

Behavioral Science

"It's psychosomatic. You need a lobotomy. I'll get a saw."
—Calvin, Calvin & Hobbes

A heterogeneous mix of epidemiology/biostatistics, psychiatry, psychology, sociology, psychopharmacology, and more falls under this heading. Many medical students do not study this discipline diligently because the material is felt to be “easy” or “common sense.” In our opinion, this is a missed opportunity. Each question gained in behavioral science is equal to a question in any other section in determining the overall score.

Many students feel that some behavioral science questions are less concrete and require awareness of social aspects of medicine. For example: If a patient does or says something, what should you do or say back? Medical ethics and medical law are also appearing with increasing frequency. In addition, the key aspects of the doctor–patient relationship (e.g., communication skills, open-ended questions, facilitation, silence) are high yield. Basic biostatistics and epidemiology are very learnable and high yield. Be able to apply biostatistical concepts such as specificity and predictive values in a problem-solving format. Also review the clinical presentation of personality disorders.

**High-Yield Clinical
Vignettes**

High-Yield Topics

Epidemiology

Ethics

Life Cycle

Physiology

Psychiatry

Psychology

These abstracted case vignettes are designed to demonstrate the thought processes necessary to answer multistep clinical reasoning questions.

- Woman with anxiety about a gynecologic exam is told to relax and to imagine going through the steps of the exam → what process does this exemplify? → systematic desensitization.
- 65-year-old man is diagnosed with incurable metastatic pancreatic adenocarcinoma → his family asks you, the doctor, not to tell the patient → what do you do? → assess whether telling patient will negatively affect his health → if not, tell him.
- Man admitted for chest pain is medicated for ventricular tachycardia. The next day he jumps out of bed and does 50 pushups to show the nurses he has not had a heart attack → what defense mechanism is he using? → denial.
- A large group of people is followed over 10 years. Every two years, it is determined who develops heart disease and who does not → what type of study is this? → cohort study.
- Girl can speak in complete sentences, has an imaginary friend, and considers boys “yucky” → how old is she? → 6–11 years old.
- Man has flashbacks about his girlfriend’s death two months following a hit-and-run accident. He often cries and wishes for the death of the culprit → what is the diagnosis? → normal bereavement.
- During a particular stage of sleep, man has variable blood pressure, penile tumescence, and variable EEG → what stage of sleep is he in? → REM sleep.
- 15-year-old girl of normal height and weight for age has enlarged parotid glands but no other complaints. The mother confides that she found laxatives in the daughter’s closet → what is the diagnosis? → bulimia.
- 11-year-old girl exhibits Tanner stage 4 sexual development (almost full breasts and pubic hair) → what is the diagnosis? → advanced stage, early development.
- 4-year-old girl complains of a burning feeling in her genitalia; otherwise she behaves and sleeps normally. Smear of discharge shows *N. gonorrhoeae* → how was she infected? → sexual abuse.
- Person demands only the best and most famous doctor in town → what is the personality disorder? → narcissism.
- Nurse has episodes of hypoglycemia; blood analysis reveals no elevation in C-protein → what is the diagnosis? → factitious disorder; self-scripted insulin.
- 55-year-old businessman complains of lack of successful sexual contacts with women and lack of ability to reach full erection. Two years ago he had a heart attack → what might be the cause of his problem? → fear of sudden death during intercourse.

Epidemiology/Biostatistics

1. Differences in the incidence of disease among various ethnic groups.
2. Leading causes and types of cancers in men versus women.
3. Prevalence of common psychiatric disorders (e.g., alcoholism, major depression, schizophrenia).
4. Differences in mortality rates among ethnic and racial groups.
5. Definitions of morbidity, mortality, and case fatality rate.
6. Epidemiology of cigarette smoking, including prevalence and success rates for quitting.
7. Modes of human immunodeficiency virus (HIV) transmission among different populations (e.g., perinatal, heterosexual, homosexual, intravenous).
8. Simple pedigree analysis (understand symbols) for inheritance of genetic diseases (e.g., counseling, risk assessment).
9. Different types of studies (e.g., randomized clinical trial, cohort, case-control).
10. Definition and use of standard deviation, p value, r value, mean, mode, and median.
11. Effects of changing a test's criteria on number of false positives and number of false negatives.

Neurophysiology

1. Physiologic changes (e.g., neurotransmitter levels) in common neuropsychiatric disorders (e.g., Alzheimer's disease, Huntington's disease, schizophrenia, bipolar disorder).
2. Changes in cerebrospinal fluid composition with common psychiatric diseases (e.g., depression).
3. Physiologic, physical, and psychologic changes associated with aging (e.g., memory, lung capacity, glomerular filtration rate, muscle mass, pharmacokinetics of drugs).
4. Differences between anterior and posterior lobes of the pituitary gland (e.g., embryology, innervation, hormones).

Psychiatry/Psychology

1. Indicators of prognosis in psychiatric disorders (e.g., schizophrenia, bipolar disorder).
2. Genetic components of common psychiatric disorders (e.g., schizophrenia, bipolar disorder).
3. Diseases associated with different personality types.
4. Clinical features and treatment of phobias.
5. Clinical features of child abuse (shaken-baby syndrome).
6. Clinical features of common learning disorders (e.g., dyslexia, mental retardation).
7. Therapeutic application of learning theories (e.g., classical and operant conditioning) to psychiatric illnesses (e.g., disulfiram therapy for alcoholics).
8. Problems associated with the physician–patient relationship (e.g., reasons for patient non-compliance).
9. Management of the suicidal patient.
10. Addiction: risk factors, family history, behavior, factors contributing to relapse.
11. How physicians and medical students should help peers with substance abuse problems.

Prevalence versus incidence

Prevalence is total number of cases in a population at a given time.

Incidence is number of new cases in a population per unit time.

Incidence is new incidents.

Prevalence \cong incidence \times disease duration.

Prevalence $>$ incidence for chronic diseases (e.g., diabetes).

Prevalence = incidence for acute disease (e.g., common cold.)

Sensitivity

Number of true positives divided by number of all people with the disease.

False negative ratio is equal to $1 - \text{sensitivity}$.

High sensitivity is desirable for a screening test.

PID = Positive In Disease
(note that PID is a **sensitive** topic).

SNOUT = SeNsitivity rules OUT.

Specificity

Number of true negatives divided by number of all people without the disease.

False positive ratio is equal to $1 - \text{specificity}$.

High specificity is desirable for a confirmatory test.

NIH = Negative In Health.

SPIN = SPecificity rules IN.

Predictive value

Positive predictive value

Number of true positives divided by number of people who tested positive for the disease.

The probability of having a condition, given a positive test.

Negative predictive value

Number of true negatives divided by number of people who tested negative for the disease.

The probability of not having the condition, given a negative test.

Unlike sensitivity and specificity, predictive values are dependent on the prevalence of the disease.

The higher the prevalence of a disease, the higher the positive predictive value of the test.

| | | Disease | |
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| | | ! | @ |
| Test | ! | a | b |
| | @ | c | d |

$$\text{Sensitivity} = \frac{a}{a+c}$$

$$\text{Specificity} = \frac{d}{b+d}$$

$$\text{PPV} = \frac{a}{a+b}$$

$$\text{NPV} = \frac{d}{c+d}$$

Odds ratio and relative risk

Odds ratio

Approximates the relative risk if the prevalence of the disease is not too high. Used for retrospective studies (e.g., case-control studies).

$$\text{OR} = ad / bc$$

Relative risk

Disease risk in exposed group/disease risk in unexposed group. Used for cohort studies.

$$\text{RR} = \frac{\left[\frac{a}{a+b} \right]}{\left[\frac{c}{c+d} \right]} \quad \text{Attributable Risk} = \left[\frac{a}{a+b} \right] - \left[\frac{c}{c+d} \right]$$

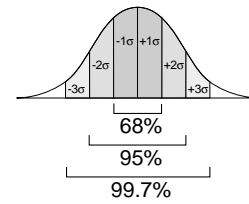
| | | Disease | |
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| | | ! | @ |
| Exposure | ! | a | b |
| | @ | c | d |

If the 95% confidence interval for OR or RR includes 1, the study is inconclusive.

Standard deviation versus error

n = sample size,
 σ = standard deviation,
 SEM = standard error of the mean,
 $SEM = \sigma/\sqrt{n}$
 Therefore, $SEM < \sigma$ and $SEM \downarrow$ as $n \uparrow$.

Normal (Gaussian) distribution:



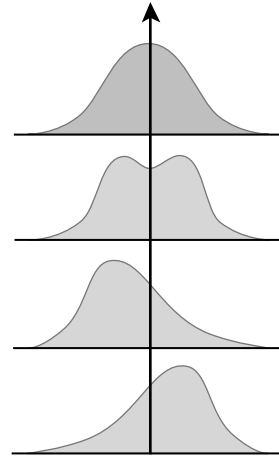
Statistical distribution

Terms that describe statistical distributions:
 Normal \approx Gaussian \approx bell-shaped (mean = median = mode).

Bimodal is simply two humps.

Positive skew is asymmetry with tail on the right (mean > median > mode).

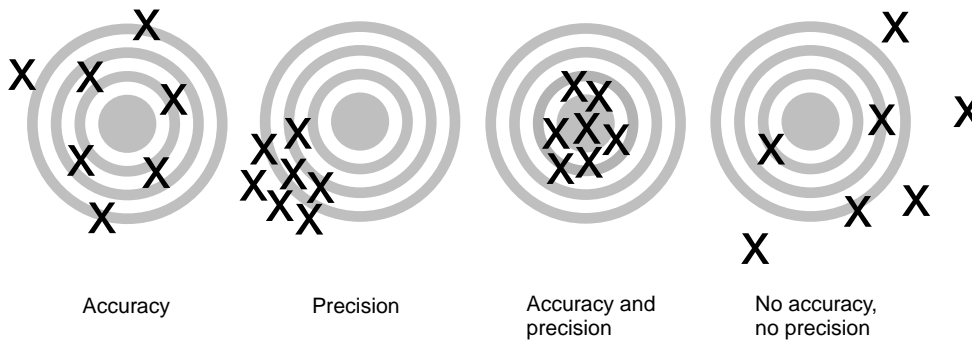
Negative skew has tail on the left (mean < median < mode).



Precision vs. accuracy

Precision is:
 1. The consistency and reproducibility of a test (reliability).
 2. The absence of random variation in a test.
 Accuracy is the trueness of test measurements.

Random error = reduced precision in a test.
 Systematic error = reduced accuracy in a test.



Reliability and validity

Reliability = Reproducibility (dependability) of a test.
 Validity = whether the test truly measures what it purports to measure. Appropriateness of a test.

Test is reliable if repeat measurements are the same.
 Test is valid if it measures what it is supposed to measure.

Correlation coefficient (r)

r is always between -1 and 1 . Absolute value indicates strength of correlation.
 Coefficient of determination = r^2 .

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| <i>t</i>-test versus ANOVA versus χ^2 | <p><i>t</i>-test checks difference between two means. ANOVA analyzes variance of three or more variables. χ^2 checks difference between two or more percentages or proportions of categorical outcomes (not mean values).</p> | <p>Mr. T is mean. ANOVA = Analysis Of Variance of three or more variables. $\%^2$ = compare percentages (%) or proportions.</p> |
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| Meta-analysis | Pooling data from several studies (often via a literature search) to achieve greater statistical power. | Cannot overcome limitations of individual studies or bias in study selection. |
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| Case-control study | Observational study. Sample chosen based on presence (cases) or absence (controls) of disease. Information collected about risk factors. | Often retrospective. |
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| Cohort study | Observational study. Sample chosen based on presence or absence of risk factors. Subjects followed over time for development of disease. | The Framingham heart study was a large prospective cohort study. |
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| Clinical trial | Experimental study. Compares therapeutic benefit of 2 or more treatments. | Highest-quality study. |
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Statistical hypotheses

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| Null (H_0) | Hypothesis of no difference (e.g., there is no association between the disease and the risk factor in the population). |
| Alternative (H_1) | Hypothesis that there is some difference (e.g., there is some association between the disease and the risk factor in the population). |

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| | | Reality | |
| | | H_1 | H_0 |
| Study results | H_1 | Power ($1 - \beta$) | α |
| | H_0 | β | |

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| Type I error (α) | <p>Stating that there is an effect or difference when there really is not (to mistakenly accept the experimental hypothesis and reject the null hypothesis). α is the probability of making a type I error and is equal to p (usually $< .05$).</p> <p>p = probability of making a type I error.</p> | <p>If $p < .05$, then there is less than a 5% chance that the data will show something that is not really there. α = you “saw” a difference that did not exist—for example, convicting an innocent man.</p> |
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| Type II error (β) | <p>Stating that there is not an effect or difference when there really is (to fail to reject the null hypothesis when in fact H_0 is false). β is the probability of making a type II error.</p> | <p>β = you did not “see” a difference that does exist—for example, setting a guilty man free.</p> <p>$1 - \beta$ is “power” of study, or probability that study will see a difference if it is there.</p> |
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| Power | Probability of rejecting null hypothesis when it is in fact false. It depends on: <ol style="list-style-type: none"> 1. Total number of end points experienced by population. 2. Difference in compliance between treatment groups (differences in the mean values between groups). | If you increase sample size, you increase power. There is power in numbers. Power = 1 - β. |
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| Reportable diseases | Only some infectious diseases are reportable, including AIDS (but not HIV positivity), chickenpox, gonorrhea, hepatitis A and B, measles, mumps, rubella, salmonella, shigella, syphilis, tuberculosis. |
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Leading causes of death in the US by age

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| Infants | Congenital anomalies, sudden infant death syndrome, short gestation/low birth weight, respiratory distress syndrome, maternal complications of pregnancy. |
| Age 1-14 | Injuries, cancer, congenital anomalies, homicide, heart disease. |
| Age 15-24 | Injuries, homicide, suicide, cancer, heart disease. |
| Age 25-64 | Cancer, heart disease, injuries, stroke, suicide. |
| Age 65+ | Heart disease, cancer, stroke, COPD, pneumonia. |

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| Disease prevention | 1°—Prevent disease occurrence (e.g., vaccination). 2°—Early detection of disease (e.g., Pap smear). 3°—Reduce disability from disease (e.g., exogenous insulin for diabetes). |
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| Additional Services for Specific Groups | |
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| Risk factor | Preventive service(s) needed |
| Diabetes | Eye, foot exams; urine test |
| Drug abuse | HIV, TB tests; hepatitis immunization |
| Alcoholism | Influenza, pneumococcal immunizations; TB test |
| Overweight | Blood sugar test (test for diabetes mellitus) |
| Homeless, recent refugee or immigrant | TB test |
| High-risk sexual behavior | HIV, hep B, syphilis, gonorrhea, chlamydia tests |

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| Elderly population in year 2000 | In year 2000, estimated US population = 300,000,000. 35 million > 65 y old. Greatest increase in those > 85 y old. | In year 2000, 13% of US population > 65 y old (yet incur 30% of total medical costs). |
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| Risk factors for suicide completion | White, male, alone, prior attempts, presence and lethality of plan, medical illness, alcohol or drug use, on 3 or more prescription medications. | SAD PERSONS: Sex (male), Age, Depression, Previous attempt, Ethanol, Rational thought, Sickness, Organized plan, No spouse, Social support lacking. |
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BEHAVIORAL SCIENCE—EPIDEMIOLOGY (continued)

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| Most common surgeries | Dilation and curettage, hysterectomy, tonsillectomy, sterilization, hernia repair, oophorectomy, cesarean section, cholecystectomy. | Most done on women. |
| Divorce statistics | US has highest rate. Teenage marriages at high risk. More common when religions are mixed. Peaks at second/third year of marriage. Higher with low SES. Unrelated to industrialization. Divorcees remarry very frequently. | |
| Medicare, Medicaid | Medicare and Medicaid are federal programs that originated from amendments to the Social Security Act. Medicare Part A = hospital; Part B = supplemental. Medicaid is federal and state assistance for those on welfare or who are indigent. | Medicar E is for E lderly. Medicaid D is for D estitute. |

BEHAVIORAL SCIENCE—ETHICS

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| Autonomy | Obligation to respect patients as individuals and to honor their preferences in medical care. | |
| Informed consent | <p>Legally requires:</p> <ol style="list-style-type: none"> 1. Discussion of pertinent information 2. Obtaining the patient's agreement to the plan of care 3. Freedom from coercion | Patients must understand the risks, benefits, and alternatives, which include no intervention. |
| Exceptions to informed consent | <ol style="list-style-type: none"> 1. Patient lacks decision-making capacity (not legally competent) 2. Implied consent in an emergency 3. Therapeutic privilege— withholding information when disclosure would severely harm the patient or undermine informed decision-making capacity 4. Waiver—patient waives the right of informed consent | |
| Decision-making capacity | <ol style="list-style-type: none"> 1. Patient makes and communicates a choice 2. Patient is informed 3. Decision is stable over time 4. Decision consistent with patient's values and goals 5. Decision not a result of delusions or hallucinations | The patient's family cannot require that a doctor withhold information from the patient. |
| Oral advance directive | Incapacitated patient's prior oral statements commonly used as guide. Problems arise from variance in interpretation of these statements. However, if patient was informed, directive is specific, patient makes a choice, and decision is repeated over time, the oral directive is more valid. | |

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| Written advance directive | <ol style="list-style-type: none"> 1. Living wills—patient directs physician to withhold or withdraw life-sustaining treatment if the patient develops a terminal disease or enters a persistent vegetative state. 2. Durable power of attorney—patient designates a surrogate to make medical decisions in the event that the patient loses decision-making capacity. Patient may also specify decisions in clinical situations. More flexible than a living will. | | | | | | |
| Nonmaleficence | <p>“Do no harm.” However, if benefits of an intervention outweigh the risks, a patient may make an informed decision to proceed.</p> | | | | | | |
| Beneficence | <p>Physicians have a special ethical responsibility to act in the patient’s best interest (physician is a fiduciary). Patient autonomy may conflict with beneficence. If the patient makes an informed decision, ultimately the patient has the right to decide.</p> | | | | | | |
| Confidentiality | <p>Confidentiality respects patient privacy and autonomy. Disclosing information to family and friends should be guided by what the patient would want. The patient may also waive the right to confidentiality (e.g., insurance companies).</p> | | | | | | |
| Exceptions to confidentiality | <ol style="list-style-type: none"> 1. Potential harm to third parties is serious 2. Likelihood of harm is high 3. No alternative means exist to warn or to protect those at risk 4. Third party can take steps to prevent harm <p>Examples include:</p> <ol style="list-style-type: none"> 1. Infectious diseases—physicians may have a duty to warn public officials and identifiable people at risk 2. The Tarasoff decision—law requiring physician to protect potential victim from harm; may involve breach of confidentiality 3. Child and/or elder abuse 4. Impaired automobile drivers 5. Suicidal/homicidal patient 6. Domestic violence | | | | | | |
| Malpractice | <table border="0"> <tr> <td data-bbox="422 1312 812 1365">Civil suit under negligence requires:</td> <td data-bbox="1023 1312 1347 1560" rowspan="3">Unlike a criminal suit, in which the burden of proof is “beyond a reasonable doubt,” the burden of proof in a malpractice suit is “more likely than not.”</td> </tr> <tr> <td data-bbox="422 1365 812 1407">1. Physician breach of duty to patient</td> </tr> <tr> <td data-bbox="422 1407 812 1449">2. Patient suffers harm</td> </tr> <tr> <td data-bbox="422 1449 812 1491">3. Breach of duty causes harm</td> <td></td> </tr> </table> | Civil suit under negligence requires: | Unlike a criminal suit, in which the burden of proof is “beyond a reasonable doubt,” the burden of proof in a malpractice suit is “more likely than not.” | 1. Physician breach of duty to patient | 2. Patient suffers harm | 3. Breach of duty causes harm | |
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| 2. Patient suffers harm | | | | | | | |
| 3. Breach of duty causes harm | | | | | | | |

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| Apgar score (at birth) | <p>Score 0–2 at 1 and 5 min in each of five categories:</p> <ol style="list-style-type: none"> 1. Color (blue/pale, trunk pink, all pink) 2. Heart rate (0, <100, 100+) 3. Reflex irritability (0, grimace, grimace + cough) 4. Muscle tone (limp, some, active) 5. Respiratory effort (0, irregular, regular) <p>10 is perfect score.</p> | <p>After Virginia Apgar, a famous anesthesiologist.</p> <p>A = Appearance (color) P = Pulse G = Grimace A = Activity R = Respiration</p> |
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| Low birth weight | <p>Defined as under 2500 g. Associated with greater incidence of physical and emotional problems. Caused by prematurity or intrauterine growth retardation. Complications include infections, respiratory distress syndrome, necrotizing enterocolitis, and persistent fetal circulation.</p> |
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| Infant deprivation effects | <p>Long-term deprivation of affection results in:</p> <ol style="list-style-type: none"> 1. Decreased muscle tone 2. Poor language skills 3. Poor socialization skills 4. Lack of basic trust 5. Anaclitic depression 6. Weight loss 7. Physical illness <p>Severe deprivation can result in infant death.</p> | <p>Studied by René Spitz. The 4 W's: Weak, Wordless, Wanting (socially), Wary. Deprivation for longer than 6 months can lead to irreversible changes.</p> |
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| Anaclitic depression | <p>Anaclitic depression = depression in an infant owing to continued separation from caregiver. Can result in failure to thrive. Infant becomes withdrawn and unresponsive.</p> |
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| Regression in children | <p>Children regress to younger behavior under stress: physical illness, punishment, birth of a new sibling, tiredness. An example is bedwetting in a child when hospitalized.</p> |
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| Child abuse | Physical abuse | Sexual abuse |
| Evidence | Healed fractures on x-ray, cigarette burns, subdural hematomas, multiple bruises, retinal hemorrhage or detachment | Genital/anal trauma, STDs, UTIs |
| Abuser | Usually female and the primary caregiver | Known to victim, usually male |
| Epidemiology | ~3000 deaths/yr in US | Peak incidence 9–12 yrs of age |

Developmental milestones

| | Approximate age | Milestone |
|-----------------------|-----------------|---|
| Infant | 3 mo | Holds head up, social smile, Moro reflex disappears |
| | 4–5 mo | Rolls front to back, sits when propped |
| | 7–9 mo | Stranger anxiety, sits alone, orients to voice |
| | 12–14 mo | Upgoing Babinski disappears |
| | 15 mo | Walking, few words, separation anxiety |
| Toddler | 12–24 mo | Object permanence |
| | 18–24 mo | Rapprochement |
| | 24–48 mo | Parallel play |
| | 24–36 mo | Core gender identity |
| Preschool | 30–36 mo | Toilet training |
| | 3 y | Group play, rides tricycle, copies line or circle drawing |
| | 4 y | Cooperative play, simple drawings (stick figure), hops on one foot |
| School age | 6–11 y | Development of conscience (superego), same-sex friends, identification with same-sex parent |
| Adolescence (puberty) | 11 y (girls) | Abstract reasoning (formal operations), formation of personality |
| | 13 y (boys) | |

Changes in the elderly

- Sexual changes
 - Men: slower erection/ejaculation, longer refractory period
 - Women: vaginal shortening, thinning, and dryness; sexual interest does not decrease
- Sleep patterns: ↓ REM sleep, ↓ slow-wave sleep, ↑ sleep latency
- Common medical conditions: arthritis, hypertension, heart disease
- Psychiatric problems (e.g., depression) become more prevalent
- Suicide rate increases

Kübler-Ross dying stages

Denial, Anger, Bargaining, Grieving, Acceptance.
Stages do not necessarily occur in this order, and more than one stage can be present at once.

Death Arrives Bringing Grave Adjustments.

Grief

Normal bereavement characterized by shock, denial, guilt and somatic symptoms.

Typically lasts 6 mo–1 yr. *BehSci. 69*

Pathologic grief includes excessively intense or prolonged grief, or grief that is delayed, inhibited or denied. *BehSci. 70*

UCV

Neurotransmitter changes with disease

Depression—decreased NE and serotonin (5-HT).
 Alzheimer’s dementia—decreased ACh.
 Huntington’s disease—decreased GABA, decreased ACh.
 Schizophrenia—increased dopamine.
 Parkinson’s disease—decreased dopamine.

Frontal lobe functions

Concentration, orientation, language, abstraction, judgment, motor regulation, mood.
 Lack of social judgment is most notable in frontal lobe lesion.

Sleep stages

| Stage (% of total sleep time in young adults) | Description | Waveform |
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| | Awake (eyes open), alert, active mental concentration | Beta (highest frequency, lowest amplitude) |
| | Awake (eyes closed) | Alpha |
| 1 (5%) | Light sleep | Theta |
| 2 (45%) | Deeper sleep | Sleep spindles and K-complexes |
| 3–4 (25%) | Deepest, non-REM sleep; sleepwalking; night terrors, bedwetting (slow-wave sleep) | Delta (lowest frequency, highest amplitude) |
| REM (25%) | Dreaming, loss of motor tone, possibly memory processing function, erections, ↑ brain O ₂ use | Beta |

At night, **BATS Drink Blood**.

1. Serotonergic predominance of raphe nucleus key to initiating sleep
2. Norepinephrine reduces REM sleep
3. Extraocular movements during REM due to activity of PPRF (parapontine reticular formation/conjugate gaze center)
4. REM sleep having the same EEG pattern as while awake and alert has spawned the terms “paradoxical sleep” and “desynchronized sleep”
5. Benzodiazepines shorten stage 4 sleep; thus useful for night terrors and sleepwalking BehSci. 97, 98
6. Imipramine is used to treat enuresis since it decreases stage 4 sleep BehSci. 62

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REM sleep

Increased and variable pulse, rapid eye movements (REM), increased and variable blood pressure, penile/clitoral tumescence. 25% of total sleep. Occurs every 90 minutes; duration increases through the night. REM sleep decreases with age. Acetylcholine is the principal neurotransmitter involved in REM sleep.

REM sleep is like sex: ↑ pulse, penile/clitoral tumescence, ↓ with age.

Sleep apnea

Central sleep apnea: no respiratory effort.
 Obstructive sleep apnea: respiratory effort against airway obstruction.
 Person stops breathing for at least 10 sec during sleep.
 Associated with obesity, loud snoring, systemic/pulmonary hypertension, arrhythmias, and possibly sudden death.
 Individuals may become chronically tired.

Narcolepsy

Person falls asleep suddenly. May include hypnagogic (just before sleep) or hypnopompic (with awakening) hallucinations. The person's nocturnal and narcoleptic sleep episodes start off with REM sleep. **Cataplexy** (sudden collapse while awake) in some patients. Strong genetic component. Treat with stimulants (e.g., amphetamines).

UCV BehSci.23

Sleep patterns of depressed patients

Patients with depression typically have the following changes in their sleep stages:

1. Reduced slow-wave sleep
2. Decreased REM latency
3. Early morning awakening (important screening question)

Stress effects

Stress induces production of free fatty acids, 17-OH corticosteroids, lipids, cholesterol, catecholamines; affects water absorption, muscular tonicity, gastrocolic reflex, and mucosal circulation.

Sexual dysfunction

Differential diagnosis includes:

1. Drugs (e.g., antihypertensives, neuroleptics, SSRIs, ethanol)
2. Diseases (e.g., depression, diabetes)
3. Psychological (e.g., performance anxiety)

UCV BehSci.74

BEHAVIORAL SCIENCE—PSYCHIATRY

Orientation

Is the patient aware of him- or herself as a person?
Does the patient know his or her own name?
Anosognosia = unaware that one is ill.
Autopagnosia = unable to locate one's own body parts.
Depersonalization = body seems unreal or dissociated.

Order of loss: first = time,
second = place,
last = person.

Amnesia types

Anterograde amnesia is being unable to remember things that occurred after a CNS insult (no new memory).

Korsakoff's amnesia is a classic anterograde amnesia that is caused by thiamine deficiency (bilateral destruction of the mamillary bodies), is seen in alcoholics, and is associated with confabulations.

Retrograde amnesia is being unable to remember things that occurred before a CNS insult. Complication of ECT.

Antero = after

Retro = before

UCV BehSci.17, 28

Substance dependence

Maladaptive pattern of substance use.

Defined as 3 or more of the following signs in 1 year:

1. Tolerance
 2. Withdrawal
 3. Substance taken in larger amounts than intended
 4. Persistent desire or attempts to cut down
 5. Lots of energy spent trying to obtain substance
 6. Important social, occupational, or recreational activities given up or reduced because of substance use
 7. Use continued in spite of knowing the problems that it causes
-

Substance abuse Maladaptive pattern leading to clinically significant impairment or distress. Symptoms have not met criteria for substance dependence. One or more of the following in 1 year:

1. Recurrent use resulting in failure to fulfill major obligations at work, school, or home
2. Recurrent use in physically hazardous situations
3. Recurrent substance-related legal problems
4. Continued use in spite of persistent problems caused by use

Signs and symptoms of substance abuse

| Drug | Intoxication | Withdrawal |
|-----------------|---|---|
| Alcohol | Disinhibition, emotional lability, slurred speech, ataxia, coma, blackouts. <i>BehSci.41</i> | Tremor, tachycardia, hypertension, malaise, nausea, seizures, delirium tremens (DTs), tremulousness, agitation, hallucinations. |
| Opioids | CNS depression, nausea and vomiting, constipation, pupillary constriction (pinpoint pupils), seizures (overdose is life-threatening). | Anxiety, insomnia, anorexia, sweating/piloerection (“cold turkey”), fever, rhinorrhea, nausea, stomach cramps, diarrhea (“flu-like” symptoms), yawning. |
| Amphetamines | Psychomotor agitation, impaired judgment, pupillary dilation, hypertension, tachycardia, euphoria, prolonged wakefulness and attention, cardiac arrhythmias, delusions, hallucinations, fever. <i>BehSci.42</i> | Post-use “crash,” including anxiety, lethargy, headache, stomach cramps, hunger, severe depression, dysphoric mood, fatigue, insomnia/hypersomnia. |
| Cocaine | Euphoria, psychomotor agitation, impaired judgment, tachycardia, pupillary dilation, hypertension, hallucinations (including tactile), paranoid ideations, angina and sudden cardiac death. | Hypersomnolence, fatigue, depression, malaise, severe craving, suicidality. |
| PCP | Belligerence, impulsiveness, fever, psychomotor agitation, vertical and horizontal nystagmus, tachycardia, ataxia, homicidality, psychosis, delirium. <i>BehSci.79</i> | Recurrence of intoxication symptoms due to reabsorption in GI tract; sudden onset of severe, random, homicidal violence. |
| LSD | Marked anxiety or depression, delusions, visual hallucinations, flashbacks. | |
| Marijuana | Euphoria, anxiety, paranoid delusions, perception of slowed time, impaired judgment, social withdrawal, increased appetite, dry mouth, hallucinations. | |
| Barbiturates | Low safety margin, respiratory depression. | Anxiety, seizures, delirium, life-threatening cardiovascular collapse. |
| Benzodiazepines | Amnesia, ataxia, somnolence, minor respiratory depression. Additive effects with alcohol. | Rebound anxiety, seizures, tremor, insomnia. |
| Caffeine | Restlessness, insomnia, increased diuresis, muscle twitching, cardiac arrhythmias. | Headache, lethargy, depression, weight gain. |
| Nicotine | Restlessness, insomnia, anxiety, arrhythmias. | Irritability, headache, anxiety, weight gain, craving, tachycardia. |

Delirium tremens

Severe alcohol withdrawal syndrome that peaks 2–5 d after last drink.
In order of appearance: autonomic system hyperactivity (tachycardia, tremors, anxiety), psychotic symptoms (hallucinations, delusions), confusion.

UCV BehSci. 20

Heroin addiction

Approximately 500,000 US addicts. Heroin is schedule I (not prescribable). Evidence of addiction is narcotic abstinence syndrome (dilated pupils, lacrimation, rhinorrhea, sweating, yawning, irritability, and muscle aches). Also look for track marks (needle sticks in veins).

Related diagnoses are hepatitis, abscesses, overdose, hemorrhoids, AIDS, and right-sided endocarditis.

Naloxone (Narcan) and naltrexone competitively inhibit opioids.
Methadone (long-acting oral opiate) for heroin detoxification or long-term maintenance.

Delirium

Decreased attention span and level of arousal, disorganized thinking, hallucination, illusions, misperceptions, disturbance in sleep–wake cycle, cognitive dysfunction.

Key to diagnosis: waxing and waning level of consciousness, develops rapidly.

Often due to substance use/abuse or medical illness.

Delirium = changes in sensorium.

Most common psychiatric illness on medical and surgical floors. Often reversible.

UCV BehSci. 18-19

Dementia

Development of multiple cognitive deficits: memory, aphasia, apraxia, agnosia, loss of abstract thought, behavioral/personality changes, impaired judgment.

Key to diagnosis: rule out delirium—patient is alert, no change in level of consciousness. More often gradual onset. In elderly patients, depression may present like dementia.

Dementia characterized by **memory** loss. Commonly irreversible.

UCV BehSci. 15-16

Major depressive episode

Characterized by 5 of the following for 2 weeks, including (1) depressed mood or (2) anhedonia:

1. Sleep disturbances
2. Loss of Interest
3. Guilt
4. Loss of Energy
5. Loss of Concentration
6. Change in Appetite
7. Psychomotor retardation
8. Suicidal ideations
9. Depressed mood

SIG E CAPS

Major depressive disorder, recurrent—requires 2 or more episodes with a symptom-free interval of 2 months. Lifetime prevalence = 13% male, 21% female.

Dysthymia is a milder form of depression lasting at least two years.

UCV BehSci. 54-56, 61

Manic episode

Distinct period of abnormally and persistently elevated, expansive or irritable mood lasting at least 1 week.

During mood disturbance, 3 or more of the following:

1. **Distractibility**
2. **Insomnia**: ↓ need for sleep
3. **Grandiosity**: inflated self-esteem
4. **Flight of ideas**
5. Increase in goal-directed Activity/psychomotor agitation
6. **Pressured Speech**
7. **Thoughtlessness**: seeks pleasure without regard to consequences

DIG FAST

UCV BehSci. 45

Hypomanic episode

Like manic episode except mood disturbance not severe enough to cause marked impairment in social and/or occupational functioning or to necessitate hospitalization, and there are no psychotic features.

Bipolar disorder

Six separate criteria sets exist for bipolar I disorders with combinations of manic, hypomanic, and depressed episodes. One manic or hypomanic episode defines bipolar disorder. Lithium is drug of choice.

Cyclothymic disorder is a milder form lasting at least 2 years.

UCV BehSci. 45-46, 52

Malingering

Patient consciously fakes or claims to have a disorder in order to attain a specific gain (e.g., financial).

UCV BehSci. 75

Factitious disorder

Consciously creates symptoms in order to assume “sick role” and to get medical attention. **Munchausen syndrome** is a subtype manifested by a chronic history of multiple hospital admissions and willingness to receive invasive procedures. **Munchausen syndrome-by-proxy** is seen when illness in a child is caused by the parent. Motivation is unconscious.

UCV BehSci. 76

Somatoform disorders

Both illness production and motivation are unconscious drives. Several types:

1. **Conversion**—symptoms suggest motor or sensory neurologic or physical disorder but tests and physical exam are negative BehSci. 51
2. **Somatoform pain disorder**—conversion disorder with pain as presenting complaint BehSci. 101
3. **Hypochondriasis**—misinterpretation of normal physical findings, leading to preoccupation with and fear of having a serious illness in spite of medical reassurance BehSci. 71
4. **Somatization**—variety of complaints in multiple organ systems BehSci. 100
5. **Body dysmorphic disorder**—patient convinced that part of own anatomy is malformed BehSci. 47
6. **Pseudocyesis**—false belief of being pregnant associated with objective signs of pregnancy BehSci. 85

UCV

Gain: 1°, 2°, 3°

- 1° gain = what the symptom does for the patient's internal psychic economy.
- 2° gain = what the symptom gets the patient (sympathy, attention).
- 3° gain = what the caretaker gets (like an MD on an interesting case).

Panic disorder

Discrete periods of intense fear or discomfort peaking in 10 minutes with 4 of the following:

1. Palpitations **PANIC**
2. Abdominal distress
3. Nausea
4. Increased perspiration
5. Chest pain, chills, and choking

Panic disorder must be diagnosed in context of occurrence (e.g., panic disorder with agoraphobia).
High prevalence during Step 1 exam.

UCV BehSci.78

Specific phobia

Fear that is excessive or unreasonable, cued by presence or anticipation of a specific object or entity. Exposure provokes anxiety response. Person (not necessarily child) recognizes fear is excessive. Fear interferes with normal routine. Treatment options include systematic desensitization. Examples include:

1. Gamophobia (*gam* = gamete) = fear of marriage.
2. Algophobia (*alg* = pain) = fear of pain.
3. Acrophobia (*acro* = height) = fear of heights.
4. Agoraphobia (*agora* = open market) = fear of open places.

UCV BehSci.99

Post-traumatic stress disorder

Person experienced or witnessed event that involved actual or threatened death or serious injury. Response involves intense fear, helplessness, or horror. Traumatic event is persistently reexperienced, person persistently avoids stimuli associated with the trauma, and experiences persistent symptoms of increased arousal. Disturbance lasts longer than 1 month and causes distress or social/occupational impairment.

UCV BehSci.81-82

Personality

Personality trait—an enduring pattern of perceiving, relating to, and thinking about the environment and oneself that is exhibited in a wide range of important social and personal contexts.

Personality disorder—when these patterns become inflexible and maladaptive, causing impairment in social or occupational functioning or subjective distress.

Cluster A personality disorder

Odd or eccentric; cannot develop meaningful social relationships. **“Weird”**

Types:

1. Paranoid—distrust and suspiciousness; projection is main defense mechanism
2. Schizoid—voluntary social withdrawal, no psychosis, limited emotional expression
3. Schizotypal—interpersonal awkwardness, odd thought patterns and appearance.

UCV BehSci.36, 38, 39

**Cluster B
personality
disorder**

Dramatic, emotional, or erratic.

“Wild”

Types:

1. Antisocial—disregard for and violation of rights of others, criminality; males > females
2. Borderline—unstable mood and behavior, impulsiveness, sense of emptiness; females > males
3. Histrionic—excessive emotionality, somatization, attention seeking, sexually provocative
4. Narcissistic—grandiosity, sense of entitlement, may demand “top” physician/best health care

UCV BehSci.29, 31, 33, 34

**Cluster C
personality
disorder**

Anxious or fearful.

“Worried”

Types:

1. Avoidant—sensitive to rejection, socially inhibited, timid, feelings of inadequacy
2. Obsessive-compulsive—preoccupation with order, perfectionism, and control
3. Dependent—submissive and clinging, excessive need to be taken care of, low self-confidence.

UCV BehSci.30, 32, 35, 37

**Hallucination
versus illusion
versus delusion**

Hallucinations are perceptions in the absence of external stimuli.

Illusions are misinterpretations of actual external stimuli.

Delusions are false beliefs not shared with other members of culture/subculture that are firmly maintained in spite of obvious proof to the contrary.

UCV BehSci.53

**Delusion vs. loose
association**

A delusion is a disorder in the content of thought (the actual idea).

A loose association is a disorder in the form of thought (the way ideas are tied together).

Hallucination types

Visual hallucination is common in acute organic brain syndrome.

Auditory hallucination is common in schizophrenia.

Olfactory hallucination often occurs as an aura of a psychomotor epilepsy.

Gustatory hallucination is rare.

Tactile hallucination (e.g., formication) is common in delirium tremens. Also seen in cocaine abusers (“cocaine bugs”).

Hypnagogic hallucination occurs while going to sleep.

Hypnopompic hallucination occurs while waking from sleep.

Schizophrenia

Waxing and waning vulnerability to psychosis.

Positive symptoms: hallucinations, delusions, strange behavior, loose associations.

Negative symptoms: flat affect, social withdrawal, thought blocking, lack of motivation.

The 4 A's described by Bleuler:

1. **Ambivalence** (uncertainty)
2. **Autism** (self-preoccupation and lack of communication)
3. **Affect** (blunted)
4. **Associations** (loose)

Five subtypes:

1. Disorganized
2. Catatonic
3. Paranoid
4. Undifferentiated
5. Residual

Fifth A should be **Auditory** hallucinations.

Genetic factors outweigh environmental factors in the etiology of schizophrenia.

Lifetime prevalence = 1.5% (males = females, blacks = whites). Presents earlier in men.

Schizoaffective disorder: a combination of schizophrenia and a mood disorder.

UCV BehSci. 86-92

Electroconvulsive therapy

Treatment option for major depressive disorder refractory to other treatment. ECT is painless and produces a seizure with transient memory loss and disorientation.

Complications can result from anesthesia. The major adverse effect of ECT is retrograde amnesia.

BEHAVIORAL SCIENCE—PSYCHOLOGY

Structural theory of the mind

Freud's three structures of the mind:

Id

Primal urges, sex, and aggression. (I want it.)

Superego

Moral values, conscience. (You know you can't have it.)

Ego

Bridge and mediator between the unconscious mind and the external world.
(Deals with the conflict.)

Ego defenses

All ego defenses are automatic and unconscious reactions to psychological stress.

| | Description | Example |
|--------------------|--|--|
| MATURE | | |
| Altruism | Guilty feelings alleviated by unsolicited generosity toward others. | Mafia boss makes large donation to charity. |
| Humor | Appreciating the amusing nature of an anxiety-provoking or adverse situation. | Nervous medical student jokes about the boards. |
| Sublimation | Process whereby one replaces an unacceptable wish with a course of action that is similar to the wish but does not conflict with one's value system. | Aggressive impulses used to succeed in business ventures. |
| Suppression | Voluntary (unlike other defenses) withholding of an idea or feeling from conscious awareness. | Choosing not to think about the USMLE until the week of the exam. |
| IMMATURE | | |
| Acting out | Unacceptable feelings and thoughts are expressed through actions. | Tantrums. |
| Dissociation | Temporary, drastic change in personality, memory, consciousness, or motor behavior to avoid emotional stress. | Extreme forms can result in multiple personalities (dissociative identity disorder). |
| Denial | Avoidance of awareness of some painful reality. | A common reaction in newly diagnosed AIDS and cancer patients. |
| Displacement | Process whereby avoided ideas and feelings are transferred to some neutral person or object. | Mother yells at child because she is angry at her husband. |
| Fixation | Partially remaining at a more childish level of development. | Men fixating on sports games. |
| Identification | Modeling behavior after another person. | Spouse develops symptoms that deceased patient had. |
| Isolation | Separation of feelings from ideas and events. | Describing murder in graphic detail with no emotional response. |
| Projection | An unacceptable internal impulse is attributed to an external source. | A man who wants another woman thinks his wife is cheating on him. |
| Rationalization | Proclaiming logical reasons for actions actually performed for other reasons, usually to avoid self-blame. | Saying the job was not important anyway, after getting fired. |
| Reaction formation | Process whereby a warded-off idea or feeling is replaced by an (unconsciously derived) emphasis on its opposite. | A patient with libidinous thoughts enters a monastery. |
| Regression | Turning back the maturational clock and going back to earlier modes of dealing with the world. | Seen in children under stress (e.g., bedwetting) and in patients on peritoneal dialysis. |
| Repression | Involuntary withholding of an idea or feeling from conscious awareness. The basic mechanism underlying all others. | |

Oedipus complex Repressed sexual feelings of a child for the opposite-sex parent, accompanied by rivalry with same-sex parent. First described by Freud.

Factors in hopelessness Four dynamic factors in the development of hopelessness: **IGAD!**

1. Sense of **I**mpotence (powerlessness)
2. Sense of **G**uilt
3. Sense of **A**nger
4. Sense of loss/**D**eprivation leading to depression

Classical conditioning Learning in which a natural response (salivation) is elicited by a conditioned (learned) stimulus (bell) that previously was presented in conjunction with an unconditioned stimulus (food). Programmed by habit, without any element of reward. As in Pavlov's classical experiments with dogs (ringing the bell provoked salivation).

Operant conditioning Learning in which a particular action is elicited because it produces a reward.
Positive reinforcement: desired reward produces action (mouse presses button to get food).
Negative reinforcement: removal of aversive stimulus increases behavior (mouse presses button to avoid shock). Do not confuse with punishment.

Reinforcement schedules

| | | |
|----------------|---|---|
| Continuous | Behavior shows the most rapid extinction when not rewarded. | This explains why people can get addicted to slot machines at casinos (variable ratio) and yet get upset when vending machines (continuous) don't work. |
| Variable ratio | Behavior shows the slowest extinction when not rewarded. | |

Psychoanalysis A form of insight therapy—intensive, lengthy, costly, great demands on patient, developed by Freud. May be appropriate for changing chronic character problems.

Topography (in psychoanalysis) Conscious = what you are aware of.
Preconscious = what you are able to make conscious with effort (like your phone number).
Unconscious = what you are not aware of; the central goal of Freudian psychoanalysis is to make the patient aware of what is hidden in his/her unconscious.

Intelligence testing Stanford–Binet and Wechsler are the most famous tests.
Mean is defined at 100, with standard deviation of 15.
IQ lower than 70 (or 2 standard deviations below the mean) is one of the criteria for diagnosis of mental retardation.
IQ scores are correlated with genetic factors but are more highly correlated with school achievement.
Intelligence tests are objective (not projective) tests.
