that may occur from an inflammatory process or a benign or malignant neoplasm.

**Twin study:** a study of genetic susceptibility in which concordance for occurrence of a particular disease is compared between dizygotic (fraternal) twins and monozygotic (identical) twins, or between twins reared together versus apart.

**Type I error:** rejection of the null hypothesis when it is actually correct.

**Type II error:** failure to reject the null hypothesis when it is actually incorrect.

**Underlying cause of death:** (1) the disease or injury that initiated the train of morbid events leading directly to death, or (2) the circumstances of the accident or violence that resulted in fatal injury.

**Utility:** in decision analysis, a patient's preference for one outcome over another, usually graded on a scale of zero, representing death, to one, representing perfect health.

**Validity:** the extent to which a measurement or a study result correctly represents the characteristics or relationship of interest.

**Variability:** the property of having a spread of values, which may arise from random sources (viz, the operation of chance) or from systematic influences (viz, bias).

**Viremia:** the presence of virus particles in the blood of a host.

**Vital statistics:** information concerning patterns of registered life events, such as births, marriages, divorces, and deaths.

**Weighted average:** a summary measure in which some of the component data values are assigned greater influence than others. For example, precision-based weighting is the calculation of a summary measure in which the relative influence of individual results is based on statistical confidence in the respective results.

**Withdrawals:** subjects who are initially included in a study but later voluntarily or involuntarily terminate participation.

**Years of potential life lost (YPLL):** a measure of total life lost to a particular age (eg, 75 years) within a population because of premature deaths.

Questions 1-3:

For each numbered situation below, select the most appropriate term from the following lettered options. Each option can be used once, more than once, or not at all.

- A. Birth cohort effect
- B. Ecologic fallacy
- C. Latent period
- D. Endemic occurrence
- E. Epidemic occurrence

1. Populations in which infection from *Helicobacter pylori* is common have a persistent, steady elevation in gastric cancer when compared with other communities in which this infection is uncommon.

2. *H pylori* infection increases the risk of gastric cancer, but the time from initial infection to cancer occurrence is more than a decade.

3. A correlation is shown between national consumption of coffee and gastric cancer mortality, but individual coffee drinkers do not have an elevated risk of developing gastric cancer.

Questions 4-7:

For each measure discussed in the numbered statements below, select the most appropriate value from the following lettered options. Each option can be used once, more than once, or not at all.

- A. 0.30
- B. 0.50
- C. 0.90
- D. 6.5
- E. 11.0
- F. Cannot be determined from the information provided

4. In a correlational study, the average annual per capita consumption of alcohol (in gallons) is used to predict annual mortality rates (per 100,000 persons) from cirrhosis of the liver across states in the United States. The resulting regression equation is

The correlation coefficient is 0.55 and the coefficient of determination is 0.30. What is the predicted increase in the liver cirrhosis annual mortality rate (per 100,000 persons) for 1 gallon per capita annual alcohol consumption?

5. Given the equation in question 4, what is the predicted annual mortality rate (per 100,000 persons) for cirrhosis of the liver in the absence of alcohol consumption?

6. Given the equation in question 4, what is the predicted annual mortality rate (per 100,000 persons) for cirrhosis of the liver in a state with an average annual per capita alcohol consumption of 5 gallons?

7. Given the equation in question 4, what proportion of the variability in average annual mortality rates (per 100,000 persons) for cirrhosis of the liver can be accounted for by knowing the corresponding per capita annual consumption of alcohol?

Questions 8-11:

For each migration discussed in the numbered statements below, select the lettered option that describes the most likely effect on the incidence rate of disease among offspring. Each option can be used once, more than once, or not at all.

A. Greater

B. Smaller

C. About the same

D. Cannot be determined from the information provided

8. When compared with the corresponding rate for nonmigrants in a high-risk country, the incidence rate for an environmentally determined disease among offspring of migrants to a low-risk country is

9. When compared with the corresponding rate for nonmigrants in a low-risk country, the incidence rate for an environmentally determined disease among offspring of migrants to a high-risk country is

10. When compared to the corresponding rate for nonmigrants in a high-risk country, the incidence rate for a genetically determined disease among offspring of migrants to a low-risk country is

11. When compared to the corresponding rate for nonmigrants in a low-risk country, the incidence rate for a genetically determined disease among offspring in a high-risk country is

1. D

2. C

3. B

4. C

5. D

6. E

7. A

8. B

9. A

10. C

11. C

For each question, select the single best answer.

Questions 1-5:

A cohort study is conducted to evaluate the relationship between dietary fat intake and the development of prostate cancer in men. In the study, 100 men with a high fat diet are compared with 100 men who are on a low fat diet. Both groups start at age 65 and are followed for 10 years. During the follow-up period, 10 men in the high fat intake group are diagnosed with prostate cancer and 5 men in the low fat intake group develop prostate cancer.

1. What is the risk of developing prostate cancer in the high fat group?
  - A. 0.05
  - B. 0.10
  - C. 0.15
  - D. 0.20
  - E. 0.25
2. What is the risk of developing prostate cancer in the low fat group?
  - A. 0.05
  - B. 0.10
  - C. 0.15
  - D. 0.20
  - E. 0.25
3. What is the risk ratio (high fat consumers compared to low fat consumers) for the occurrence of prostate cancer?
  - A. 0.05
  - B. 0.75
  - C. 1.0
  - D. 1.5
  - E. 2.0
4. The point estimate for the risk ratio in question 3 suggests that the risk of prostate cancer associated with consumption of a high fat diet is
  - A. Decreased
  - B. Increased
  - C. Not affected
  - D. Cannot be determined from the information provided
5. The 95% confidence interval is 0.95 to 3.5. For statistical significance at an alpha level of 0.05, the correct interpretation of these results is that
  - A. A statistically significant association exists between high dietary fat intake and an increased risk for prostate cancer.
  - B. A statistically significant association exists between high dietary fat intake and a decreased risk for prostate cancer.
  - C. It can be concluded with 95% confidence that high dietary fat intake protects against prostate cancer.
  - D. It can be concluded with 95% confidence that high dietary fat intake increases the risk of prostate cancer.
  - E. The risk of prostate cancer is not statistically significantly different between men with high fat intake and men with low fat intake.

Questions 6-10:

A cohort study is conducted to evaluate the relationship between serum cholesterol level and the occurrence of myocardial infarction in women. In the study, 500 women with high serum cholesterol levels and 500 women without high serum cholesterol levels are followed over a 10-

year period. During the study, 40 of the women with high serum cholesterol levels and 15 of the women with normal serum cholesterol levels develop a newly diagnosed myocardial infarction.

6. The incidence rate (per 10,000 person-years) for a myocardial infarction among women with high serum cholesterol is

- A. 30
- B. 50
- C. 60
- D. 80
- E. 100

7. The incidence rate (per 10,000 person-years) for a myocardial infarction for women with normal serum cholesterol is

- A. 30
- B. 50
- C. 60
- D. 80
- E. 100

8. The (incidence) rate ratio for myocardial infarction is

- A. 0.37
- B. 1.33
- C. 2.67
- D. 3.15
- E. 3.75

9. The risk difference is

- A. 0.002
- B. 0.005
- C. 0.006
- D. 0.01
- E. 0.05

The attributable risk percent is

- A. 25.5%
- B. 35.0%
- C. 47.5%
- D. 55.5%
- E. 62.5%

- 1. B
- 2. A
- 3. E
- 4. B
- 5. E
- 6. D
- 7. A
- 8. C
- 9. E
- 10. E

Questions 1-4:

For each numbered situation below, select the best descriptor from the following lettered options. Each option can be used once, more than once, or not at all.

- A. Ecologic fallacy
- B. Confounding
- C. Random error
- D. Misclassification
- E. Cohort effect
- F. Selection bias

1. In a case-control study of environmental exposure to tobacco smoke and risk of sudden infant death syndrome (SIDS) in children, low socioeconomic status is associated with exposure to environmental tobacco smoke and is a risk factor for SIDS.
2. In the study cited in question 1, cases are sampled from death certificates and controls are sampled from registrants in a managed care health insurance plan.
3. In the study cited in question 1, parents of children who have died from SIDS are more likely to overestimate their child's exposure to environmental tobacco smoke than are parents of controls.
4. A correlation analysis across 15 states reveals an association between mortality rates from SIDS and smoking prevalence among young adults, but parents of children who die from SIDS are not more likely than other parents to be smokers.

Questions 5-7:

For each numbered situation below, select the most appropriate advantage of the case-control design from the following lettered options. Each option can be used once, more than once, or not at all.

- A. Confounding is unlikely because of randomization
  - B. Efficient for the study of rare diseases
  - C. Efficient for the study of diseases that develop slowly
  - D. The risk among exposed persons can be estimated directly
  - E. The temporal relationship between exposure and disease is clearly defined
  - F. The ability to conduct an assessment quickly allows rapid intervention
5. Assessing risk factors for infection in a community-wide outbreak of cryptosporidiosis.
  6. Assessing risk factors for congenital defects of the neural tube.
  7. Assessing the role of antioxidants in reducing the risk of atherosclerotic coronary artery disease.

Questions 8-10:

For each numbered measure below, select the most appropriate calculation from the following lettered options. Each option can be used once, more than once, or not at all.

- A. 80/150
- B. 20/280
- C. 20/300
- D.  $(80 \times 280)/(20 \times 70)$
- E. 80/70
- F.  $(20 \times 70)/(80 \times 280)$
- G.  $(80/100)/(70/350)$

8. The odds of exposure among cases in an unmatched case-control study of risk factors for adenocarcinoma of the esophagus, in which chronic heartburn was found in 80 of 150 cases and

20 of 300 controls.

9. The odds of exposure among controls in the study described in question 8.

10. The odds ratio for exposure in the unmatched case-control study described in question 8.

Questions 11-13:

For each numbered situation below, select the best descriptor from the following lettered options. Each option can be used once, more than once, or not at all.

A. Concordant pair

B. Discordant pair

C. Not applicable

D. Cannot be determined from the information provided

11. In a pair-matched case-control study of traumatic head injury as a risk factor for Alzheimer's disease, a patient with Alzheimer's disease had a prior history of head trauma and the corresponding control did not have prior head trauma.

12. In a pair-matched case-control study of cognitive impairment as a risk factor for hip fracture in the elderly, a patient with a hip fracture has cognitive impairment as does the corresponding control.

13. In an unmatched case-control study of infection from *Helicobacter pylori* as a risk factor for stomach cancer, a patient with stomach cancer has serum antibody to *H pylori* and a control also is antibody seropositive for *H pylori*.

1. B

2. F

3. D

4. A

5. F

6. B

7. C

8. E

9. B

10. D

11. B

12. A

13. C

➤ **Accuracy vs. Precision**

- Accuracy and validity are the same. (hitting the target)  
Precision and reliability are the same. (hitting the target in the same place every time)
- if you have both: accuracy/validity AND precision/reliability then you hit the target in the middle (bull's eye) everytime...
- use this analogy for analyzing tests in biostats.  
so accuracy/validity would mean you get the same answer most of the time, not necessarily the right one  
and precision/reliability means you get the right answer most of the time.



- **CORRECTION:** see the FA part of BS... they have a picture and explain it well.  
Correction: accuracy and validity (hitting the target- but all over the target)  
Precision and reliability (hitting one area of the target all the time- not necessarily the bulls eye)  
if you have both: accuracy/validity AND precision/reliability then you hit the target in the middle (bull's eye) everytime...
- **Validity:** whether the test truly measures what it purports to measure  
**Reliability:** Reproducibility of a test. (getting around the same ans./results every time)

A child begins to copy:

A Circle at 3yr

A Cross at 4yr

A Square at 5yr

A triangle at 6yr

- Stranger Anxiety: 7-11mo  
Separation Anxiety: 12-15mo
- aging decrease both REM & stages 3,4, wake early in the morning  
MDD: short REM latency, long first REM, total REM% INCREASE (>25%) BUT REM decrease toward morning leads to waking early in the morning, decrease stages 3,4, normal sleep onset  
elderly and depressed people awake more than 3 times during the night  
bipolar and anxious people have difficulty with sleep beginning  
alcohol, benzo and barbiturates decrease REM & delta sleep (stage 3,4)  
Recall: TOTAL REM INCREASE IN MDD!
- In what group age is illness perceived as a punishment??????? Ans. 0-5 yrs.
- EMANCIPATION: Under 18 years is legally incompetent and considered minor. But the boy is emancipated minor as he is serving military. Other facts that make minors emancipated are- 1) living and supporting on their own 2) Marriage. Please note being pregnant or having child does not make child emancipated.  
Partial emancipation is considered for substance abuse, STD treatment, birth control and prenatal care as these issues have impact on public health.
- 1] diff bet schizotypal and schizoaffective?  
2] diff bet autistic and asperger disorder?

Ans. schizotypal disorder: in DSMIV: a personality disorder: with odd behavioral and magical thinking

but! schizoaffective disorder: in DSMIV: psychotic disorder that characterized by psychosis + mood symptoms

Autistic disorder: problems with communication and social relationship, also MR, repeating

behavioral

some of them have unusual abilities in one field like math! asperger the same but no delay in language development, in fact it's mild form of autistic disorder

- schizophreniform- - symptoms less than 6 months  
schizophrenia-symptoms more than 6 months  
schizoid--avoidant, socially isolated, very few friends  
schizotypal- - magical thinking
- in addition: schizoid--"voluntary", not a psychosis (what's that guy's name in "Angel eyes"??)  
schizotypal--thinks weird but looks weird too!! (Robbin Williams in "Fisher King" will be a good example)  
schizoaffective--schizophrenia + mood disorder (that will be me...)
- neurotransmitter of REM sleep? Ans. acetylcholine..
- and what's the role of serotonin in sleep cycle? Ans. I think it initiates sleep!...  
yes, serotonin regulates sleep pattern, increase level of serotonin associated with increase in total sleep and delta sleep, do you know the location of REM sleep system? Ans. Pons
- Anaclitic Depression: when a baby between the age of 6 and 15 months is separated from its primary care giver, it can suffer from anaclitic depression characterised by depression and episodes of screaming and loud protests
- ON HARDY-WEINBERG:

That's used to calculate the prevalence of each genotype (AA, Aa, or aa), given the prevalence of each gene (A or a). If A accounts for 70% and a for the rest, AA will account for 49% ( $0.7 \times 0.7$ ), Aa for 42% ( $0.3 \times 0.7 \times 2$ ), and aa for 9% ( $0.3 \times 0.3$ ). Just draw a 2x2 table, and that'll make it very clear.

> Basically you have to calculate the positive predictive value (PPV), for which prevalence is required which in this case is 10%. Assuming the population to 100 construct a 2x2 table using the sensitivity and specificity for the test which is this problem is 80% and 90% respectively.

---	Disease	No Disease	Total
pos	8	9	17
neg	2	81	83
tot	10	90	100

So the PPV will be true positive divided by total positive ie 8 divided by 17 which is 47%

- **Emphasized Topics:**
  - **STATISTICS**

Lots of computations on odds ratio, relative risk, Hardy-Weinberg, values for sensitivity and specificity of two studies and you will be asked to compare. May questions also about biases. The study will be described and you have to determine what is the bias of study. Questions on alpha and beta errors. Same thing as before, the study will be described and you'll be asked what error is it. Questions on what is the best thing to say to a patient given a particular situation. For this you have to study ethics. Kaplan is OK

- **BEHAVIORAL SCIENCE**

- **ELDERLY**

What are the cognitive changes?

Physiologic changes

Alzheimers, Dementia, Delirium etc. Know the common Differential Diagnosis like Picks etc.

- **PERSONALITY DISORDERS**

- **COMMON PSYCHIATRIC ILLNESS (Depression, Schizophrenia etc.)**

- **DRUG ADDICTION/DEPENDENCY**

- **DEFENSE MECHANISMS**

- **NEUROTRANSMITTERS**

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➤ **MISCELLANEOUS TOPICS**

➤ **PROGNOSTIC FACTORS IN SCHIZOPHRENIA.**

Mark each one of the following choices with "g" for good prognosis and "p" for poor prognosis for a patient with Schizophrenia.

1. onset of psychotic symptoms within a month of the first change in behavior.
2. withdrawn autistic behavior
3. flat affect
4. positive family history of schizophrenia.
5. confusion or perplexity at the height of the psychotic episode.
6. good premorbid social and occupational functioning.

Ans. 1, 5, 6 –G : 2, 3, 4 -P

> 1.17 YR old male visits the physician bcos his parents are worried about his behaviour.he is always in the shower taking hours in the morning.he spends lot of time washing his hands which he says is to get rid of the germs.which of the foll neuro transmitter abnormalities is the cause for the disease

- a.dopaminergic
- b.cholinergic
- c.noradrenergic
- d.serotonergic

2.A 30 yr old man is brought to the ER by a friend bcos he was turning blue.On exam he is pale,perioral cyanosis,shallow resp of 3-5/min.he is unresponsive .his friend reports he must have taken something to "relax".no track marks are seen.the drug most likely the patient has taken is

- a. benzodiazepine
- b. alcohol
- c. cocaine
- d. ketamine
- e. opiate

Ans. 1.d ....diag is OCD .....NT is serotonin

2.e opiate.....this is the one that causes respiratory depression

➤ confidence interval

The formula is

$$CI = X \pm Z \left( \frac{S}{\sqrt{N}} \right)$$

where CI is conf interval

+ - is plus minus

Z = z score which is 2 for 95% confidence and 2.5 for 99% (this will be mentioned in the question)

S = Standard deviation

N = sample size

➤ Case 1

A 16-year-old female presents to a family physician to obtain a referral for family therapy. She is estranged from her mother and stepfather, who see the same physician. For many years, this patient responsibly cared for her four younger siblings while their single mother worked. Since her mother's marriage, the family has become involved in a fundamentalist church. The patient moved out when she felt the social and moral restrictions of the family's religion were too burdensome for her. The patient seemed quite mature; she maintained a 3.5 GPA, along with a part-time job. She demonstrated a genuine desire for reconciliation, and the therapy referral was provided. She also requested and obtained a prescription for contraceptives during the visit, with the assurance that her sexual activity would be kept confidential. In follow-up, she reported that the therapist had informed her that if she mentioned anything about being sexually active with her adult partner, he would be obliged to report her to the state. The patient was very concerned about the conflict between this statement and the family physician's prior assurance of confidentiality. Should this patient's confidentiality be broken?

While the physician has a moral obligation to obey the law, he must balance this against his responsibility to the patient. In researching the Criminal Code of Washington, the physician learned that sexual intercourse with a minor, at least 16, but under 18, is a class C felony, and a reportable offense, if the offender is at least 90 months older than the victim. This patient's relationship did not actually meet the criteria for mandatory reporting. Had this not been the case however, the physician could be justified in weighing the balance of harms arising from the filing of such a report.

There is little justification for informing the family of the young woman's sexual activity. Due to the family's strong fundamentalist beliefs, significant damage would have occurred in the family reconciliation process with this discovery. Although they would clearly disapprove of the patient's actions, her choices carry no risk of harm to them.

➤ Case 2: A 55-year-old man has a 3-month history of chest pain and fainting spells. You feel his symptoms merit cardiac catheterization. You explain the risks and potential

benefits to him, and include your assessment of his likely prognosis without the intervention. He is able to demonstrate that he understands all of this, but refuses the intervention.

Can he do that, legally? Should you leave it at that?

This patient understands what is at stake with his treatment refusal. As he is competent to make this decision, you have a duty to respect his choice. However, you should also be sure to explore his reasons for refusing treatment and continue to discuss your recommendations. A treatment refusal should be honored, but it should also not be treated as the end of a discussion.

- Real Case: Feb. 01, 2002 - Two physicians are faced with their worst fear their own nine-month old baby presents in the ED with a severe drug overdose. Instead of following his colleagues' recommendations, the father refuses to intubate the child until it is clear that she won't last much longer without the procedure. The mother pushes away the on-call critical care pediatrician, demanding another doctor, even if it means wasting precious minutes. Meanwhile, the baby is screaming, struggling for life on a trauma table. This week's episode of ER presents a puzzling, but not uncommon, paradox of the medical profession. If the physician's moral obligation is to always act in the best interests of his patient by providing the most appropriate treatment, why will he sometimes deviate from the standard of care when treating a family member or close friend? Just as Drs. Mark Greene and Elizabeth Corday were reluctant to pursue the traditional and effective method of treatment when their baby fell ill, many physicians provide treatments for their family members that they might not consider for the typical patient. It has been argued that physicians always have their patients' best interests in mind when caring for family members, but may lose sight of this "best interests" standard when treating patients with whom they have no personal connection. While the human urge to protect one's own is admittedly strong, applying this view to the doctor-patient relationship seems to undermine physician integrity. It seems far more likely that physicians, whose careers are founded on the Hippocratic Oath, diligently look to the best interests of all their patients whenever possible. However, when personal interests cloud the lens of objectivity (as when treating family members), a physician may fail to act in the best interests of the patient. Indeed, evidence suggests that physicians treating family members sometimes lose their sense of impartiality and do not act in the patient's best interests. One study reported that 33% of physicians have observed another physician "inappropriately involved" in a family member's care. (1) Such inappropriate involvement may lead to overtreatment or undertreatment, strained professional relations between colleagues with differing views on treatment, improper allocation of hospital resources, and, most significantly, severe emotional strain on the treating physician. Understanding the reasons why physicians sometimes act inappropriately when treating family members is essential when faced with the sort of situation presented in this week's episode. Not only does such understanding help Dr. Greene's and Dr. Corday's colleagues in negotiating the proper course of treatment, but it also may have helped Mark and Elizabeth themselves understand their own biases and take a slightly more objective view towards the care of their child.

There are three common situations in which physicians are often unable to maintain their objectivity when treating family members or children - when the situation is too emotionally charged, when the physician's personal knowledge of the patient makes objectivity impossible, or when the situation is too personal for the physician to feel comfortable as a primary caregiver. (2) Of these, the first situation is by far the most common, and is the one faced by Drs. Greene and Corday this week. When their baby accidentally overdoses on their teenaged daughter's stash of illegal drugs, Mark and Elizabeth's emotions are running high. These parents respond in an understandable fashion - with fear, panic, and a desperate desire to do everything possible to get their child through this emergency. However, unlike most parents, these two are in a position to direct their baby's treatment based on their own medical expertise. Many physicians have a psychological need to feel omnipotent, and any setback in treating a family member may result in "doubts, guilt, or an exaggerated sense of responsibility that may become pathological." (3) For this reason, physicians caring for their own children may be tempted to bypass traditional means of treatment in an effort to avoid exposing the patient to further stress or trauma. While many physician-parents tend to overtreat by taking all possible measures to improve their child's health, Mark and Elizabeth err on the side of undertreatment. Like most clinicians, they recognize how unpleasant and stressful intubation can be on a patient. In an effort to spare their baby this ordeal, and possibly because they are in denial about the severity of her condition, they delay the procedure for far longer than is medically indicated. When the two finally step aside, Dr. Kerry Weaver tells Mark that the course of treatment would have been different had it not been for his and Elizabeth's involvement. "If this wasn't your baby, we would have intubated a long time ago," she emphasizes. Dr. Weaver's statement makes it clear that the baby's best interests were not necessarily served by involving the emotionally-strained parents in her care.

When physician-parents are too emotionally involved in their child's care, treatment may not only be rendered less effective, but other related problems may result. Interpersonal relations between physician-parents and colleagues may become strained when colleagues are asked to deviate from the typical standard of care when treating physicians' children. Physician-parents may invoke the hostility of administrators and caregivers by bypassing what seem to them like exasperating administrative procedures - everyday delays in treatment and test results, visitors' hours, insurance paperwork, etc. At the request of the parent, resources may be directed towards the ill child even if they would be better utilized elsewhere, and the care of other patients on the unit may consequently be delayed. Finally, the emotional strain on the parent himself is evidenced by conflicting responsibilities - to the child, to the medical profession, to colleagues or family members, and to his own conscience - which make it impossible for him to look at his child's care objectively. When your own child is in danger, it is often impossible to separate the role of "parent" from that of "physician." Understanding and accepting this struggle of identity helps some physician-parents to step back and leave their child's care in the hands of a trusted colleague, who may be better able to serve both the child's and parent's best interests.

➤ High Yield Re: **Inform Consent**

What is informed consent?

Informed consent is the process by which a fully informed patient can participate in choices about her health care. It originates from the legal and ethical right the patient has to direct what happens to her body and from the ethical duty of the physician to involve the patient in her health

care.

What are the elements of full informed consent?

The most important goal of informed consent is that the patient have an opportunity to be an informed participant in his health care decisions. It is generally accepted that complete informed consent includes a discussion of the following elements:

- the nature of the decision/procedure
- reasonable alternatives to the proposed intervention
- the relevant risks, benefits, and uncertainties related to each alternative
- assessment of patient understanding
- the acceptance of the intervention by the patient

In order for the patient's consent to be valid, he must be considered competent to make the decision at hand and his consent must be voluntary. It is easy for coercive situations to arise in medicine. Patients often feel powerless and vulnerable. To encourage voluntariness, the physician can make clear to the patient that he is participating in a decision, not merely signing a form. With this understanding, the informed consent process should be seen as an invitation to him to participate in his health care decisions. The physician is also generally obligated to provide a recommendation and share her reasoning process with the patient. Comprehension on the part of the patient is equally as important as the information provided. Consequently, the discussion should be carried on in layperson's terms and the patient's understanding should be assessed along the way.

Basic consent entails letting the patient know what you would like to do and asking them if that will be all right. Basic consent is appropriate, for example, when drawing blood. Decisions that merit this sort of basic informed consent process require a low-level of patient involvement because there is a high-level of community consensus.

How much information is considered "adequate"?

How do you know when you have said enough about a certain decision? Most of the literature and law in this area suggest one of three approaches:

- reasonable physician standard: what would a typical physician say about this intervention? This standard allows the physician to determine what information is appropriate to disclose. However, it is probably not enough, since most research in this area shows that the typical physician tells the patient very little. This standard is also generally considered inconsistent with the goals of informed consent as the focus is on the physician rather than on what the patient needs to know.
- reasonable patient standard: what would the average patient need to know in order to be an informed participant in the decision? This standard focuses on considering what a patient would need to know in order to understand the decision at hand.
- subjective standard: what would this patient need to know and understand in order to make an informed decision? This standard is the most challenging to incorporate into practice, since it requires tailoring information to each patient.

Most states have legislation or legal cases that determine the required standard for informed consent. In the state of Washington, we use the "reasonable patient standard." The best approach to the question of how much information is enough is one that meets both your professional obligation to provide the best care and respects the patient as a person with the right to a voice in health care decisions. (See also Truth-Telling and Law and Medicine.)

What sorts of interventions require informed consent?

Most health care institutions, including UWMC, Harborview, and VAMC have policies that state which health interventions require a signed consent form. For example, surgery, anesthesia, and



other invasive procedures are usually in this category. These signed forms are really the culmination of a dialogue required to foster the patient's informed participation in the clinical decision.

For a wide range of decisions, written consent is neither required or needed, but some meaningful discussion is needed. For instance, a man contemplating having a prostate-specific antigen screen for prostate cancer should know the relevant arguments for and against this screening test, discussed in layman's terms. (See also Research Ethics.)

When is it appropriate to question a patient's ability to participate in decision making?

In most cases, it is clear whether or not patients are competent to make their own decisions.

Occasionally, it is not so clear. Patients are under an unusual amount of stress during illness and can experience anxiety, fear, and depression. The stress associated with illness should not necessarily preclude one from participating in one's own care. However, precautions should be taken to ensure the patient does have the capacity to make good decisions. There are several different standards of decision making capacity. Generally you should assess the patient's ability to:

- understand his or her situation,
- understand the risks associated with the decision at hand, and
- communicate a decision based on that understanding.

When this is unclear, a psychiatric consultation can be helpful. Of course, just because a patient refuses a treatment does not in itself mean the patient is incompetent. Competent patients have the right to refuse treatment, even those treatments that may be life-saving. Treatment refusal may, however, be a flag to pursue further the patient's beliefs and understanding about the decision, as well as your own.

What about the patient whose decision making capacity varies from day to day?

Patients can move in and out of a coherent state as their medications or underlying disease processes ebb and flow. You should do what you can to catch a patient in a lucid state - even lightening up on the medications if necessary - in order to include him in the decision making process.

What should occur if the patient cannot give informed consent?

If the patient is determined to be incapacitated/incompetent to make health care decisions, a surrogate decision maker must speak for her. There is a specific hierarchy of appropriate decision makers defined by state law (also see the DNR topic page). If no appropriate surrogate decision maker is available, the physicians are expected to act in the best interest of the patient until a surrogate is found or appointed.

Is there such a thing as presumed/implied consent?

The patient's consent should only be "presumed", rather than obtained, in emergency situations when the patient is unconscious or incompetent and no surrogate decision maker is available. In general, the patient's presence in the hospital ward, ICU or clinic does not represent implied consent to all treatment and procedures. The patient's wishes and values may be quite different than the values of the physician's. While the principle of respect for person obligates you to do your best to include the patient in the health care decisions that affect his life and body, the principle of beneficence may require you to act on the patient's behalf when his life is at stake. A 64-year-old woman with MS is hospitalized. The team feels she may need to be placed on a feeding tube soon to assure adequate nourishment. They ask the patient about this in the morning and she agrees. However, in the evening (before the tube has been placed), the patient becomes disoriented and seems confused about her decision to have the feeding tube placed. She tells the

team she doesn't want it in. They revisit the question in the morning, when the patient is again lucid. Unable to recall her state of mind from the previous evening, the patient again agrees to the procedure.

Is this patient competent to decide? Which preference should be honored?

A 64-year-old woman with MS is hospitalized. The team feels she may need to be placed on a feeding tube soon to assure adequate nourishment. They ask the patient about this in the morning and she agrees. However, in the evening (before the tube has been placed), the patient becomes disoriented and seems confused about her decision to have the feeding tube placed. She tells the team she doesn't want it in. They revisit the question in the morning, when the patient is again lucid. Unable to recall her state of mind from the previous evening, the patient again agrees to the procedure.

Is this patient competent to decide? Which preference should be honored?

This patient's underlying disease is impairing her decision making capacity. If her wishes are consistent during her lucid periods, this choice may be considered her real preference and followed accordingly. However, as her decision making capacity is questionable, getting a surrogate decision maker involved can help determine what her real wishes are.

- 
- please clarify my doubt  
what happens to the levels of Ach in alzheimers and what is the role of Acetyl choline esterase inhibitors in this.
    - Ans. in Alzheimer: Ach decreased coz of cholinergic neurons degeneration  
Acheesterase: breaks down Ach to choline&acetate, so blocking the action of this enzyme by tacrine, donepezil provides more Ach&can delay the progression of Alzheimer dementia

- The incidence of cystic fibrosis in caucasian population is 1 in 1600. the expected frequency of heterozygote carriers in this population is
  - a) 1 in 10
  - b) 1 in 20
  - c) 1 in 40
  - d) 1 in 80
  - e) 1 in 160

Ans. B?

- In kaplan page 7 behavioral science says "Question: what is the effect of increased prevalence on sensitivity? On Positive Predictive Value"? Answer : Sensitivity stays the same but positive value increases"  
But WHY? Would you explain to me? And also would you explain in a very simple way what is the relation between Sensitivity, specificity, PPV and NPP and accuracy?
  - Ans. sensitivity measures how well A TEST identifies truly ill people (so test feature!), it's not correlated to prevalence (number of individuals with disease/total population) but PPV is a probability that someone with +test actually has

disease, and it increased when number of affected people increased in population or in other words prevalence increased.

- If a test more sensitive=e.g. ELISA=very sensitive ...it include all case HIV+ve.+but not SPECIFIC.it means if sensitive test it has some cases who are not HIV +ve only confirm by WESTERN BLOT.THATS why it goes with NPV>

IF SPECIFIC....e.g. WESTERN BLOT...if positive...it mean all are +ve.no chances that in those ppl one do not have disease...so it goes with PPV.

- I will like to illustrate this question with the case of diabetes diagnosis using FBS. Let us assume that the sensitivity of FBS to detect diabetes is 90%. Therefore if the test is applied to a population with a prevalence of diabetes of 20% then we will expect to identify 9/10 of the 20%. If the total population of such a community is 200 we will get 36 diabetic based on FBS. This leaves 4 diabetic unidentified. If prevalence of diabetes were to increase due to poor eating habits to about 30% our test will then identify 90% of the 30% of the diabetics which will be 54.

Now positive predictive value tells us if you are identified as being diabetic from the test what is the probability that you are diabetic. Every test except for one with a 100% sensitivity and 100% specificity is bound to pick up some false positives. In a highly prevalent community the number of false positives is reduced by virtue of the fact that there are fewer negatives in the population. Thus the positive predictive value which is the number of true positives/(true positives+false positives) will be increased.

- tell me the association between sensitivity or specificity to PPV or NPV...i got mixed up sensitivity usually measures all those who truly have disease.then it should be ass. with PPV ..right! but the books say the other way round..plz clarify my concept..any one?

- Ans. seN for N  
sPe for P

- sensitivity goes with NPV.Cos if test is more sensitive and you have a + result,you may still be normal(FP).But if u get a - then you sure dont have the disease.

Specificity goes with PPV.Ie if u get a + result then you sure are +.But if u get a - you might still have the disease(FN).

- PPV probability that someone with+test actually has disease,as it calculated by  $\frac{\text{true}+s}{\text{sum of true}+s\&\text{false}+s}$ ,so it's correlated to specificity (specificity measures how well a test identifies people without disease)and false+:normal patients that incorrectly identified as being ill  
NPV probability that a person with a -test is actually well,as it calculated by  $\frac{\text{true}-s}{\text{sum of true}-s\&\text{false}-s}$ ,it correlated to sensitivity(sensitivity measures how well a test identifies truly ill people)and false-:ill people that test shows they're normal  
in summery:

sensitivity.....false negative.....NPV

specificity.....false positive.....PPV

this is what i know,hope it helps,if not i can explain more

- Mnemonic: +PV= $\frac{\text{true}+s}{\text{sum of true}+s \& \text{FALSE}+s}$   
specificity= $\frac{\text{true}-s}{\text{sum of true}-s \& \text{FALSE}+s}$

- $PV = \frac{\text{true+s}}{\text{true+s} + \text{FALSE-s}}$
- sensitivity =  $\frac{\text{true+s}}{\text{sum of true+s} + \text{FALSE-s}}$

➤ **BQ:** which test is used for IQ testing in 2 yrold?

- Ans. Stanford Binet scale, coz verbal skill not component of a test, for children <4 yr  
also:  
4-6yr WPPSI  
6-17yr WISC-R  
>=17yr WAIS-R
- i meant Stanford Binet <4 yr old, after 4-6yr: WPPSI

➤ What do objective and projective tests mean in beh?

Ans. objective test based on Qs easily scored: like MMPI, projective test requires subject to interpret the Qs: like Rorschach test, TAT.

- in operant conditioning the rate of extinction is most effectively slowed wen the response has been maintained on a reinforcement scedule of
  - 1]fixed ratio
  - 2]variable ratio
  - 3]fixed interval reinforcement
  - 4]continuous reinforcement
  - 5]peicework reinforcement

B] extinction is easiest with?

Ans. 2]variable ratio

forb: 4]continuous reinforcement

- a behaviour pattern that increases in frequency wen followed by a reward is an exampl of
  - 1]classical conditioning
  - 2]shaping
  - 3]respondent conditionig
  - 4]operant conditionig
  - 5]generalization

ans. 4 ]operant conditioning

- in a programme aimed at cessation of smoking, a 45yr old woman is required to smoke as many cigarettes in a small booth i short period of time, the mech used here is?
  - 1] habituation

- 2]aversive conditionig
- 3]stimulus control
- 4]variable ratio reinforcement
- 5]systematic desensitization

Ans. 2

- an obese women on a wt loss programme is not losing wieght n confesses not to have followed the schedule for the first few weeks n then gone on a crash diet during the week prior to the check up, it is.

- 1]stimulus control
- 2]variable ratio reinforcement
- 3]fixed interval reinforcement
- 4]variable interval reinforcement

Ans. 3, fixed interval ratio , i.e she follows the schedule everytime just befor the planned check up

- the best self management procedure in a weight loss intervention programme is?
  - 1]inforamtion control
  - 2]self monitoring
  - 3]self punishment
  - 4]self reward
  - 5]enlisiting social support

Ans. 4

- An old lady is brought to the hospital in coma by her daughter with whom she lives. The old lady is in coma and is diagnosed to be brain dead. When the daughter is spoken to, she says, “knowing mom, I feel that should something happen to her, she’d prefer to be withdrawn from life support”. Just then , the old lady’s estranged son comes there after hearing the news and he looks at the doc and says “why haven’t u done anything yet, I want the best treatment for my mother?” if I were the doctor, I would have been in a fix, what would you do?

Ans. follow daughter's advise (as the caregiver in this case), son is in state of denial!

- A pt comes to ur office and tells u ‘doc, I just want to tell someone this, but I’m going to go home and kill my wife’ and then walks out your door... what do you do?

Ans. this is tarasoff decision: stop harm  
 so, you need to go after the patient  
 in case if patient gets away - call911, then you call wife and ask her to come to your office /here you need to remember tarasoff 2

- A 16 yr old girl comes to you and tells you she is planning to have sex with her boyfriend and does not want to get pregnant. She asks you to write a prescription for birth control pills. What will you do as a physician ?
- Ans. parental consent not reqd for contraceptive prescription. Also treatment in emergency, drug alcohol addict, STD treatment.  
So i guess you could give OC but counsel them.
- Hey I just verified the contraceptive usage thing. These are the 4 categories where a minor living with his parents does not need parental consent -->  
STD treatment, contraceptives, substance abuse treatment, prenatal care.
- A 15 yr old mother of one, comes with genitourinary complaints. Whose consent will the doctor have to take to examine her ?
- the 15 year old again.  
theses are two fields.....Pregnant girl <18, mother less than 18, and an independant minor who can give consent solely.  
and Correct me if I am wrong..is it the same rule for a boy or a girl,<18 who ask for the advise in contraception with out telling their parents!
- a married minor too...
- One more thing is a pregnant lady or a teenaged mom under 18 yrs of age does NOT automatically become emancipated(not sure of the spelling!) ie doesn't become independent to give consent unless she is ACTIVELY TAKING CARE OF THE CHILD
- Well, here's a 17 yr old boy in the army and he comes with a bullet wound in his thigh. U need to remove it surgically. Who do you have to take consent from?
- Ans. the boy himself because he is independant minor.
- TRUE OR FALSE? Feeding tube is a medical treatment and can be withdrawn at the patient's request
- Ans. True
- How about in anorexia nervosa?
- Ans. false in case of anorexia nervosa. anorexia nervosa usually seen in girls teens e.g. 15y.o., in this case doesn't matter what she said  
if this pt >18 - go to the cort /this is an expection when on the test answer is go to the cort.
- TRUE OR FALSE ? a competent patient has the right to refuse even life saving hydration (oral or I.V fluids)
- Ans. True if >18
- An 8 yr old child with IDDM needs to undergo treatment with insulin but the parents refuse surgery and say they will take the child home and pray for its welfare... what should the doctor do?

- (a) Don't start treatment
- (b) decide to go ahead against the parents' wishes and start Rx
- (c) try to convince them to agree threatening them with the child's death
- (d) go to court with the dispute.

- Ans. Could have been b, But patient is not serious enough immediately. (like DKA). So now could have been c but you can't threaten them. Only convince. So D is best I guess.
- we have to go to court with the dispute. This is the only reason to go to court, other decisions should be taken outside the court

- If a patient, a 52 yr old male with no other illnesses, comes with signs of ischemic heart disease and you, as a doctor know he needs an emergency coronary artery bypass graft surgery but he REFUSES surgery. What next?
  - (a) ignore him and perform surgery
  - (b) take consent from his spouse
  - (c) don't do surgery
  - (d) threaten him that he will die if he doesn't undergo surgery

Ans. C, and mention in the notes that you have explained to the patients the need of surgery and he refuses,

- how do you assess for visual retention of presented objects?  
how do you differentiate from Bender visual motor Gestalt test

ans. The Bender test is a brief, nonverbal assessment consisting of nine stimulus cards, each showing a figure. The client is asked to reproduce the figures, a task requiring visual association, motor coordination, and the ability to integrate perceptual and motor skills to achieve accurate reproductions.

AND

Dynamic Visual Retention Test (W.H. Gaddes, 1988 Revision) has been shown to be sensitive to left frontal lobe damage/dysfunction and to discriminate dyslexic readers

- **BQ:** by decreasing the upper limit of normal of a test, what changes are seen in:
  - 1) sensitivity?
  - 2) PPV?
  - 3) false negative rate?

Ans. sensitivity: increased  
PPV: decreased  
false negative rate: decreased



- what are alpha and beta errors in stat? Ans. Alpha error is we reject(fail to accept) the null hypothesis when the null is true. Beta error is when we accept the null hypothesis though it is false. To have an analogy, alpha error occurs when you convict an innocent person and beta error occurs when you free a guilty person. Both these errors have to be kept very low. The value 1-beta should be very high because that indicates the power of the test.
- Why is Stanford binet is best for young children? Ans. it's the ratio of mental age to chronological age multiplied by 100 as it's not completely based on language performance best for children 2-4yr
- Mnemonic on Alzheimer's disease:
  - RONALD (Ronald Reagan, a famous victim):  
R Reduction of Ach  
O Old age  
N Neurofibrillary tangles  
A Atrophy of cerebral cortex (diffuse)  
L Language impairment  
D Dementia (MC in elderly)/ Down's syndrome
  - very important... and what congenital anomaly is it associated with in those over the age of 40?....ans. Down's syndrome
  - so what do you see in the brain?...ans. amyloid deposits..and neurofibrillary tangles
  - we see plaques due to amyloid deposition.  
in down syndrome patient beta amyloid protein production increases which causes development of plaques.
- most likely method used by both males and females to commit suicide is? Ans. Pills to try to kill themselves...  
Gun to complete the act...
- most admissions in the hospitalisation r due to? Ans. psych reasons including drug abuse
- in which subspeciality of physicians highest suicide rate is seen? Ans. Psychiatrists
- this disease diagnosis involves more malpractice suits than any other? Ans. Breast cancer diagnosis.
- highest suicide rates are seen in which profession?  
- Ans. Dentists #1  
Psychiatrists #2
- which neurotransmitter is most imp for sleep serotonin or acetylcholine? Ans. Both.  
In causing sleep its Serotonin and Ach.  
In Waking up its Norepi, and Dopamine.
- Which is the most common form (Nicotine, Caffeine, Alcohol) of drug use in US? Ans. ALCOHOL!  
Alcohol is the most abused drug.  
Therefore FAS is the most common cause of MR.