

# CHAPTER 1

# Epidemiology & Biostatistics

## Epidemiology

## Epidemiologic measures

- Epidemiology is the study of the distribution and determinants of health-related states within a population.
- Epidemiology sees disease as distributed **within a group**, not as a property of an individual.
- The tools of epidemiology are **numbers**.
- Numbers in epidemiology are **ratios** converted into rates.
- The denominator is key: who is “at risk” for a particular event or disease state.
- Compare the number of actual cases with the number of potential cases to determine the rate.
- Rates are generally, but not always, per 100,000 persons by the Centers for Disease Control and Prevention (CDC), but can be per any multiplier (Vital statistics are usually per 1,000 persons).

$$\frac{\text{Actual cases}}{\text{Potential cases}} = \frac{\text{Numerator}}{\text{Denominator}} = \text{RATE}$$



## Incidence and Prevalence

### 1. Incidence rate (IR):

- The rate at which **new events** occur in a population.
- The numerator is the number of **NEW** events that occur in a defined period; the denominator is the population at risk of experiencing this new event during the same period.
- Remember, IR:
  - Should include only new cases of the disease that occurred during the specified period.
  - **Should not include old cases or dead cases in the denominator.**
- Primary prevention: Stopping someone from getting the disease = **preventing incidence**.

$$\frac{\text{Number of new cases}}{\text{Number "at risk" to be a new case}} = \text{incidence}$$

- Mnemonic: Incidence is the rate at which new cases coming **in**.

### ❖ Attack rate:

- It is the cumulative incidence of infection in a group of people observed over a period of time during an epidemic, usually in relation to **foodborne illness**.
- **It is the number of exposed people infected with the disease divided by the total number of exposed people.**
- It is measured from the beginning of an outbreak to the end of the outbreak. It is often referred to as an attack ratio.

### 2. Prevalence rate:

- All persons who experience an event in a population.
- The numerator is **ALL** individuals who have an attribute or disease at a particular point in time (or during a particular period of time); the denominator is the population at risk of having the attribute or disease at this point in time (**dead cases are not at risk!**).
- The numerator includes not only new cases, but also old cases (people who remained ill during the specified point or period in time).
- **A case is counted in prevalence until death or recovery occurs.**

- Prevalence is most useful for measuring the burden of chronic diseases such as tuberculosis, malaria and HIV in a population.

$$\frac{\text{Total number of cases}}{\text{Number in population "at risk" to be a case}} = \text{prevalence}$$

- Point vs. Period Prevalence:

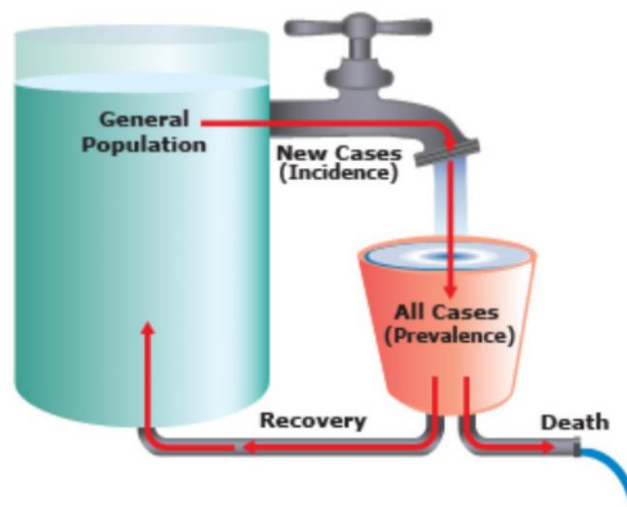
A. Point prevalence: prevalence during a particular "point in time".

B. Period prevalence: prevalence during a specified period or "span of time".

- Secondary prevention:** Reducing the cases of the disease = preventing prevalence.
- Tertiary prevention:** Decreasing negative effects of the disease "improve Quality of life"
- ❖ Understanding the relationship between incidence and prevalence:

$$\text{Prevalence} = \text{Incidence} \times \text{Duration} (P = I \times D)$$

- Prevalence  $\approx$  incidence for short duration disease (common cold). Prevalence  $>$  incidence for chronic diseases, due to large # of existing cases (diabetes).
- Prevalence pot:
  - Incident cases or new cases are monitored over time.
  - New cases join pre-existing cases to make up total prevalence.
  - Prevalent cases leave the prevalence pot in one of two ways  $\rightarrow$  recovery or death.





❖ Practice:

Qs. How do prevalence and incidence change if:

1. A cure is discovered?
  - **A Prevalence will go down.** New cases may occur at the same rate (incidence), but fewer people are living with it because it can be cured (decreased prevalence).
2. An effective prevention, such as a vaccine, is discovered?
  - **Both incidence and prevalence will go down.** If the disease is chronic and incurable such as hepatitis B, the prevalence may decrease very slowly, but the number of new cases (incidence) may drop dramatically.
3. An effective therapy prolongs life, but does not cure?
  - **Prevalence increases** as more people are living longer with the disease.
4. Person-to-person transmission is decreased?
  - Incidence will go down, and over time, prevalence will follow.

What happens to incidence and prevalence if:	Incidence	Prevalence
New effective treatment is initiated?	N	↓
New effective vaccine gains widespread use?	↓	↓
Number of persons dying from the condition increases?	N	↓
Additional Federal research dollars are targeted to a specific condition?	N	N
Behavioral risk factors are reduced in the population at large?	↓	↓
Contacts between infected persons and noninfected persons are reduced:		
For airborne infectious disease?	↓	↓
For noninfectious disease?	N	N
Recovery from the disease is more rapid than it was 1 year ago?	N	↓
Long-term survival rates for the disease are increasing?	N	↑

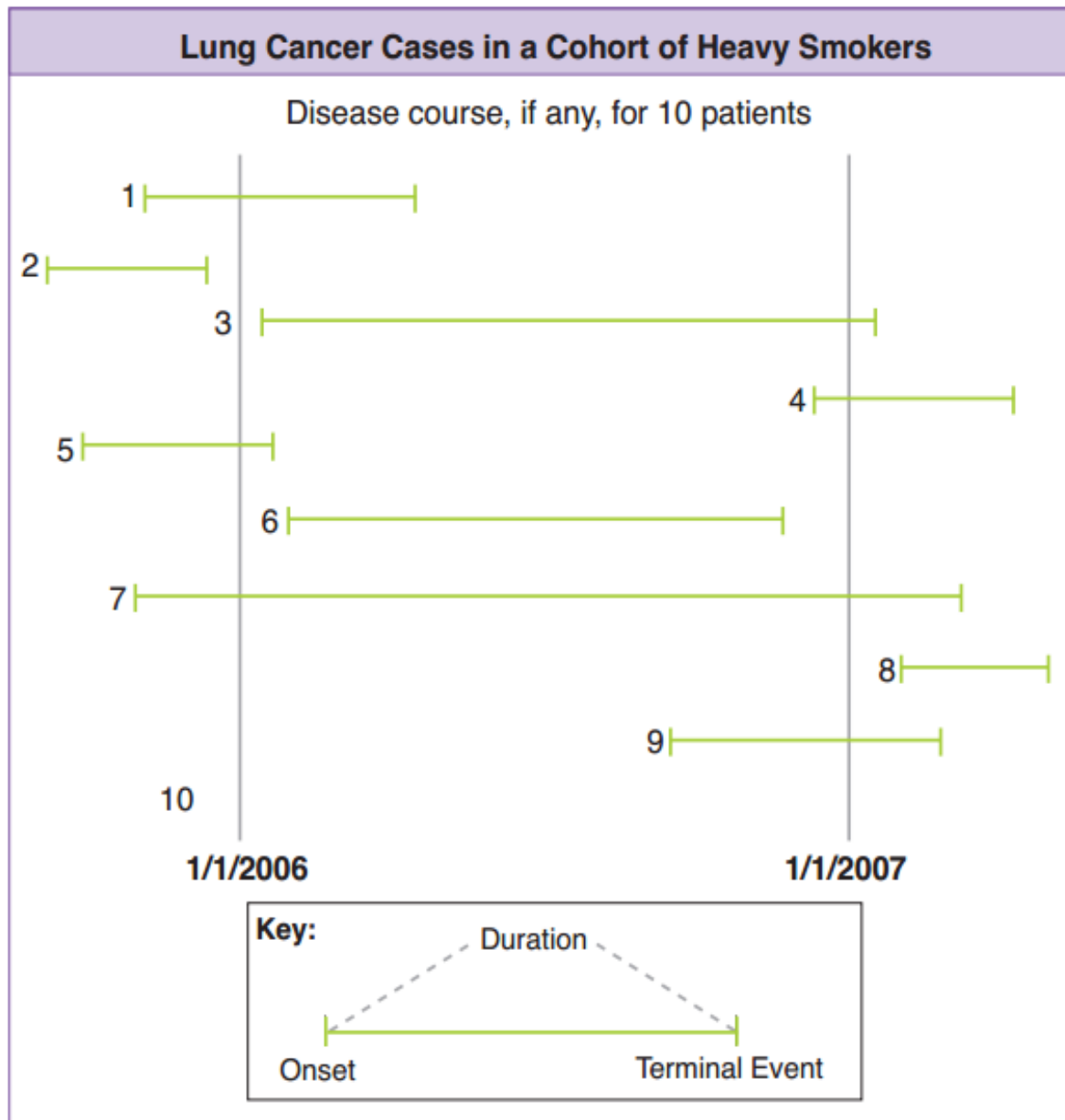
❖ N = no change; ↓ = decrease; ↑ = increase.

## ❖ N.B:

- Incidence answers the question: how many new cases of the disease were diagnosed in a population during a particular period of time?
- Prevalence answers the question: how many cases of the disease, both new and old, exist in a population at a particular point in time? The relationship between prevalence and incidence can be expressed as the following equation:

$$\text{Prevalence} = (\text{Incidence}) \times (\text{Time})$$

- Incidence of a disease is not changed by any kind of treatment, because the disease has already developed when the treatment is started.
- Any treatment that prolongs survival but does not cure the disease will increase prevalence due to an increase in the number of afflicted (but still alive) individuals overtime.
- An increasing prevalence and stable incidence can be attributed to factors which prolong the duration of a disease (improved quality of care).

❖ Counting for Incidence and Prevalence:

- Incidence (from 1/1/2006 to 1/1/2007) =  $\frac{4}{6}$  (2 is dead, 1&5&7 are old cases).
- Period prevalence (from 1/1/2006 to 1/1/2007) =  $\frac{7}{9}$  (2 is dead).
- Point prevalence (1/1/2007) =  $\frac{4}{6}$  (1&2&5&6 are dead).

### Crude, Specific, and Standardized Rates

- A. **Crude rate:** Numerator/denominator for total population.
  - B. **Specific rate:** Numerator/denominator for sub-groups within population. Ex: "age-specific" or "sex-specific" rate or "cause-specific".
  - C. **Standardized rate (or adjusted rate):** Removing effects of demographic variables when comparing two or more populations
- Types of mortality rates:

Crude mortality rate	$\frac{\text{Deaths}}{\text{Population}}$
Cause-specific mortality rate	$\frac{\text{Deaths from cause}}{\text{Population}}$
Case-fatality rate	$\frac{\text{Deaths from cause}}{\text{Number of persons with the disease/cause}}$
Proportionate mortality rate (PMR)	$\frac{\text{Deaths from cause}}{\text{All deaths}}$

### Interpreting Diagnostic and Screening Tests

- Uses  $2 \times 2$  table comparing test results with the actual presence of disease.
- TP = true positive; FP = false positive; FN = false negative; TN = true negative.

		Disease		
		+	-	
Test	+	TP	FP	PPV = $\frac{TP}{TP + FP}$
	-	FN	TN	NPV = $\frac{TN}{TN + FN}$
		Sensitivity = $\frac{TP}{TP + FN}$	Specificity = $\frac{TN}{TN + FP}$	

"Trues on Top divide by everything"

### Pre-test Probabilities

#### A. Sensitivity:

- The probability of correctly identifying a case of disease.
- Sensitivity is the proportion of truly diseased persons in the screened population who are identified as diseased by the screening test. This is also known as the “true positive rate”.
- Everyone in the calculation is a diseased person.
- $\text{Sensitivity} = \text{TP}/(\text{TP} + \text{FN}) = \text{true positives}/(\text{true positives} + \text{false negatives})$
- $\text{SEN} = 750/(750 + 250) = 750/1,000 = 75\%$
- $1 - \text{SEN} = \text{False Negative Rate}$ .

	Yes	No
Positive	750	50
Negative	250	950

#### B. Specificity:

- The probability of correctly identifying disease-free persons.
- Specificity is the proportion of truly non-diseased persons who are identified as non-diseased by the screening test. This is also known as the “true negative rate”.
- Everyone in the calculation is a healthy person.
- $\text{Specificity} = \text{TN}/(\text{TN} + \text{FP}) = \text{true negatives}/(\text{true negatives} + \text{false positives})$ .
- $\text{SPEC} = 950/(950 + 50) = 950/1,000 = 95\%$ .
- Measures only the distribution of persons who are disease-free.
- $1 - \text{specificity} = \text{false positive rate}$ .

	Yes	No
Positive	750	50
Negative	250	950

### Post-test Probabilities

#### A. Positive predictive value:

- The probability of disease in a person who receives a positive test result.
- The probability that a person with a positive test is a true positive (has the disease) is referred to as the “predictive value of a positive test”.
- Everyone in the calculation got a positive on the test.
- Positive predictive value =  $TP/(TP + FP)$  = true positives/(true positives + false positives)
- $PPV = 750/(750 + 50) = 750/800 = 93.8\%$
- Measures only the distribution of persons who receive a positive test result

	Yes	No
Positive	750	50
Negative	250	950

#### B. Negative predictive value:

- The probability of no disease in a person who receives a negative test result.
- The probability that a person with a negative test is a true negative (does not have the disease) is referred to as the “predictive value of a negative test”.
- Everyone in the calculation got a negative on the test.
- Negative predictive value =  $TN/(TN + FN)$  = true negatives/(true negatives + false negatives).
- $NPV = 950/(950 + 250) = 950/1,200 = 79.2\%$ .
- Measures only the distribution of persons who receive a negative test result.

	Yes	No
Positive	750	50
Negative	250	950

C. Accuracy (ACC):

- Overall correctness of the test.
- Everyone is included in this calculation.
- $ACC = ((TP + TN) / (TP + TN + FP + FN))$ .
- $ACC = ((750 + 950) / (750 + 950 + 50 + 250)) = 1,700 / 2,000 = 85\%$ .

	Yes	No
Positive	750	50
Negative	250	950

❖ Practice Questions:

- What is the effect of increased **incidence** on sensitivity? On positive predictive value?
  - (None; screening does not assess incidence).
- What is the effect of increased **prevalence** on sensitivity? On positive predictive value?
  - (Sensitivity stays the same, positive predictive value increases).

Prevalence & PPV/NPV	
Prevalence ↑	<ul style="list-style-type: none"> <li>• PPV ↑</li> <li>• NPV ↓</li> </ul>
Prevalence ↓	<ul style="list-style-type: none"> <li>• PPV ↓</li> <li>• NPV ↑</li> </ul>

NPV = negative predictive value;  
PPV = positive predictive value.

## ❖ N.B:

1. It is important to remember that the **NPV will vary with the pretest probability of a disease**.
  - A patient with a high probability of having a disease will have a low NPV if a negative test, whereas a patient with a low probability of having a disease will have a high NPV with a negative test.
  - Specific examples are given below:
- A. Thyroid cancer and FNA test results:
  - A patient with a high pre-test probability for having thyroid cancer (young age, radiation exposure) has a low NPV.
- B. HIV and ELISA test results:
  - A patient who belongs to a high-risk group (multiple sexual partners, admits to not using condoms, IV drug user) has a high pre-test probability; consequently, this patient will have a low NPV. On the other hand, a patient who belongs to a low-risk group (one monogamous sexual partner, consistent condom use, no history of IV drug use) has a low pre-test probability; consequently, this patient will have a high NPV.
  - The prevalence of a disease is directly related to the pre-test probability of having the disease and, thus, also affects the NPV.
  - In a nutshell:
  - **Remember that the NPV will vary with the pretest probability of a disease. A patient with a high probability of having a disease will have a low NPV with a negative test but a patient with a low probability of having a disease will have a high NPV with a negative test.**
2. **Both the positive predictive value (PPV) and negative predictive value (NPV) of a test depend on the prevalence of the disease of interest in the population in which the test is applied. PPV Increases and NPV decreases with an Increase in prevalence.**
  - The more common the disease is in the population, the more likely a patient with a positive test result actually is diseased (a "true positive"). If the disease is relatively common - as gastric cancer is in China - the probability is reasonably high that a patient who tests positive actually has the disease. If the disease is relatively uncommon - as gastric cancer is in the United States - the probability is far lower that a patient who tests positive actually has the disease.



❖ The relationship between the screening test probability:

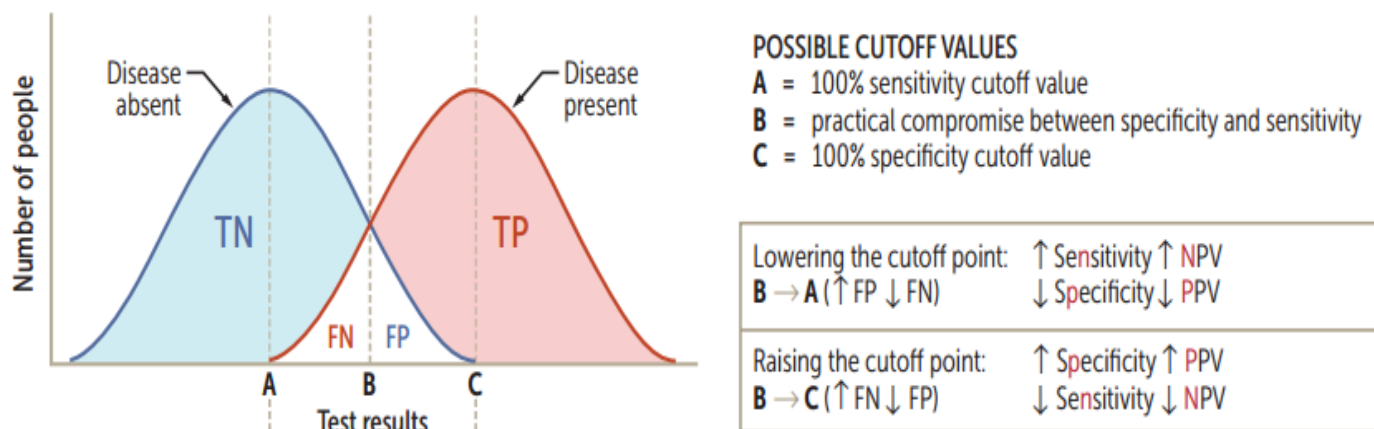
- The key links are in the denominators:

$$\begin{array}{cc} \text{SEN} = \frac{\text{TP}}{\text{TP} + \text{FN}} & \text{PPV} = \frac{\text{TP}}{\text{TP} + \text{FP}} \\ \text{SPEC} = \frac{\text{TN}}{\text{TN} + \text{FP}} & \text{NPV} = \frac{\text{TN}}{\text{TN} + \text{FN}} \end{array}$$

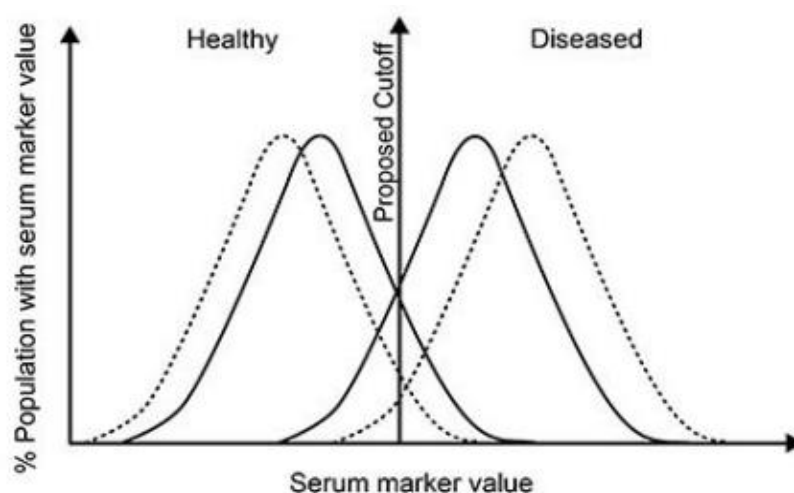
Remember **SNOUT** and **SPIN**!

- If a test has a high sensitivity, then a negative result would indicate the absence of the disease:
  - Take for example temporal arteritis (TA), a large vessel vasculitis involving predominantly branches of the external carotid artery which occurs in patients age >50, has elevated ESR in every case. So, 100% of patients with TA have elevated ESR. The sensitivity of an abnormal ESR for TA is 100%. If a patient you suspect of having TA has a normal ESR, then the patient does not have TA.
  - Mnemonic for the clinical use of sensitivity: **SN-N-OUT** (SeNsitive test- Negative-rules out disease).
- If a test has a high specificity, then a positive result would indicate the existence of the disease.
  - Example:
    - CT angiogram has a very high specificity for pulmonary embolism (97%). A CT scan read as positive for pulmonary embolism is likely true.
  - Mnemonic for the clinical use of specificity: **S-P-IN** (Specific test- Positive-rules in disease).

### Selecting Screening Test Cutoff Values

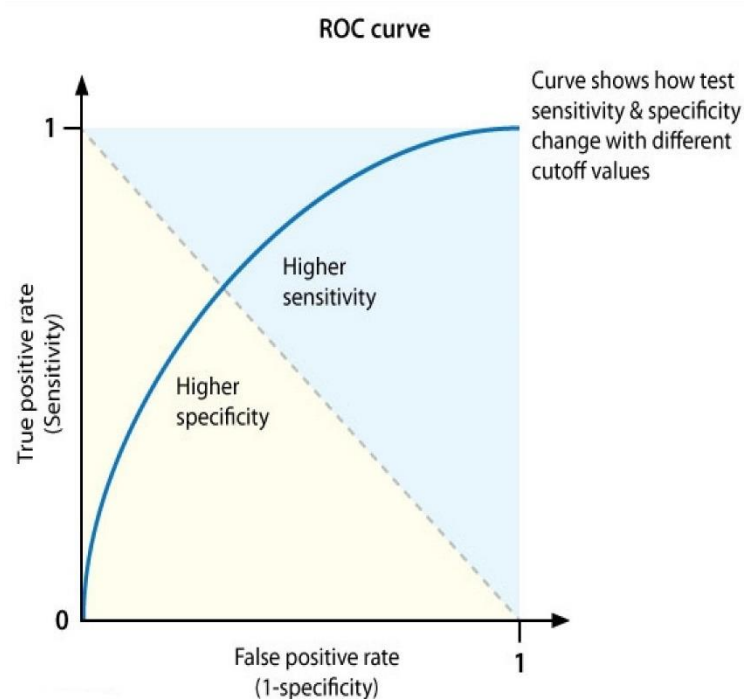
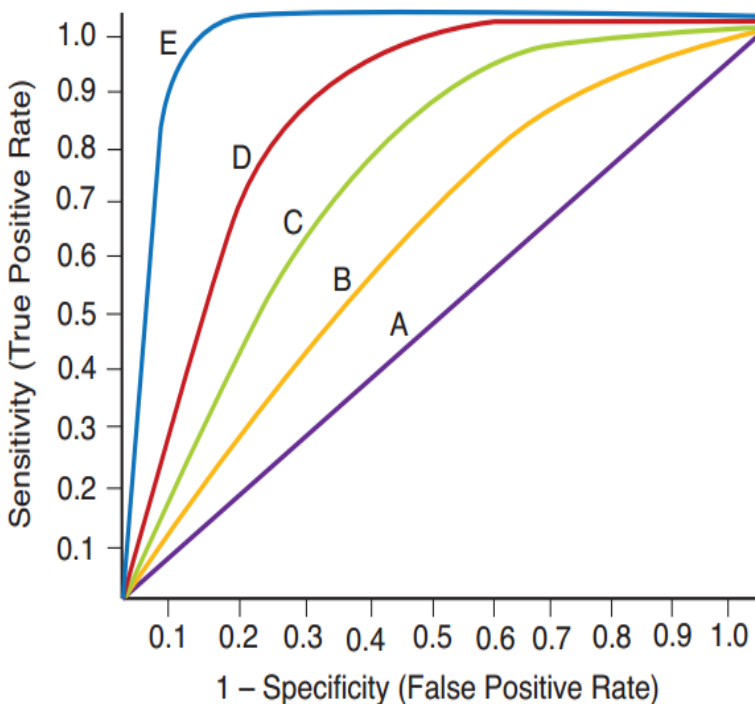


- Point of optimum sensitivity = point of optimum Negative predictive value.
- Point of optimum specificity = point of optimum Positive predictive value.
- ❖ N.B:
  - The degree of overlap between the healthy and diseased population curves limits the maximum combined sensitivity and specificity of a test.
  - In this example, the cutoff value is optimally placed to maximize both sensitivity and specificity.
  - Sensitivity represents the ability of a test to identify those with a given disease.
  - It is calculated as TP divided by the number of people with the disease (TP + FN).
  - Specificity represents the ability of a test to exclude those from having a given disease.
  - It is calculated as TN divided by the number of people without the disease (TN + FP).
  - In this specific instance, decreased overlap between the healthy and diseased population curves decreases both the number of FP and FN, and thus allow for a test with both higher sensitivity and specificity.
  - Therefore, the dashed curves are associated with higher sensitivity and specificity.



### Receiver Operating Characteristic (ROC)

- Used to compare with available alternative diagnostic test.
- Used to help to set test cutoff values.
- In this example, test E is the best test.
- Screening tests need high sensitivity; confirmatory tests need high specificity.
- The better performing test will have a higher area under the curve (AUC), with the curve closer to the upper left corner.



## Understanding Types of Research Studies

A. Observational Studies:

- Recording without intervention.
- Looking at information available in the natural world.

B. Experimental Studies (Clinical Trials):

- Assessing the Effects of an intervention.
- Generates new information by assessing effects of intervention(s).

## Types of Observational Studies

A. Cross-sectional study:

- In a cross-sectional study, exposure and outcome are measured simultaneously at a particular point in time ("snapshot study"). In other study designs, a certain time period separates the exposure from the outcome.
- Asks, "What is happening?"
- Prevalence study.
- Cannot provide incidence.
- Assesses who has or does not have a disease in a defined population.
- Conducted at (essentially) a single point in time.
- Also, records occurrence of risk factors that may be related to disease.
- Analysis assesses only the association between disease and risk factors, not causation.

B. Case-Control Study:

- A case-control study is designed by selecting individuals with a particular disease (cases), individuals without that disease (controls), and then evaluating previous exposure status.
- Asks, "What happened?"
- Key comparison: Diseased vs. non-diseased.
- Looks backward in time for the presence or absence of risk factors (Retrospective).

- Analysis looks for risk factors in the history of the diseased group that are not found in the history of the non-diseased group.
- Can give evidence for causality.
- No assessment of prevalence or incidence.
- Allows focus on persons with the disease, with non-disease only included for comparative purposes.

C. Cohort Study:

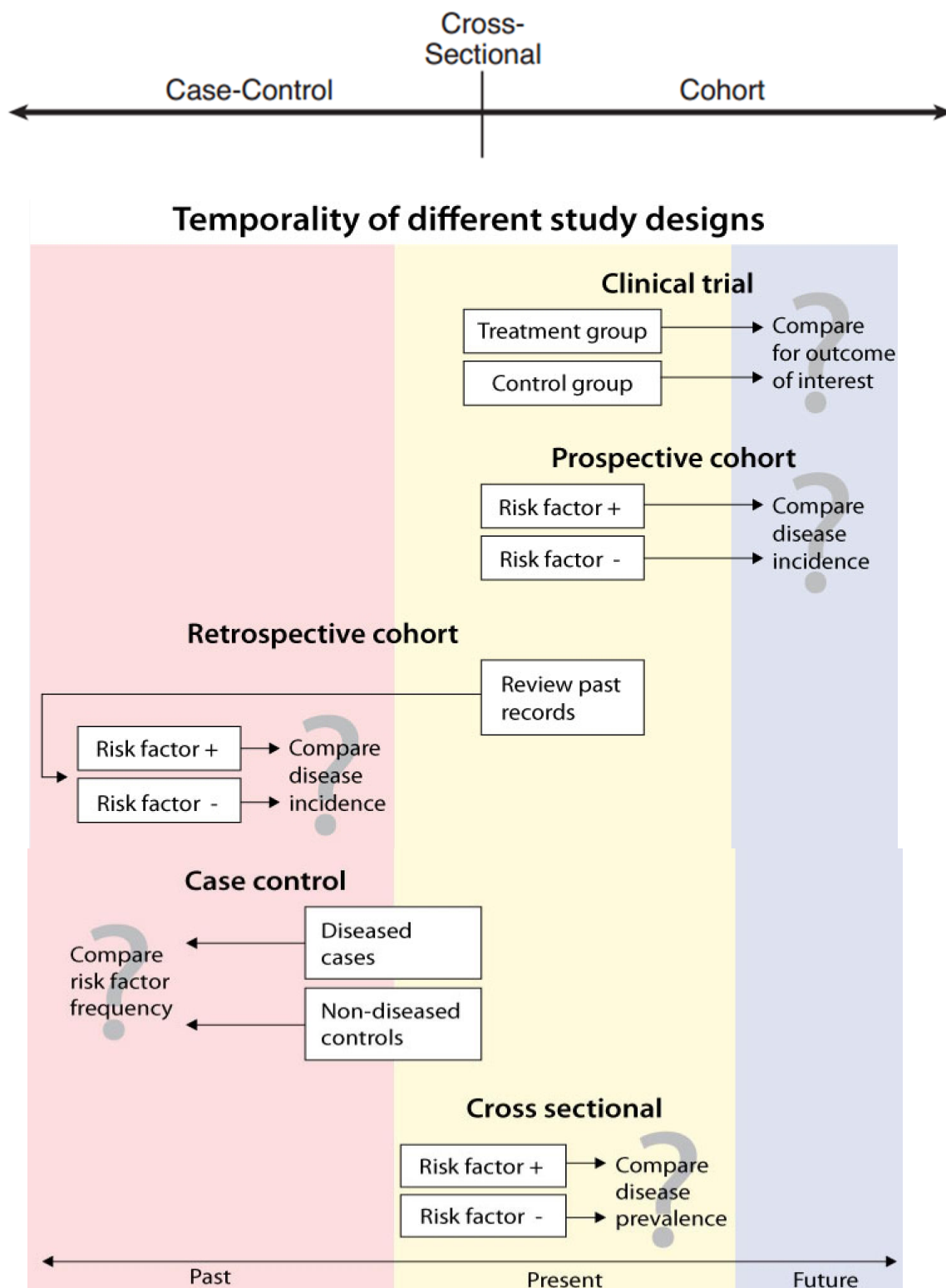
- Identifies people with risk factors and compares disease incidence to incidence rate in another group of people without those risk factors.
- Key comparison: Risk factor vs. no-risk factor.
- Analysis compares incidence rates in those who have and do not have risk factor.
- Can be prospective or retrospective.
- Usually prospective, following people forward in time.
- The critical distinction between case control and retrospective cohort studies is the order in which outcomes and risk factors are assessed. Case control studies determine the outcome first and then look for associated risk factors: retrospective cohort studies first ascertain risk factor exposure and then determine the outcome.
- Gives assessment of incidence and causality.
- No estimate of prevalence.

D. Twin concordance study:

- Compares the frequency with which both monozygotic twins vs both dizygotic twins develop the same disease.
- Measures heritability and influence of environmental factors ("nature vs nurture").

E. Adoption study:

- Compares siblings raised by biological vs adoptive parents.
- Measures heritability and influence of environmental factors.



## How We Analyze Cohort and Case-Control Studies

### A. Cohort and clinical trial studies:

#### 1. Relative Risk (Relative Risk Ratio) (RR):

- Compares incidence rates in groups with and without risk factor by division (Risk of developing disease in the exposed group divided by risk in the unexposed group).
- Relative risk (RR) is used in cohort studies to determine how strongly a risk factor (exposure) is associated with an outcome.
- Answers question: "How much more (or less) likely?"

### Relative Risk Calculation

$$RR = \frac{\text{Incidence in exposed}}{\text{Incidence in unexposed}}$$

Relative risk calculation

Risk status	Disease status	
	Present	Absent
Exposed	a	b
Non-exposed	c	d

$$\text{Relative risk (RR)} = \frac{a/(a+b)}{c/(c+d)}$$

- $RR = 1 \rightarrow$  no association between exposure and disease.
- $RR > 1 \rightarrow$  exposure associated with  $\uparrow$  disease occurrence.
- $RR < 1 \rightarrow$  exposure associated with  $\downarrow$  disease occurrence.

2. **Attributable Risk (AR):**

- Compares incidence rates in groups with and without risk by **subtraction** (excess risk that is attributable to the exposure).
- Answers question: "How many more cases?"
- If risk of lung cancer in smokers is 21% and risk in nonsmokers is 1%, then the attributable risk is 20%.

**Attributable Risk Calculation**

$$AR = \text{Incidence rate in exposed} - \text{Incidence rate in unexposed}$$

Infant Mortality for City	
South side = $\frac{8}{1,000}$ live births	North side = $\frac{16}{1,000}$ live births
<b>1. Relative Risk Calculation</b>	<b>How much more likely?</b>
$RR = \frac{\frac{16}{1,000}}{\frac{8}{1,000}} = 2.0$	<b>Twice as likely</b>
$RR = \frac{\frac{8}{1,000}}{\frac{16}{1,000}} = 0.5$	<b>Half as likely</b>
<b>2. Attributable Risk Calculation</b>	<b>How many more cases?</b>
$AR = \frac{16}{1,000} - \frac{8}{1,000} = \frac{8}{1,000}$	For every 1,000, 8 more cases

	Disease		No Disease		
<b>Exposed</b>	80	<b>A</b>	720	<b>B</b>	$800 I_E = \frac{80}{800} = 10\%$
<b>Unexposed</b>	80	<b>C</b>	1,520	<b>D</b>	$1,600 I_U = \frac{80}{1,600} = 5\%$
	$RR = \frac{10\%}{5\%} = 2.0$				
	$AR = \frac{160}{1,600} - \frac{80}{1,600} = \frac{80}{1,600}$				



3. **Attributable Risk Percent (AR%):**

- Attributable risk percent (ARP) or etiologic fraction is an important measure of the impact of a risk factor being studied.
- ARP represents the excess risk in the exposed population that can be attributed to the risk factor in percentage.
- Calculation uses RR.

$$AR\% = \frac{RR - 1}{RR}$$

If  $RR = 4.0$

$$AR\% = \frac{4.0 - 1.0}{4.0} = \frac{3}{4} = 75\%$$

4. **Absolute risk reduction:**

- The difference in risk (**not the proportion**) attributable to the intervention as compared to a control.
- If 8% of people who receive a placebo vaccine develop the flu vs 2% of people who receive a flu vaccine, then  $ARR = 8\% - 2\% = 6\% = 0.06$ .

$$ARR = \frac{c}{c + d} - \frac{a}{a + b}$$

5. **Relative risk reduction:**

- The proportion of risk reduction attributable to the intervention as compared to a control.
- If 2% of patients who receive a flu shot develop the flu, while 8% of unvaccinated patients develop the flu, then  $RR = 2/8 = 0.25$ , and  $RRR = 0.75$ .

$$RRR = 1 - RR$$

6. **Number Needed to Treat (NNT):**

- Really about **prevention**, not treatment.
- How many do you have to do something to prevent one case of disease?
- Calculated as **inverse of Absolute risk reduction (ARR)**.
- Lower number = better treatment.**

$$NNT = 1/ARR$$

7. **Number needed to harm (NNH):**

- Number of patients who need to be exposed to a risk factor for 1 patient to be harmed.
- Calculated as **inverse of Attributable risk**.
- **Higher number = safer exposure**.

$$NNH = 1/AR$$

B. **Case-Control Studies:**❖ **Odds Ratio:**

- A case-control study is used to compare the exposure of people with the disease (cases) to the exposure of people without the disease (controls).
- **The main measure of association is the exposure odds ratio (Cross calculation).**

		Disease	
		Yes	No
Risk	Yes	<b>A</b>	<b>B</b>
	No	<b>C</b>	<b>D</b>

**Computing an Odds Ratio**

$$OR = \frac{A/C}{B/D} = \frac{AD}{BC}$$

❖ **N.B:**

1. **If the disease is rare (low disease prevalence), disease incidence (number of new cases) is typically low, and the OR generally approximates the RR. This is called the "rare disease assumption".**
  - Mathematically: given standard contingency tables,  $RR = [a / (a + b)] / [c / (c + d)]$  and  $OR = AD/BC$ . When the disease is rare, A and C represent small quantities. Therefore, A is negligible compared to B, and C is negligible compared to D; this results in a reasonable mathematical approximation of RR, where RR becomes approximately AD/BC, which equals OR.
2. **Hazard ratios are the ratio of an event rate occurring in the treatment group versus the non-treatment group.**
  - **Ratios <1 indicate that the treatment group had a lower event rate and ratios >1 indicate that the treatment group had a higher event rate.**

## Experimental Studies (Clinical Trials, Intervention Studies)

### ❖ Phases of Clinical Trials:

#### A. Phase 1: Safety Trial

- Drug is tested on **healthy individuals**.
- Conducted on small numbers of subjects.
- Assesses any unknown dangers or negative effects.

#### B. Phase 2: First Use on Patients

- Drug is given in different doses, timings, and delivery mechanisms.
- Goal: to determine dosage levels and proper protocols for use.
- Moderate sample size.
- Some hints at **efficacy**.

#### C. Phase 3: Main Event

- **Assesses efficacy and side effects.**
- Large number of patients involved.
- Evidence used for FDA approval.

#### D. Phase 4: Post-Marketing Survey

- **Monitoring of reports from physician and patients after drug is in common usage.**
- Looking for issues that were missed in previous studies.
- Focus on identifying as yet undetected "rare but serious" side effects.
- If adverse effects found:
  - Black box warning, or
  - Drug removed from usage.

#### E. Phase 4 continues for as long as the compound is in use.

## Features of Randomized Controlled Clinical Trials

### ❖ Baseline for Comparison is Control Group:

#### A. Placebo Group:

- Research subjects given everything treatment group is given except the actual drug being tested.
- Usually given inert substance, "sugar pill".
- Ethical if not withholding known effective treatment.
- Many patients get better in placebo group (often 35% or more).
- Question: "Does this drug work better than no drug?"

#### B. Standard of Care Group:

- Used when another treatment of some benefit already exists, as in looking for a better cancer treatment.
- Question: "Does this new drug work better than the old drug?"

#### C. Random Assignment:

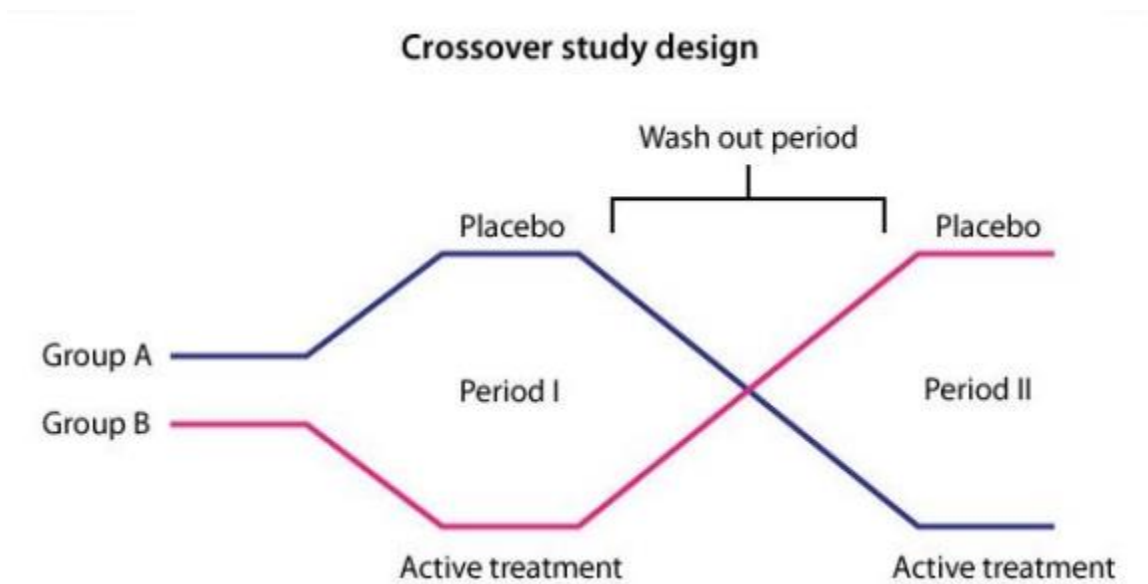
- Research subjects put into treatment or control groups by a random process.
- Random number generator may be used.
- Helps to ensure same kind of people in both groups.
- "Individually we are all different, but in the aggregate, we are all the same."

#### D. Double-Blind Design:

- Blinding technique is commonly used in clinical trials.
- The blinding can involve patients exclusively or both patients and physicians (double blinding). The main purpose of blinding is to prevent patient or researcher expectancy from interfering with the determination of an outcome.
- For example, a researcher's belief in a positive outcome in treated patients can potentially result in observer bias.

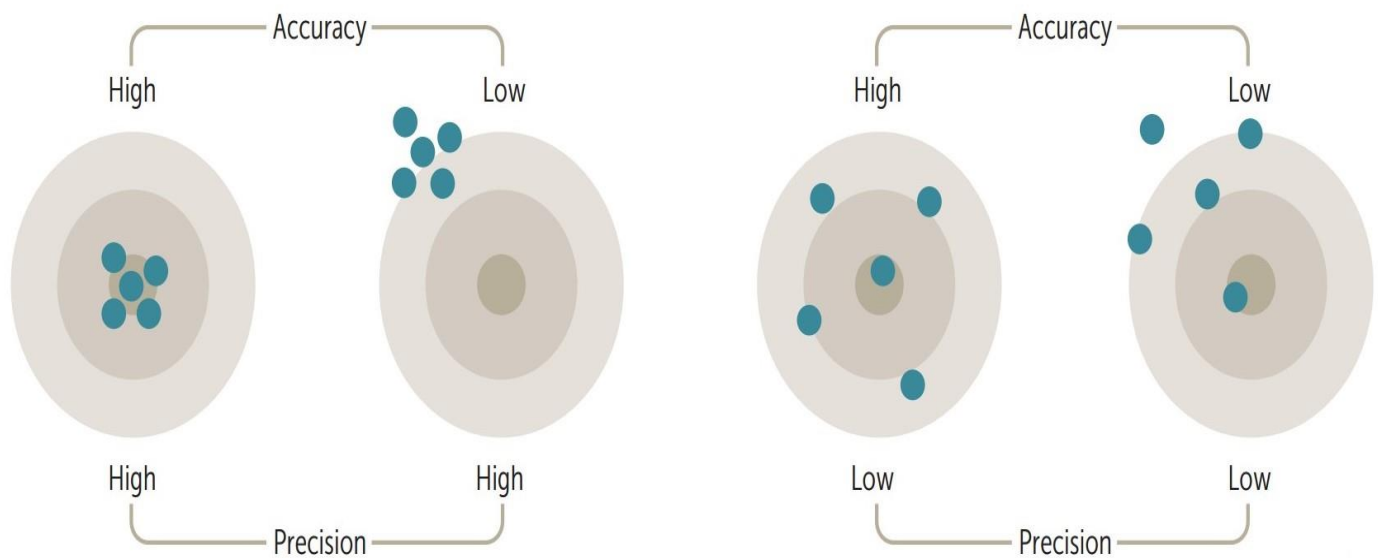
**E. Crossover Design:**

- If you need comparison group, but want everyone in the study to get the drug being tested.
- At start of study, one group gets drug while other group gets placebo.
- Then, at a set time point, group getting placebo is switched to drug, and group getting drug is switched to placebo.
- Must be double-blind.
- The principal drawback of crossover trials is that the effects of one treatment may “carry over” and alter the response to subsequent treatments. To limit this disadvantage, a washout (no treatment) period is often added between consecutive treatments. The washout period is designed to be long enough to allow the effects of prior treatment to wear off.



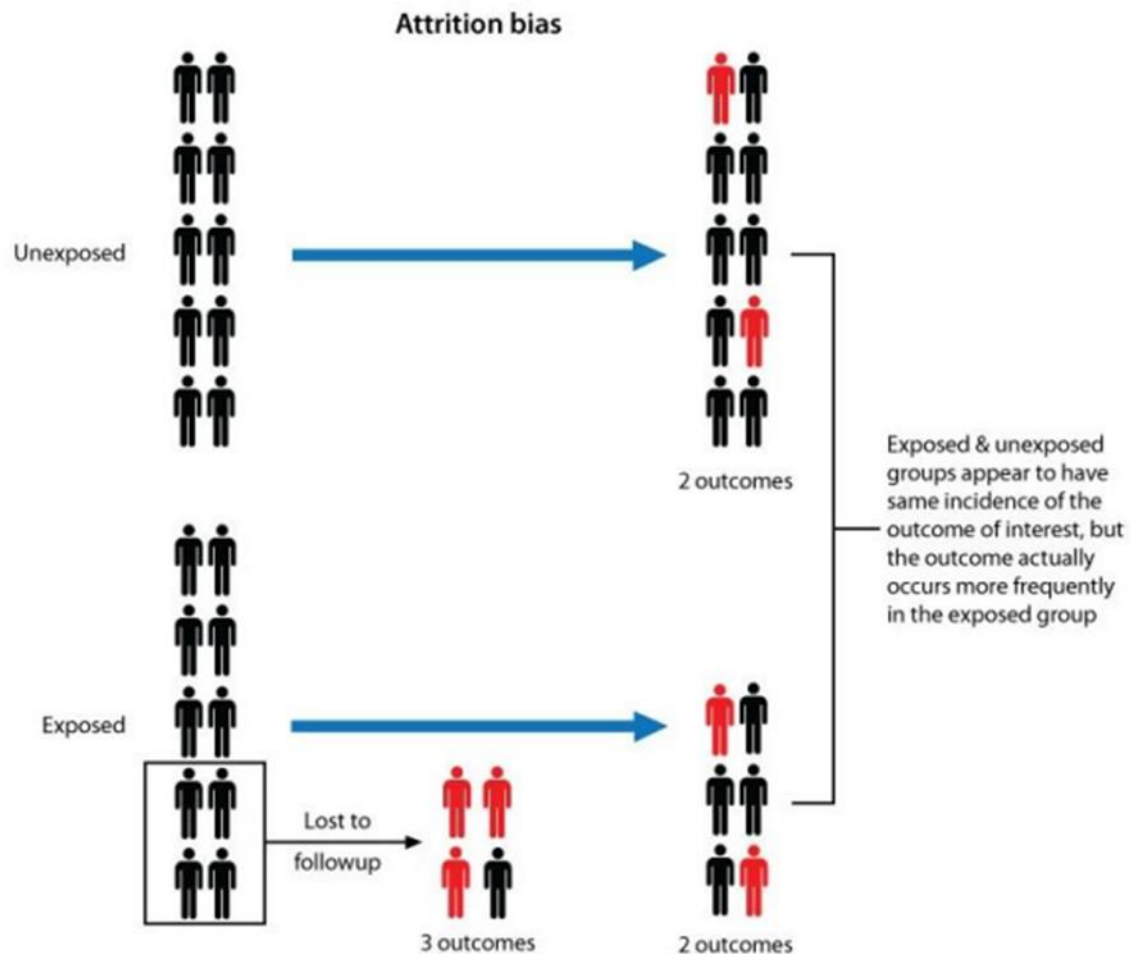
## Ways Research Can be Misleading (Understanding the Bias)

- **Precision:**
  - The consistency and reproducibility of a test (reliability).
  - A reliable test gives similar results on repeat measurements.
  - Random error  $\downarrow$  precision in a test. Reliability is maximal when random error is minimal.
  - $\uparrow$  Precision  $\rightarrow$   $\downarrow$  standard deviation.
  - $\uparrow$  precision  $\rightarrow$   $\uparrow$  statistical power ( $1 - \beta$ ).
- **Accuracy:**
  - The trueness of test measurements (validity).
  - The absence of systematic error or bias in a test.
  - Systematic error  $\downarrow$  accuracy in a test.



## Bias and study errors

- Bias Occurs When Research Generates a **Distorted Picture of Reality**.
- Bias in research is a **deviation from the truth of inferred results**. It can be done intentionally or unintentionally.
- 1. **Selection bias:**
  - **Problem:** **Sample does not reflect the population.**
  - Those in the study sample are not a good reflection of the population we want to say something about: **"Who is in does not match who is out"**.
- A. **Ascertainment (sampling) bias:** Study population differs from target population due to **nonrandom selection methods**.
- B. **Non-respondent bias:**
  - Participating subjects differ from non-respondents in meaningful ways.
  - Generally speaking, the lower the response rate, the greater the likelihood of a non-response bias.
- C. **Berkson's bias:** study population selected from hospital is **less healthy than general population**.
- D. **Healthy worker effect:** The working population is healthier on average than the general population → Any sample consisting of only working individuals does not represent the general population (**This effect occurs because severely ill individuals do not usually work**).
- E. **Prevalence (Neyman) bias:**
  - Occurs when **individuals with severe or mild disease are excluded**, resulting in an error in the estimated association between an exposure and an outcome.
  - **If you were studying risk factors for myocardial infarction among patients admitted to a cardiac ward**, you could get a skewed result if you failed to include healthier patients (perhaps those who has "silent MIs") or sicker patients, such as those who have already died from a cardiac arrest before reaching the emergency department.
- F. **Attrition bias (loss of follow up bias):**
  - **In prospective studies, disproportionate loss to follow-up between the exposed and unexposed groups creates the potential for attrition bias, which is a form of selection bias. As a result, investigators generally try to achieve high patient follow-up rates in prospective studies.**



▪ Solution to selection biases:

- **Random assignment.** An ideal randomization process minimizes selection bias, results in near-equal treatment and control group sizes and achieves a low probability of confounding variables.

2. Measurement Bias:

- **Problem:** How the data is collected affects the data that is obtained.

A. Leading questions:

- Suggesting in word choice, nonverbal behavior, or tone, what answer is preferred.

B. Hawthorne effect:

- The Hawthorne effect is defined as the tendency of a study population to affect an outcome due to the knowledge of being studied.
- This awareness leads to a change in behavior while under observation, thereby seriously affecting the validity of the study.



C. Observer-Expectancy Bias (Pygmalion effect):

- Observer bias occurs when the investigator's decision is adversely affected by knowledge of the exposure status.
- Person making assessment perceives things in a certain way based on prior knowledge or experience.

D. Recall bias:

- People do not remember clearly what happened in the past.
- Recall bias results from inaccurate recall of past exposure by people in the study and applies mostly to retrospective studies such as case-control studies.
- Sometimes, they simply make things up.

E. Reporting bias:

- Reporting bias may occur if subjects over- or under-report exposure history due to perceived social stigmatization (smoking, sexual experiences).

F. Procedure bias:

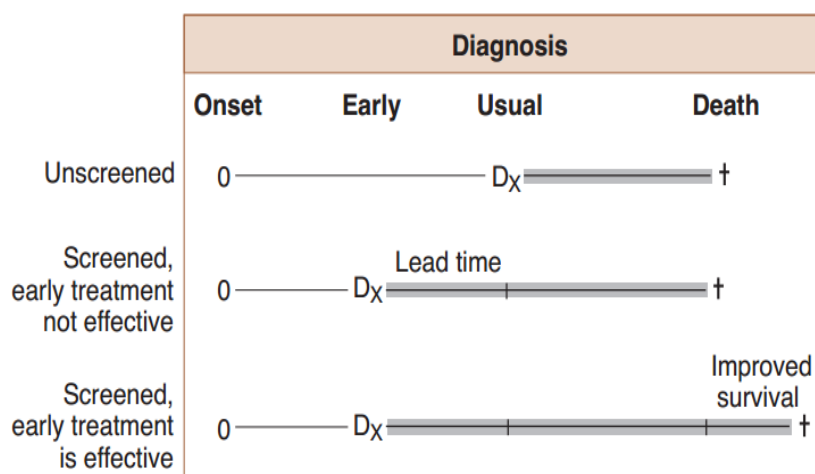
- Subjects in different groups are not treated the same.
- Patients in treatment group spend more time in highly specialized hospital units.

▪ Solution to measurement bias:

- Use a control group.
- Double-blind design: If the researchers do not have the knowledge, it cannot influence how they deal with research subjects.

3. Lead-Time Bias:

- **Problem:** False estimate of the benefits of an intervention.
- The prospect of lead-time bias should always be considered when evaluating any screening test. Lead-time bias is defined as an artificial increase in survival time among tested patients who actually have an unchanged prognosis.
- Patients screened with more sensitive tests appear to live longer only because the disease was detected earlier than it would have been if diagnosed clinically. The overall length of time from disease onset to death actually remains the same in both groups.
- Solution to lead-time bias: Use life-expectancy, not time since diagnosis.



#### 4. Proficiency Bias:

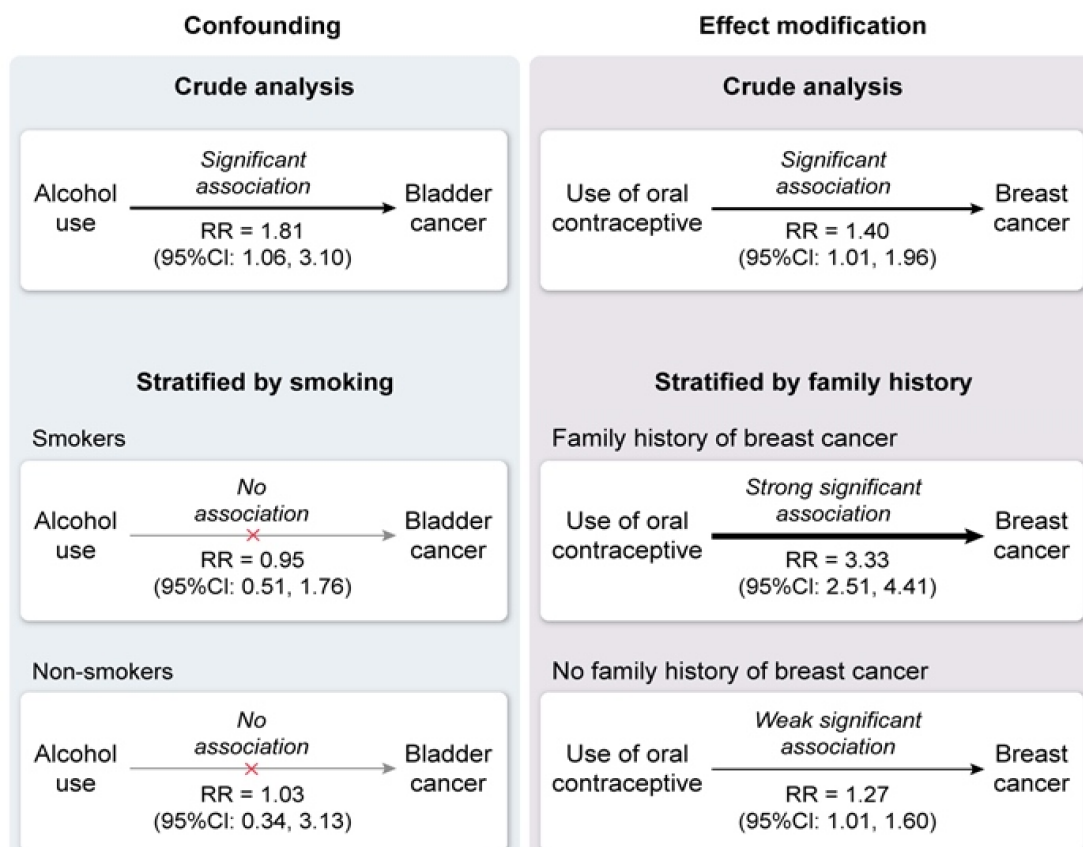
- **Problem:** Interventions or treatments are not applied with equal skill to all research subjects.
- Who does the procedure may matter more than what procedure is done.
- New surgical procedures are often first done by the most expert surgeons, yielding an **inflated estimate of the benefits and outcomes from the surgery**.
- Solution to proficiency bias:
  - Be sure that treatment providers are selected at random.

#### 5. Confounding:

- **Problem:** Some additional variable, not the subject of research interest, produces the observed results.
- Often about the "**hidden cause**".
- No study is entirely free of confounding.
- **Alcoholics have higher rates of lung cancer than non-alcoholics, suggesting that alcohol use causes lung cancer. Confounding issue: Alcoholics are more likely to be smokers.**
- Solution to confounding:
  - Do multiple studies (meta-analysis).
  - **Matching is a method generally used in the design stage of case-control studies to control confounding (when a perceived association between an exposure and an outcome is actually explained by a confounding variable associated with both the exposure and the outcome). The initial step in matching involves selecting variables that could be confounders (age, race). Cases and controls are then selected based on the matching variables so that both groups have a similar distribution in accordance with the variables.**

## ❖ N.B:

- Effect modification results when an external variable positively or negatively impacts the effect of a risk factor on the disease of interest. **It can be distinguished from confounding by performing a stratified analysis centered on the variable of interest. Effect modification is not a bias, but rather is a natural phenomenon that is important to recognize.**
  - The difference between confounding, effect modification:
    - Confounding bias:**
      - Alcohol (exposure) Oral cancer (outcome). Smoking is a confounding bias here, Why?
        - Because smoking is related to BOTH the exposure and the outcome.** People who smoke will more often drink alcohol, and people who have oral cancer, were probably smokers (smoking is a known risk factor for oral cancer).
    - Effect modification:**
      - OCPs (exposure) Breast cancer (outcome). Family history of breast cancer is an effect modification here.
      - Asbestos (exposure) Lung cancer(outcome). Smoking is an effect modification
      - Estrogens (exposure) DVT (outcome). Smoking is an effect modification.
      - The effect modification is ONLY related to the outcome, but NOT to the exposure.** Smoking does not affect neither asbestos exposure nor estrogen levels or intake, BUT definitely is a risk for lung cancer and DVT!
      - Family history of breast cancer has nothing to do with choosing to use OCPs, but definitely has a factor in increasing risk of breast cancer!

**Confounding vs effect modification**

2. Latent period (Latency) is a very important issue to consider when studying disease epidemiology.
  - In most infectious diseases, the latent period (the time elapsed from initial exposure to clinically apparent disease) is relatively short. On the other hand, the pathogenesis of some disease processes (cancer or heart disease) may demonstrate a very long latent period before clinical manifestations develop.
  - The concept of a latency period can also be extended to risk factors and risk reducers. Sometimes, a significant amount of time must pass before exposure to a risk modifier has a clinically evident effect on the disease process. In addition, exposure to a risk modifier may need to occur continuously over a certain period before the disease outcome is affected. For example, at least 1 year of high-dose statin therapy was required to show a significant protective advantage over moderate-dose therapy.
  - Cumulative exposure to a risk factor or risk reducer must sometimes occur for prolonged periods before a clinically significant effect is detected.

## Biostatistics

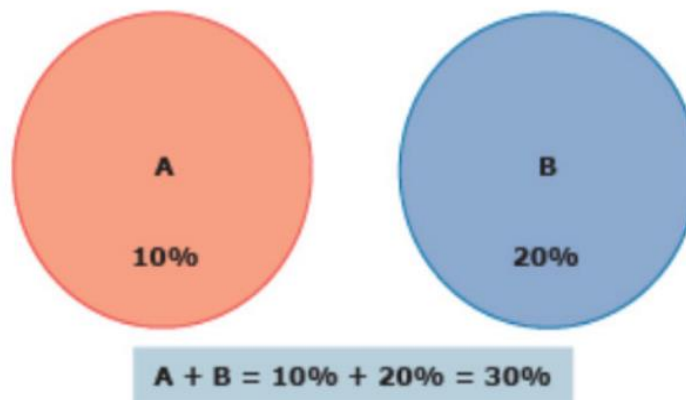
## Answering Probability Questions

## A. Combining Independent Events:

- Independent means that **knowing one probability tells you nothing about the occurrence of another.**
- **Key idea: Multiply probabilities ( $A \times B$ ).**
- **Example:**
  - If the chance of having blond hair is 0.3 and the chance of having a cold is 0.2, the chance of meeting a blond-haired person with a cold is:  $0.3 \times 0.2 = 0.06$  (or 6%).

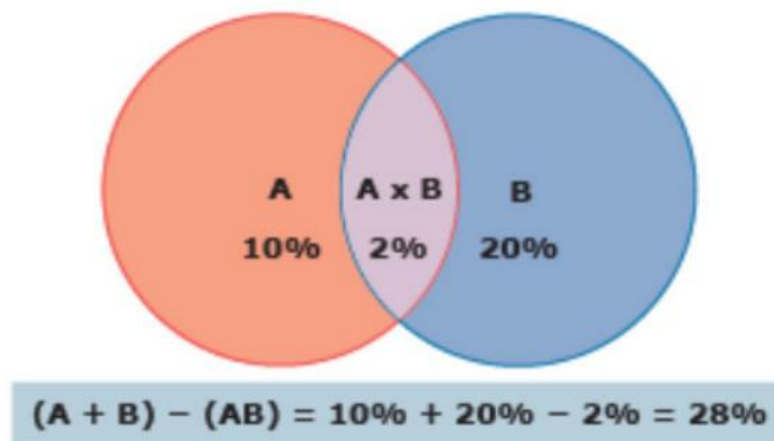
## B. Combining Mutually Exclusive Events:

- Mutually exclusive means **events cannot occur at the same time.**
- **Key idea: Add probabilities together = ( $A + B$ ).**
- **Example:**
  - If a coin lands on heads, it cannot be tails; the two are mutually exclusive. If a coin is flipped, the chance that it will be either heads or tails is:  $0.5 + 0.5 = 1.0$  (or 100%)



C. **Non-mutually Exclusive Events= (A+ B) - (AB)**

- Non-mutually exclusive means **events can occur at the same time**.
- **Key idea: add probabilities together, then subtract the overlap.**
- **Example:**
  - If the chance of having diabetes is 10% and the chance of being obese is 20%, the chance of meeting someone who is obese or has diabetes or both is:  $0.1 + 0.2 - (0.1 \times 0.2) = 0.28$  (or 28%)



## Descriptive Statistics

- Summarizing the data you have to make it understandable and easier to manage.
- Representing the world as a **distribution**.

## Central tendency

A. Mean:

- Mathematical **average**.
- Add together all values and divide by number of observations.
- Most affected by outliers (extreme values).
- Example:
  - The average (or mean) of a dataset is the sum of the values divided by the total number of values. In this example, the average number of UTI episodes per child is the sum (total number) of UTIs divided by the total sample size (total number of children). The total sample size is:  $50 + 30 + 10 + 10 = 100$  children.
  - The total number of UTIs is:  $(0 \times 50) + (1 \times 30) + (2 \times 10) + (3 \times 10) = 0 + 30 + 20 + 30 = 80$  UTIs. The average is obtained by dividing the total number of UTIs (80) by the total sample size (100). Therefore, the average number of UTI episodes per year =  $80/100 = 0.8$  UTIs for a child in this sample

B. Median:

- 50th percentile, middle number.
- The median of an ordered dataset is the number that separates the right half of the data from the left half.
- If even number of observations; add middle 2 numbers and divide by 2.
- Example:
  - If the ordered dataset is (75, 75, 80, 90, 110, 110). There are 6 observations, which is an even number of observations. The median value splits the dataset in half; it lies between 80 and 90 (3 values on the left and 3 values on the right). The median is  $(80 + 90) / 2 = 85$  mm Hg.
  - Now, assume one of the values is missing and the ordered dataset includes the following 5 observations (odd number of observations): (75, 80, 90, 110, 110). In this case, the median value would be 90 mm Hg, which splits the dataset in half (2 values on the left and 2 values on the right).

C. Mode:

- Highest frequency.
- **Most common value.**
- **Least affected by outliers.**

## ❖ N.B:

1. In normal distribution curve, also called bell-shaped curve: **Mean = median = mode.**
2. An outlier is defined as an extreme and unusual observed value in a dataset. It may be the result of a recording error, a measurement error, or a natural phenomenon. It can affect measures of central tendency (mean, median, mode) as well as measures of dispersion (standard deviation, variance).  
**Modes tend to be resistant to outliers.**

## Nonnormal distributions

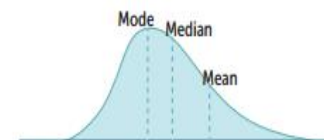
## Bimodal

Suggests two different populations (eg, metabolic polymorphism such as fast vs slow acetylators; age at onset of Hodgkin lymphoma; suicide rate by age).



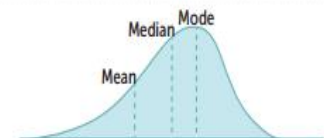
## Positive skew

Typically, mean > median > mode.  
Asymmetry with longer tail on right.



## Negative skew

Typically, mean < median < mode.  
Asymmetry with longer tail on left.





## Measures of Variation

### ❖ Standard Deviation:

- Standard deviation = **how much variability exists from the mean in a set of values.**
- Standard error of the mean = an estimate of how much variability exists between the sample mean and the true population mean.
- Assessing spread around the mean.
- For example, 68% of all the values lie within 1 standard deviation from the mean. The remaining 32% of the values are therefore outside of one standard deviation, with 16% of these above and 16% below one standard deviation from the mean. In addition, 95% of values are within 2 standard deviations from the mean and 99.7% are within 3 standard deviations.
- Think about it as the "average deviation".
- Concept, not calculation is what is needed for the exam.

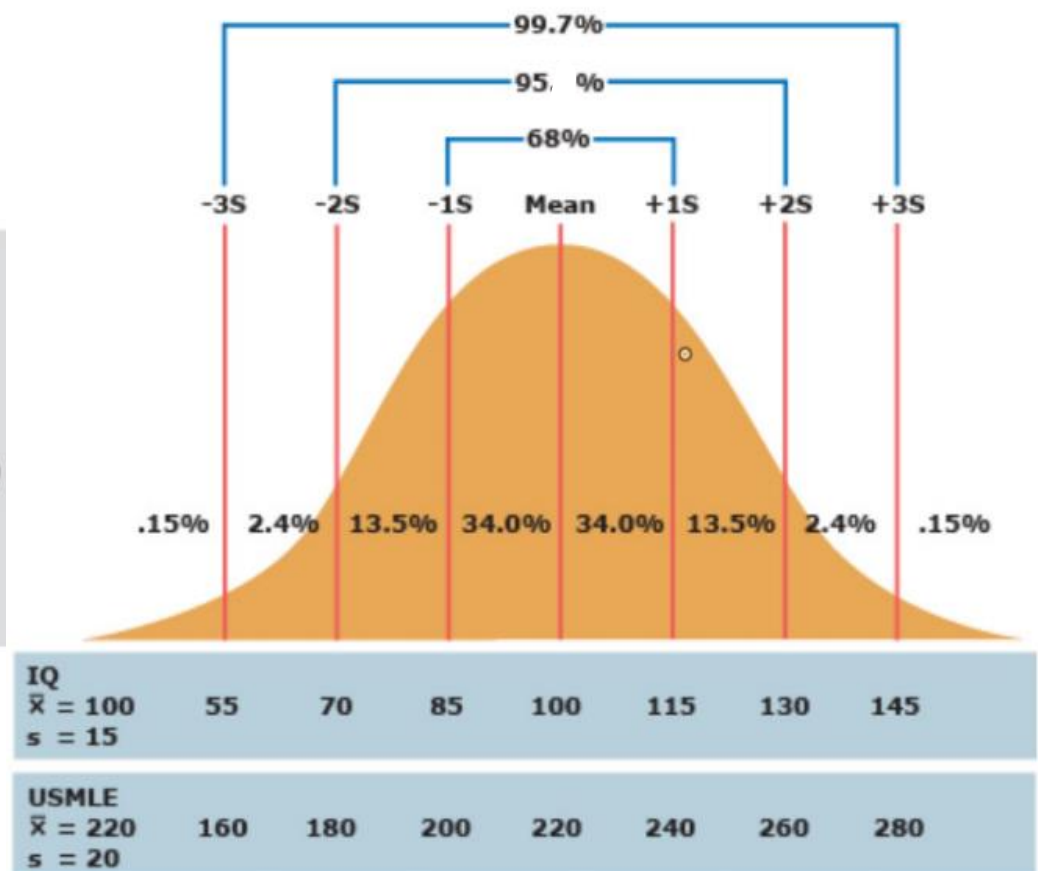
$$S = \sqrt{\frac{\sum(x - \bar{x})^2}{n-1}}$$

s = standard deviation ( $s^2$  = variance)

x = each observation

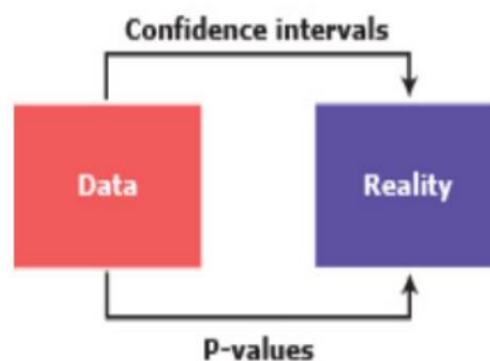
$\bar{x}$  = mean

n = sample size



## Inferential statistics

- Making an inference from the Sample to the population; or Data to reality.
- Inferential statistics would not be necessary if investigators studied all members of a population. However, because we can rarely observe and study entire populations, we try to select samples that are representative of the entire population so that we can generalize the results from the sample to the population.
- Two types of inferential statistics:
  1. Confidence intervals.
  2. P-values.



## Confidence Intervals

- Measured value is understood as an approximation.
- Reality is seen as very likely "around" that measured value.
- A 95% confidence interval (CI) is the range of values in which one can be 95% confident that the true mean of the underlying population falls. The 95% CI (corresponding to  $p = .05$ ) is often used.
- For the 95% CI,  $Z = 1.96$ .
- For the 99% CI,  $Z = 2.58$ .

$$\bar{x} \pm z \left( \frac{s}{\sqrt{n}} \right)$$

- $\bar{x}$  = mean
- $z$  = z-score (standard score)
- $\left( \frac{s}{\sqrt{n}} \right)$  = standard error

## Computing Confidence Interval of The Mean

If on a test:

$$\text{Mean} = 81\% \quad \bar{x} \pm Z (s/\sqrt{n})$$

$$S = 9\% \quad 81 \pm 2 (9/\sqrt{36})$$

$$N = 36 \quad 81 \pm 3$$

Compute 95% CI.



Conclusion: The *real mean* likely falls somewhere between 78 and 84

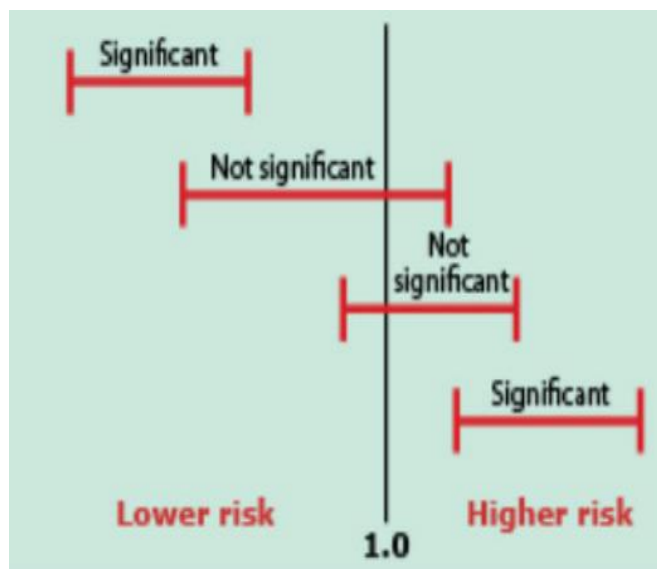
Note: CI does NOT mean:

- 95% of class falls within 78 to 84
- the real mean is most likely 81

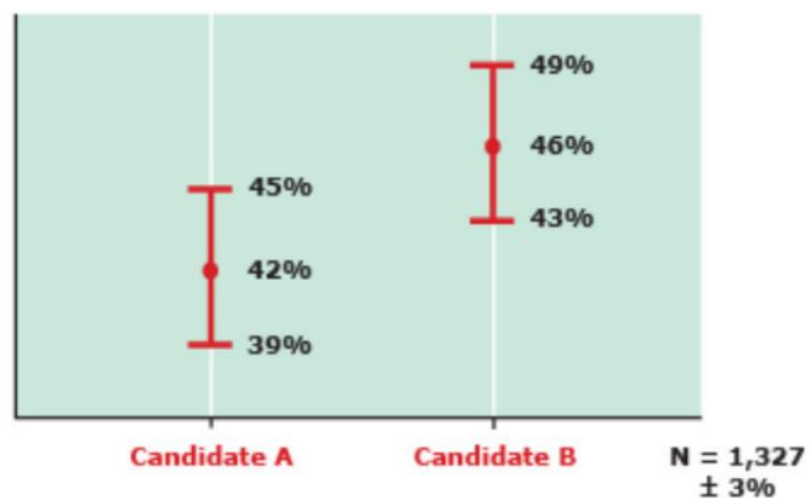
### Interpreting Confidence Intervals for Relative Risks and Odds Ratios

- Use the rule for interpreting relative risks (from cohort studies) or odds ratios (from case-control studies).
- If the 95% CI for odds ratio or relative risk includes 1 → then there is no significant difference and  $H_0$  is not rejected.
- If the 95% CI for a mean difference between 2 variables includes 0 → then there is no significant difference and  $H_0$  is not rejected.
- If the CIs between 2 groups do not overlap → statistically significant difference exists.
- If the CIs between 2 groups overlap → usually no significant difference exists.

	RR	CI	Meaning
Comparison A	2.34	(1.67–2.95)	significant, increased risk
Comparison B	1.97	(0.89–2.88)	not significant
Comparison C	0.64	(0.31–1.14)	not significant
Comparison D	0.73	(.51–.92)	significant, decreased risk



### Interpreting Confidence Interval of the Mean



Q: Is Candidate B leading?

A: No, they are tied. (Difference is within the margin of error.)

### P-Values and Hypothesis Testing

#### 1. Null (H<sub>0</sub>):

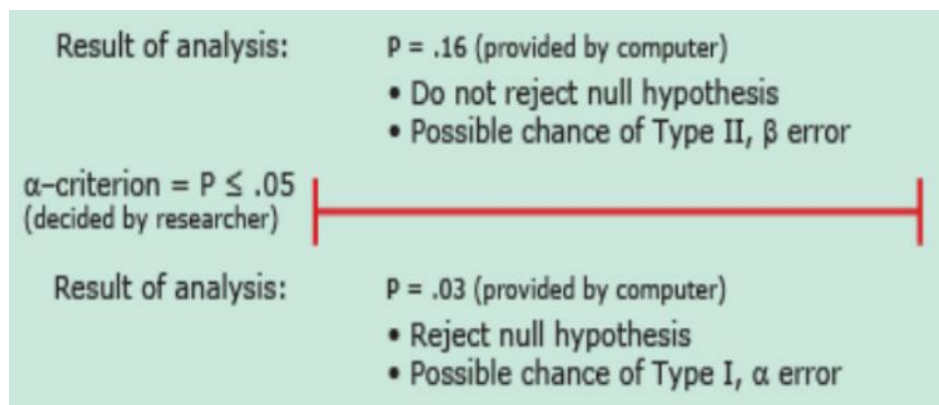
- Hypothesis of **no difference or relationship** (there is no association between the disease and the risk factor in the population).
- Start with the Null Hypothesis (The opposite of what you are trying to show).
- "Null" is a **statement of no effect**.
- If you want to show "The drug works," the null hypothesis is stated as "The drug does not work"
- In other words, any difference observed in the study is due to chance or random factors, not the action of the drug.

- We do not prove the null hypothesis, but hope to reject it. If I reject "The drug does not work," I am left with the alternative, "The drug works."
  - The logic is such that we do not get to prove something. Rather, we accumulate evidence to disprove something.
  - The p-value is the probability of observing a given (or more extreme) result due to chance alone, assuming the null hypothesis is true. A result is generally considered statistically significant when  $p \leq 0.05$ .
2. **Alternative (H1):**
- Hypothesis of **some difference or relationship** (there is some association between the disease and the risk factor in the population).

### Outcomes of statistical hypothesis testing

- Correct result:
    - Stating that there is an effect or difference when one exists (**null hypothesis rejected in favor of alternative hypothesis**).
    - Stating that there is no effect or difference when none exists (**null hypothesis not rejected**).
  - Types of Errors in Statistical Decision Making:
- A. **Type I (alpha error):**
- **Reject the null hypothesis when it is really true.**
  - Stating that there is an effect or difference when none exists (**null hypothesis incorrectly rejected in favor of alternative hypothesis**).
  - Also called false-positive error.
  - $\alpha$  = you **a**ccused an innocent man.
  - **Computed p-value estimates chance of Type I error.** If  $p < 0.05$  for a study outcome, the probability of obtaining that result purely by chance is  $< 5\%$ .
- B. **Type II (beta error):**
- **Not reject the null hypothesis when it is really false.**
  - Stating that there is not an effect or difference when one exists (**null hypothesis is not rejected when it is in fact false**).
  - Also called false-negative error.

- $\beta$  = you **b**lindly let the guilty man go free.
- $\beta$  is related to statistical power ( $1 - \beta$ ), which is the probability of rejecting the null hypothesis when it is false.



	Reality	
	$H_1$	$H_0$
Study rejects $H_0$	Power ( $1 - \beta$ )	$\alpha$ Type I error
Study does not reject $H_0$	$\beta$ Type II error	

Blue shading = correct result.

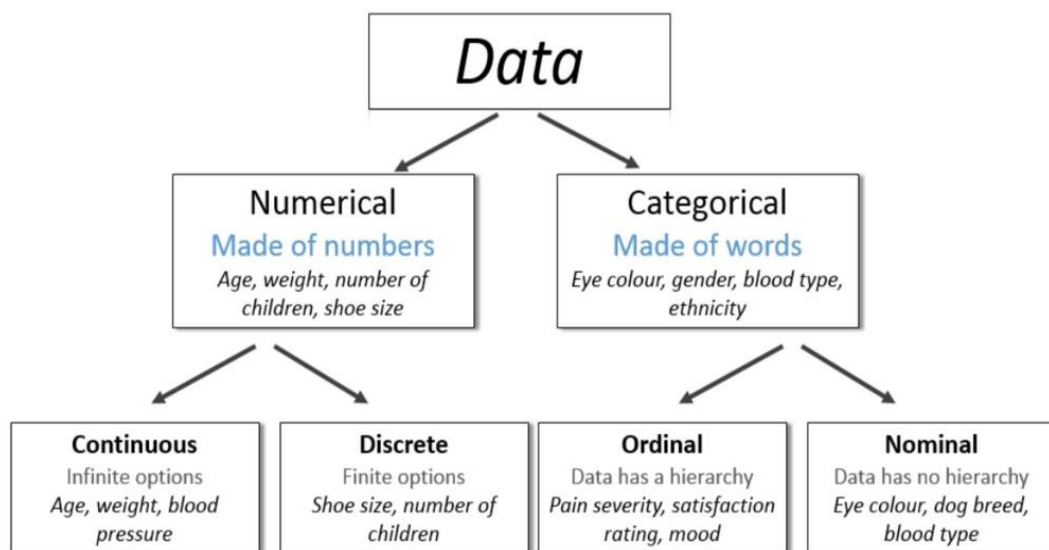
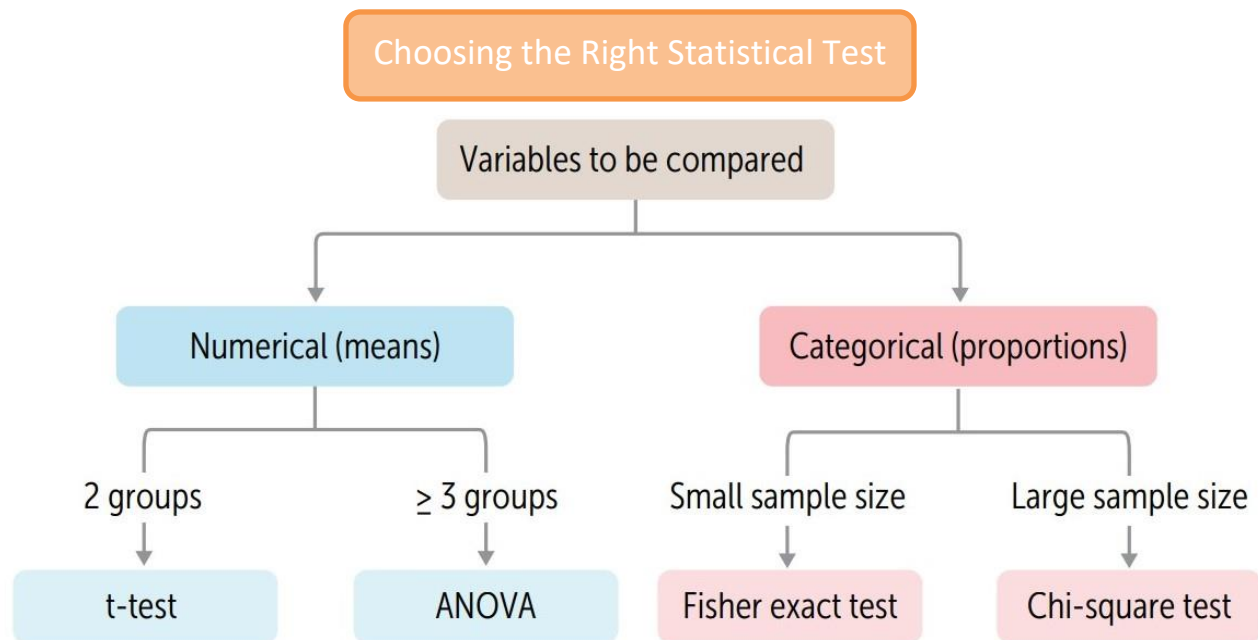
- ❖ N.B:
  - Statistical significance can be expressed with either p values or confidence intervals, but both are interrelated. For instance,  $p < 0.05$  corresponds to a 95% confidence interval that does not contain the null value. Likewise  $p < 0.01$  is equivalent to a 99% confidence interval that does not contain the null value. Conversely, if the null value is within a given confidence interval, then the p value is  $>$  the equivalent confidence interval.

### Statistical Power (1- $\beta$ )

- Definition:
  - It is the probability of rejecting the null hypothesis when it is truly false.
- 1-Power = Type II error.
- Three things increase power:
  - Larger sample size (more information). There is power in numbers.
  - Larger effect size (looking for something bigger).
  - ↑ precision of measurement.
- If you reject the null hypothesis, you must have had enough power. You were able to make a decision.

### Statistical Significance vs. Clinical Significance

1. Statistical Significance Occurs When Computed P Value Is Low Enough:
  - Answers the question: "Is there a difference?"
  - Reject null hypothesis.
  - Chance of Type I error.
2. Clinical Significance Occurs When the Difference We Detect Has Real-World Consequence:
  - P-value does not tell you this.
  - Answers the question: "Is this a difference that matters?"
  - Decide clinical significance based on common sense assessment.
  - Decide based on what seems right to you.
  - Example:
    - Drug A lowers blood pressure (BP) more than Drug B. This difference is statistically significant at  $p = .001$ . However, Drug A lowers BP only 1% more than Drug B. The actual difference is small.
    - Likely conclusion → Strong statistical significance. No real clinical significance.
    - Common reason for this outcome is very large sample size (N).



### T-Test

- T-Test → Checks differences between **means** of **2** groups. **Tea** is **meant** for **2**.
- Example: comparing the mean blood pressure between men and women.
- Compares the means and standard deviations of two groups. Limited to comparing only **two** groups.



**ANOVA**

- Checks differences between means of 3 or more groups.
- 3 words: ANalysis Of VAriance.
- Example: comparing the mean blood pressure between members of 3 different ethnic groups.
- ❖ N.B:
  - A t-test is used to compare the difference between the means of 2 groups. Analysis of variance (ANOVA) compares the difference between the means of 2 or more groups.

**Chi-Square**

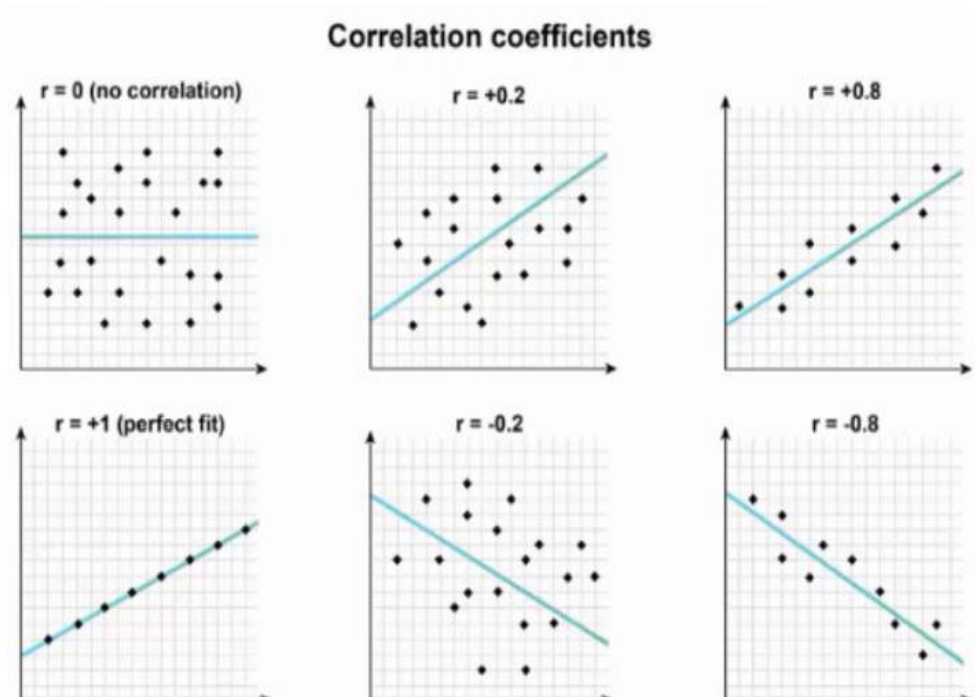
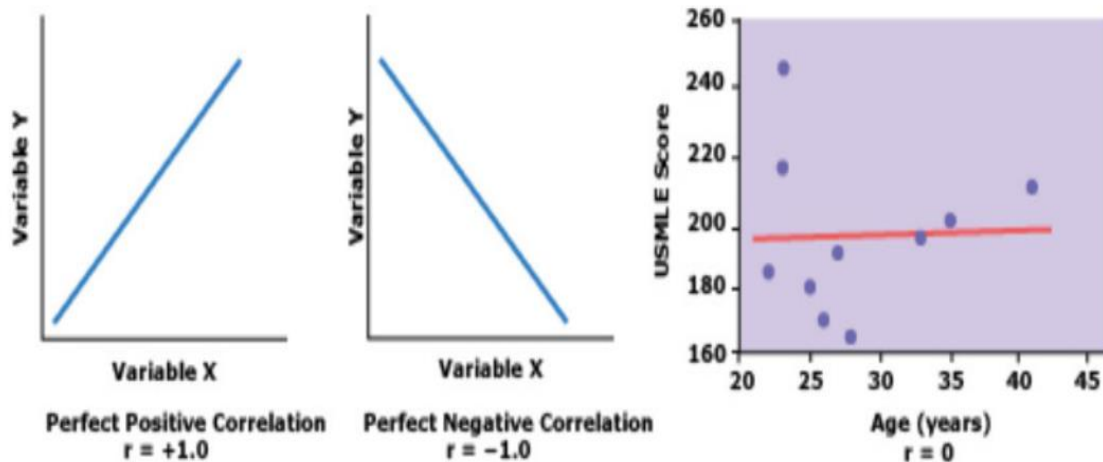
- Checks differences between 2 or more percentages or proportions of categorical outcomes (not mean values).
- Pronounce Chi-tegorical.
- Example: comparing the percentage of members of 3 different ethnic groups who have essential hypertension.

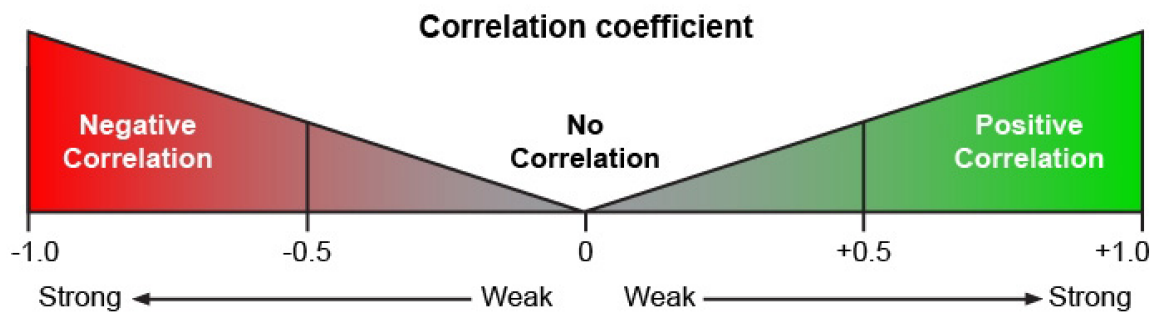
**Fisher's exact test**

- Checks differences between 2 percentages or proportions of categorical, nominal outcomes.
- Use instead of chi-square test with small populations.
- Example: comparing the percentage of 20 men and 20 women with hypertension.

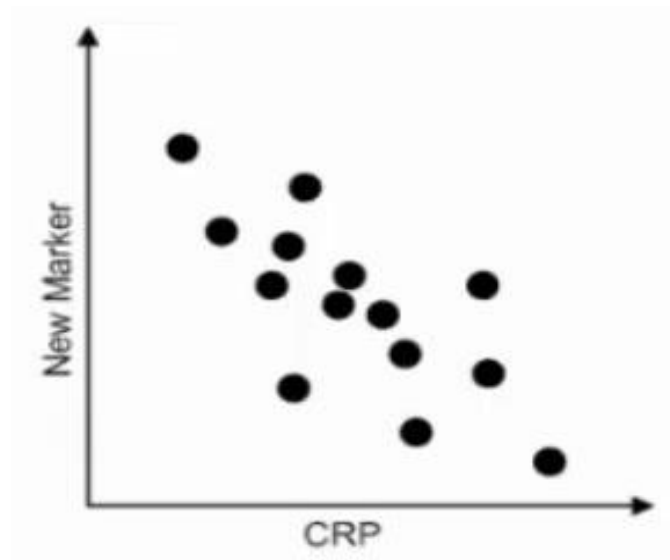
## Pearson Correlation coefficient

- For two interval variables, use Pearson correlation ( $r$ ).
- Ranges from -1.0 to +1.0:
  - **Positive** number → **proportional** relationship (as one variable ↑, the other variable ↑).
  - **Negative** number → **inverse** relationship (as one variable ↑, the other variable ↓).
  - The closer the absolute value of  $r$  is to 1, the stronger the linear correlation between the 2 variables, either positive or negative.
  - A correlation coefficient of 0 → **there is no association** (a random distribution).





- Based on the plot below, the correlation coefficient between the 2 variables is closest to which of the following values?
- In this case, the scatter plot shows a **linear association** between the blood level of the new marker and that of CRP, so we know that the correlation coefficient is not 0.
- The scatter plot above shows that an **increase in CRP level is associated with a decrease in the new marker's level**. Therefore, you should expect the correlation coefficient to be **negative**.
- That leaves only the two negative values, -0.2 and -0.8. Although the scatter plot does not demonstrate a perfect linear arrangement of measurements, the plot appears to demonstrate a **reasonably strong linear association**. Thus, a correlation coefficient value of -0.8 is the most appropriate answer among the options given.



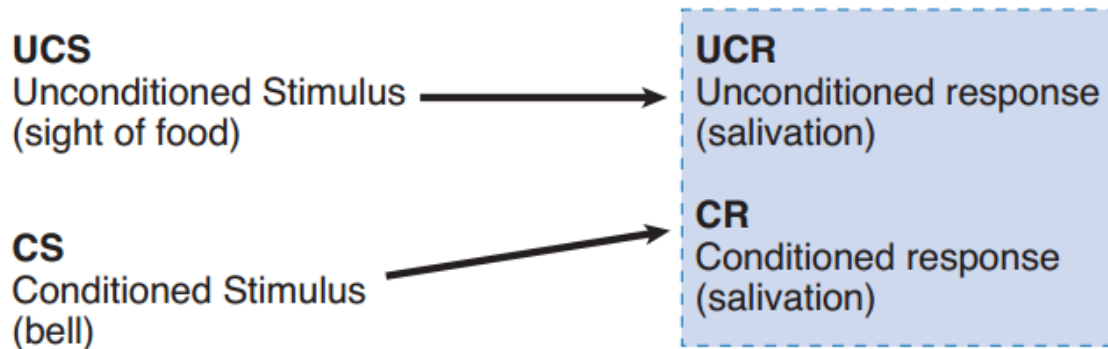


## **CHAPTER 2**

# **Psychology**

## Learning and Behavioral Change

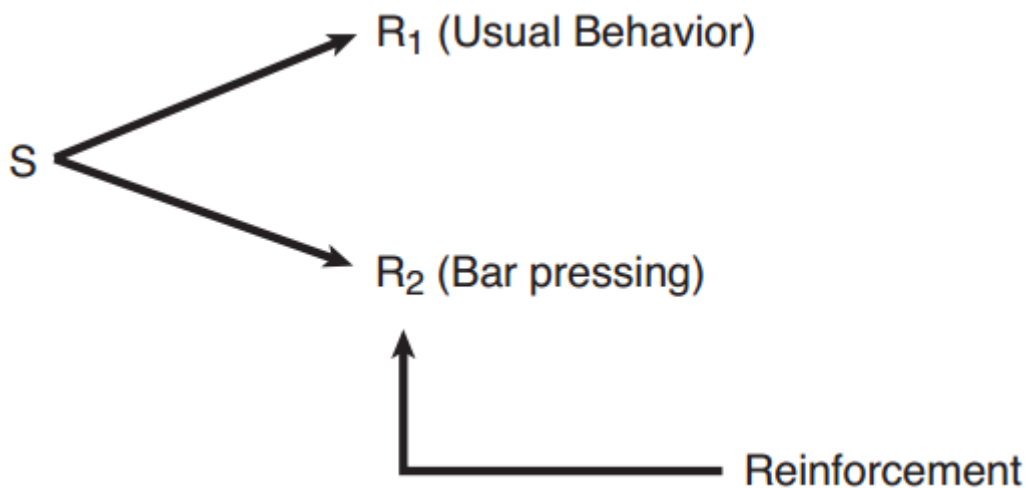
## A. Classical Conditioning



- In classical conditioning, the conditioned response is elicited by the conditioned stimulus after repeated pairings of the UCS and CS.
  - The Pavlovian experiment paired the ringing of a bell with the bringing of food so that, eventually, the sound of the bell elicited the salivatory response, which previously occurred only with the sight of the food.
  - Or, for example, a patient receives chemotherapy (UCS), which induces nausea (UCR). Eventually, the sights and sounds of the hospital alone (CS) elicit nausea (now a CR).
- ❖ Extinction:
- After learning has occurred, **removal of the pairing between the UCS and the CS results in a decreased probability that the conditioned response will be made.**

## B. Operant or Instrumental Conditioning

- In operant conditioning, a new response is emitted, perhaps randomly at first, which results in a consequence. The consequence acts as reinforcement and changes the probability of the response's future occurrence.
- In the Skinner experiment, pressing a lever resulting in the delivery of food. After receiving food, the bar-pressing behavior increased. Because it changed behavior, the food is a reinforcing event.



- Reinforcement is delivery of a consequence that increases the likelihood that a response will occur. A reinforcer is defined by its effects. Any stimulus is a reinforcer if it increases the probability of a response.
- **Types of reinforcers:**
  - A. A positive reinforcer is a stimulus that, **when applied** following an operant response, strengthens the probability of that response occurring.
    - **Example:**
      - Giving money to child for good grades.
      - Giving a child praise when he says thank you.
  - B. A negative reinforcer is a stimulus that, **when removed** following an operant response, strengthens the probability of that response occurring.
    - **Example:** Loud buzz to put on the seatbelt.
- Positive and negative do not imply good and bad, respectively. Rather, positive defines adding a stimulus and negative means removing a stimulus. **Both positive and negative reinforcement lead to an increase in response frequency or strength.**
- Punishment, like negative conditioning, **usually uses a noxious stimulus. However, this stimulus is imposed to weaken response.** Ordinarily, punishment should be paired with positive reinforcement for alternative behaviors.
  - **Examples:**
    - Going to jail for breaking the rules.
    - Speeding tickets when you pass the speed limit.
- Extinction refers to **the disappearance of a response when it is no longer being reinforced.**

**Types of Reinforcement**

Stimulus: (S)			
Behavior: (R)	Add		Remove
	<b>Stops</b>	Punishment	Extinction
	<b>Increases</b>	Positive reinforcement	Negative reinforcement

**C. Modeling, Observational, or Social Learning**

- Watching someone else get reinforcement is enough to change behavior.
- Correlating the effects of watching violence on television with committing violence “in the real world” stems from this concept.



### Behavior therapy and behavior modification

- Focus on treating symptoms directly rather than changing underlying internal conflicts.

### Therapy/Modification Based on Classical Conditioning

#### A. Systematic desensitization:

- Usually begins with **imagining oneself in a progression of fearful situations and using relaxation strategies that compete with anxiety.**
- Often used to treat **anxiety and phobias.**
- Based on the counterconditioning or reciprocal inhibition of anxiety responses:
  - i. **Step 1:** Hierarchy of fear-eliciting stimuli is created, building **from least to most stressful.**
  - ii. **Step 2:** Therapist teaches the technique of muscle relaxation, a response that is incompatible with anxiety.
  - iii. **Step 3:** Patient is taught to relax in the presence, real or imagined, of each stimulus on the hierarchy from least to most stressful.
    - When the person is relaxed in the presence of the feared stimulus, objectively, there is no more phobia.

#### B. Exposure:

- Simple phobias can sometimes be treated by **forced exposure to the feared object.**
- Exposure maintained until fear response is extinguished.
- Example: fear of heights treated by having patient to ride up elevator.

#### C. Aversive conditioning:

- Occurs when a stimulus that produces deviant behavior is paired with an aversive stimulus.
- Used **in the treatment of alcoholism.**
- Example:
  - An alcoholic is given a nausea-inducing drug (**disulfiram**) whenever he drinks so that drinking eventually comes to elicit **unpleasant rather than pleasant events.**

### Therapy/Modification Based on Operant Conditioning

#### A. **Shaping (or successive approximations):**

- Achieves final target behavior by **reinforcing successive approximations of the desired response**.
- Reinforcement is gradually modified to move behaviors from the more general to the specific responses desired.
- **Example:**
  - An autistic boy who won't speak is first reinforced, perhaps with candy, for any utterance. From those utterances, the appropriate phonemes are selected and reinforced until the child utters the sought-after sounds. Eventually, reinforcement is contingent on his using speech correctly in the proper context.

#### B. **Extinction:**

- **Discontinuing the reinforcement that is maintaining an undesired behavior.**
- **Example:**
  - If complaining results in a patient receiving a lot of attention, stopping the attention will eventually stop the undesired behavior.

#### C. **Stimulus control:**

- Sometimes stimuli inadvertently acquire control over behavior.
- When this is true, **removal of that stimulus can extinguish the response**.
- **Example:**
  - A person's eating behavior is tied to a particular stimulus, such as television watching. Reducing the time watching television should reduce the amount eaten.
  - An insomniac is permitted in his bed only when he is so tired that he falls asleep almost at once.

#### D. **Fading:**

- **Gradually removing the reinforcement without the subject discerning the difference.**
- **Example:**
  - Promoting smoking cessation by reducing the nicotine content of the cigarettes gradually and "silently" over a period of time.
  - Gradually replacing postoperative painkiller with a placebo.

## Defense mechanisms

- Defense mechanisms are a concept born out of Freudian psychology.
- Recall that the Freudian psyche consists of:
  - **Id:** animalistic, instinctive urges, sex, aggression, and other primary processes (**Impulses from self**).
  - **Ego:** rational and language-based executors linking to reality (**Problem-solving**).
  - **Super-ego:** the conscience, the moral compass insisting on socially acceptable behavior (**Values from others**).
- Defense mechanisms are means of protecting oneself from awareness of uncomfortable feelings. They can be classified as immature or mature:
  - Immature defense mechanisms are maladaptive and generally seen in children and in psychopathologic states.
  - Mature defense mechanisms are more often used by adults and **allow for a healthy adaptive response to emotional distress**.
- Psychopathology is an **issue of intensity and extent**. Psychopathology = **too much all at once, or for too extended a period of time**.
- All defenses are **unconscious**, with one exception: **suppression**.

## Immature Defense Mechanisms

- A. **Projection:**
- Seeing what is within self as part of the outside world, either the general environment or a particular person "**Self, seen in others**"
  - What is in self is projected onto others the way a movie projector puts the movie on the screen.
  - Examples:
    - **Man accuses his wife of having an affair, when he is attracted to his new work colleague.**

**B. Identification:**

- Identification refers to modeling one's behavior after someone who is perceived to be more powerful or prestigious (**unconscious imitation**).
- Reverse process of projection.
- Examples:
  - A resident starts putting his stethoscope in his pocket like his favorite attending, instead of wearing it around his neck like before.
- When conscious, we call this imitation.

**C. Denial:**

- Avoiding the awareness of some painful reality.
- First stage of grief.
- Often seen in substance-use disorders.
- Examples:
  - "Those tests may say I have cancer, but they are wrong".
  - "The bank statement says I'm out of money, but that just can't be right!".

**D. Splitting:**

- The world seen in terms of extremes.
- **Things seen as "all good" or "all bad"**. Can rapidly shift from one to the other.
- **Splitting is commonly seen in borderline personality disorder** and can contribute to the unstable relationships and mood instability that characterize this disorder.
- Examples:
  - "You are the best doctor in the world. My old doctor was a malpractice nightmare"

**E. Idealization:**

- Expressing extremely positive thoughts of self and others while ignoring negative thoughts.
- Examples:
  - A patient boasts about his physician and his accomplishments while ignoring any flaws.

F. **Repression:**

- Involuntarily withholding an idea or feeling from conscious awareness.
- Involves "unconscious forgetting, with retrieval essentially impossible".
- Examples:
  - A person who was a prisoner of war cannot recall a period in captivity.
  - A boy who was sexually abused cannot recall time spent with his uncle.
- Contrast with suppression.

G. **Displacement:**

- Redirecting emotion or behavior to a different target. Usually impulses are redirected to a less threatening, lower status target.
- Person is not aware of doing this (unconscious).
- Examples:
  - A person who is angry at the boss yells at the spouse instead.
  - The resident was shamed and angered by being reprimanded by the attending and instead of acknowledging his feelings, he displaces his negative emotions onto a "safer" target by making sarcastic, shaming comments to a junior member of the team.

H. **Acting Out:**

- Subconsciously coping with stressors or emotional conflict using actions rather than reflections or feelings.
- Emotional outburst is not what the person actually feels, but a covering up of actual feelings.
- Common covering behaviors: Getting drunk, driving fast, overeating, having sex, playing music loudly, getting into fights.
- Differentiate from displacement.

I. **Regression:**

- Involuntarily turning back the maturational clock and going back to earlier modes of dealing with the world.
- Regression often happens when people are tired, afraid, hungry, or in pain. Frequently seen in medical settings.
- Children, although young, can still regress.

- Examples:

- An adult act like a child. "Baby talk" between sweethearts.
- A previously toilet-trained child develops enuresis after his baby brother is born.
- A patient breaks down crying hysterically when told bad news.
- A patient began sleeping in his parents' room due to anxiety about being alone, which is more characteristic of an earlier developmental stage.

J. Somatization:

- Real, objective physical symptoms produced by psychological processes.

- Feelings manifest as physical symptoms "Symptom replaces anxiety".

- Examples:

- Woman says she is not sad about her divorce, but complains of headaches and GI upset.
- Getting a headache while taking an exam.

- At the extreme, produces the somatoform disorders.

K. Isolation of Affect:

- Cognitive aspects of experience are retained while emotion is discarded "Facts retained, feelings disposed".

- Examples:

- Woman who was raped discusses the events without any emotion.
- A surgeon tells a patient about negative results without empathy or sensitivity.

L. Intellectualization:

- Emotion removed and replaced by excess cognition.

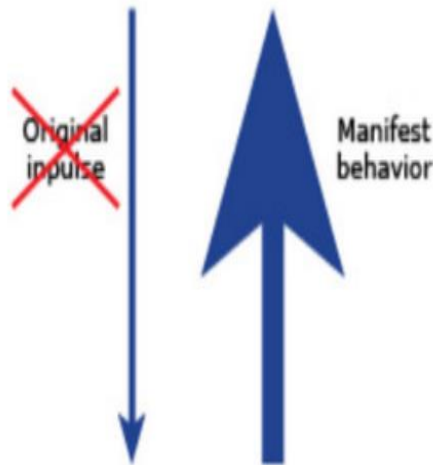
- Intellectualization is the transformation of an emotionally difficult event into a purely intellectual problem to avoid confronting its uncomfortable emotional components.

- Examples:

- The patient keeps working (another intellectual focus) and discussing details of his medical condition (cancer diagnosis), but not his feelings, with his family interferes with the patient's ability to deal with his feelings and to grieve with his family.

**M. Reaction Formation:**

- Transforming **unacceptable** or unattainable emotion into its **extreme opposite**.
- An exact attitude reversal: Love - hate, joy- despair.
- Examples:
  - A mother who does not want her new baby is very solicitous and overprotective.
  - A patient with libidinous thoughts enters a monastery.

**N. Undoing:**

- An action that reverses or fixes the unacceptable or intolerable sense of making things right again; fixing or atoning.
- Examples:
  - A man who is sexually aroused by woman he meets immediately leaves and buys his wife flowers.

**O. Rationalization:**

- Proclaiming logical reasons for actions actually performed for other reasons, usually to avoid self-blame "**Unconscious justification**".
- Examples:
  - After getting fired, claiming that the job was not important anyway.
  - "Yes, we killed women and children, but we were at war".
  - "If the room were not so dam noisy, I would have done better on the exam."

P. **Passive Aggressive:**

- Passive aggression is the expression of angry feelings in a nonconfrontational manner.
- Expectation of action followed by inaction.
- Examples:
  - A woman makes a date to meet someone at a restaurant but does not show up.
  - A professor ignores questions from a particular student after class but answers questions for others.

Q. **Dissociation:**

- Splitting off of the brain from conscious awareness.
- Person is having an experience, but is shielded from feeling the full emotional weight of events.
- Example:
  - A woman who was raped says that during the rape she felt as if she were floating on the ceiling instead of being within her own body (depersonalization).

**Mature Defense Mechanisms**A. **Humor:**

- Venting of unpleasant feelings by laughter.
- A way to recognize and cope with an unpleasant reality without being overwhelmed by it.
- Examples:
  - Joking about failing the board exam.

B. **Suppression:**

- Suppression is a mature defense mechanism in which an individual intentionally puts aside unpleasant thoughts or feelings to better cope with the present reality. In contrast to repression, the individual is aware of the emotion but decides not to attend to it.
- Person has the ability to access the emotion later and accept it.
- A medical student forgets about his workload while at a party, but then remembers the test he has to study for as he returns to his room.
- Different from repression in that content can be recalled.

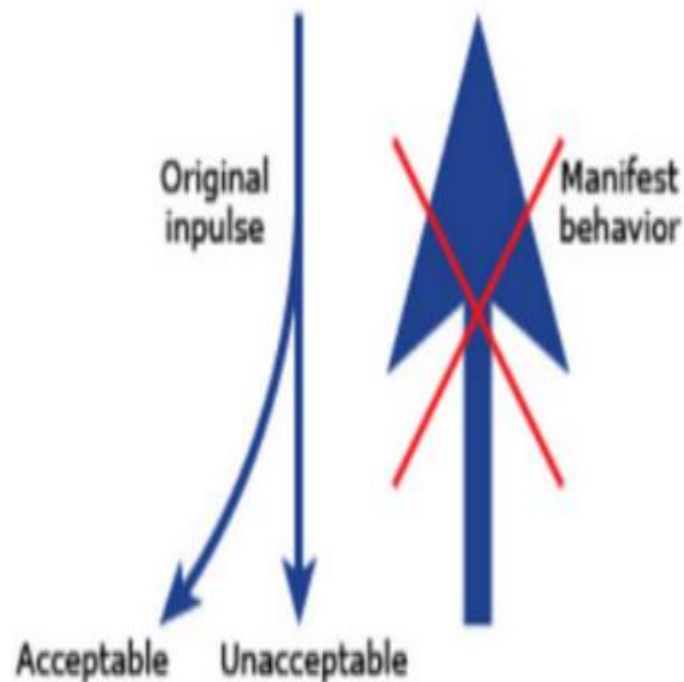


C. **Altruism:**

- Helping others without apparent return to self.
- Person gets **unconscious benefit** from:
  - Making the world a better place.
  - Relieving guilt that we have that others do not.
  - Storing up credits to balance out future bad behaviors.
- Examples:
  - A man who lost a leg in an accident volunteers at camps for children with physical disabilities.
  - **Mafia boss makes large donation to charity.**
  - A wealthy woman volunteers weekly at a soup kitchen for the poor.

D. **Sublimation:**

- Replacing an unacceptable wish with a course of action that is similar to the wish but socially acceptable (vs reaction formation).
- Examples:
  - Intense hostility and anger are redirected by choosing boxing as a sport.
  - Professor becomes a helpful mentor for a female student to whom he is attracted.
  - Becoming a nutritionist to overcome personal obesity.



### Key defense mechanisms

<b>Immature</b>	<ul style="list-style-type: none"> <li>• Acting out: Expressing unacceptable feelings through actions</li> <li>• Denial: Behaving as if an aspect of reality does not exist</li> <li>• Displacement: Transferring feelings to less threatening object/person</li> <li>• Intellectualization: Focusing on nonemotional aspects to avoid distressing feelings</li> <li>• Passive aggression: Avoiding conflict by expressing hostility covertly</li> <li>• Projection: Attributing one's own feelings to others</li> <li>• Rationalization: Justifying behavior to avoid difficult truths</li> <li>• Reaction formation: Transforming unacceptable feelings/impulses into the opposite</li> <li>• Regression: Reverting to earlier developmental stage</li> <li>• Splitting: Experiencing a person/situation as either all positive or all negative</li> </ul>
<b>Mature</b>	<ul style="list-style-type: none"> <li>• Sublimation: Channeling impulses into socially acceptable behaviors</li> <li>• Suppression: Putting unwanted feelings aside to cope with reality</li> </ul>

### Transference and countertransference

- In transference, **emotions and reactions to someone in the past are unconsciously carried forward and applied to someone in the present.**
- Patient toward doctor = transference.
- Doctor to patient = countertransference.
- Unconscious process, but not a defense mechanism.
- **Can be positive or negative** and frequently affect doctor-patient relationships.

## **CHAPTER 3**

# **Psychiatry**

## Types of Abuse

## Child Abuse

	Physical abuse	Sexual abuse
<b>Signs</b>	<p>Fractures, bruises, or burns.</p> <p>Injuries often in <b>different stages of healing</b> or in patterns resembling possible implements of injury.</p> <p>Includes abusive head trauma (shaken baby syndrome), characterized by subdural hematomas or retinal hemorrhages.</p> <p>Caregivers may delay seeking medical attention for the child or provide explanations inconsistent with the child's developmental stage or pattern of injury.</p>	<p><b>STIs, UTIs, and genital, anal, or oral trauma.</b></p> <p>Most often, there are no physical signs; sexual abuse should not be excluded from a differential diagnosis in the absence of physical trauma.</p> <p>Children often <b>exhibit sexual knowledge or behavior incongruent with their age.</b></p>
<b>Epidemiology</b>	40% of deaths related to child abuse or neglect occur in children < 1 year old.	Peak incidence 9-12 years old.

- Child neglect:

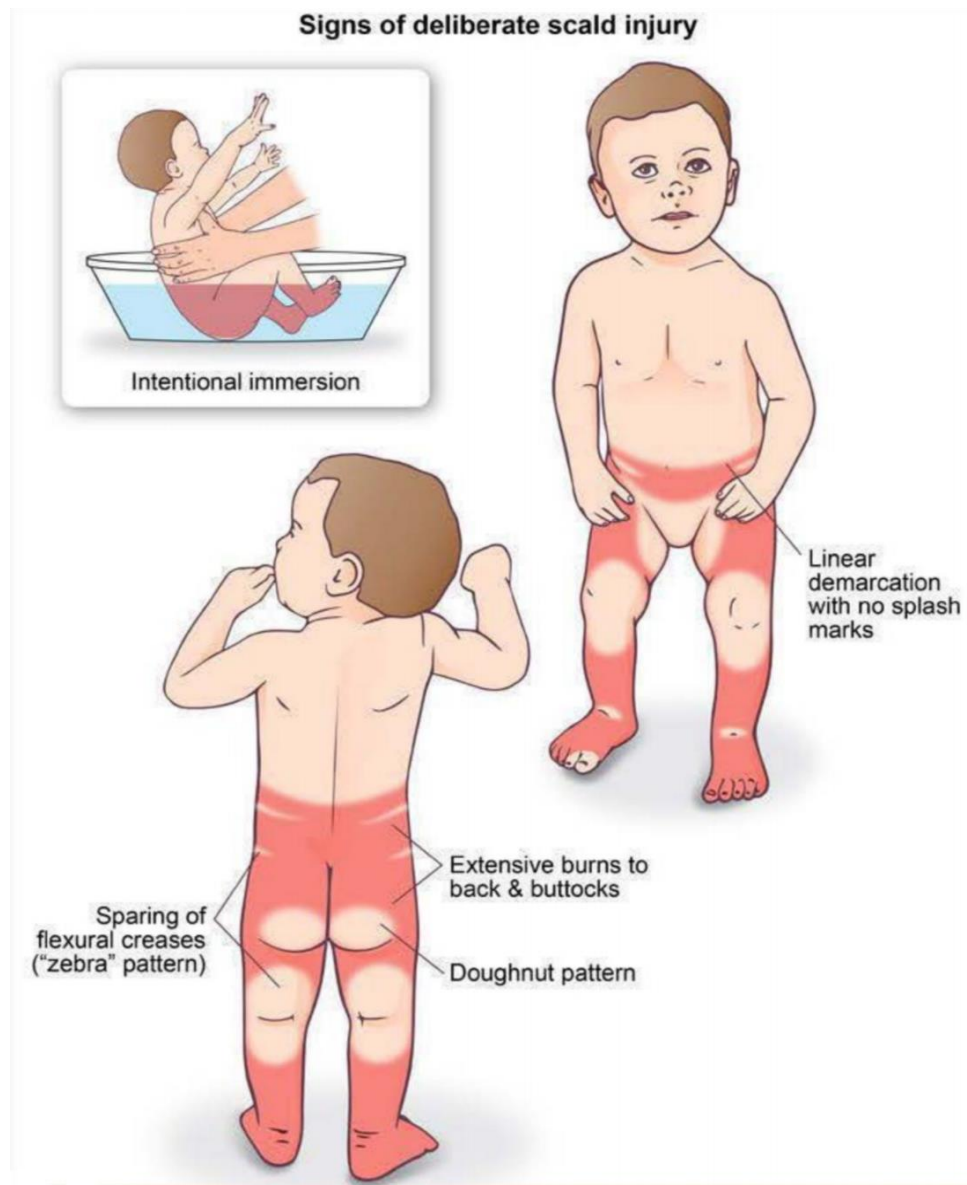
- Failure to provide a child with adequate food, shelter, supervision, education, and/or affection.
- **Most common form of child maltreatment.**
- Deprivation **for > 6 months** can lead to **irreversible** changes.
- **Severe** deprivation can result in **infant death**.
- Evidence: poor hygiene, malnutrition, withdrawal, impaired social/emotional development, failure to thrive.
- **As with child abuse, suspected child neglect must be reported to local child protective services.**

- Vulnerable child syndrome:

- Parents perceive the child as especially susceptible to illness or injury.
- **Usually follows a serious illness or life-threatening event.**
- Can result in missed school or overuse of medical services.

## ❖ N.B:

1. **Child abuse is a mandatory reportable offense up to age 18.**
    - Failure to do so is criminal offense.
    - If case is reported in error, the physician is protected from legal liability.
    - Remember your duty to protect the child (separate from the parents), as well as the duty to report.
    - Physicians should have a high index of suspicion for physical/sexual abuse in children with sudden behavioral problems, stressful family environments, or parents with active drug/alcohol abuse.
  2. Deliberate scald injuries are characterized by sharp lines of demarcation, uniform burn depth, and spared flexor surfaces.
- In contrast, splash marks, poorly defined wound margins, non-uniform burn depth, and immediate presentation after injury are all features of accidents.



### Domestic Violence

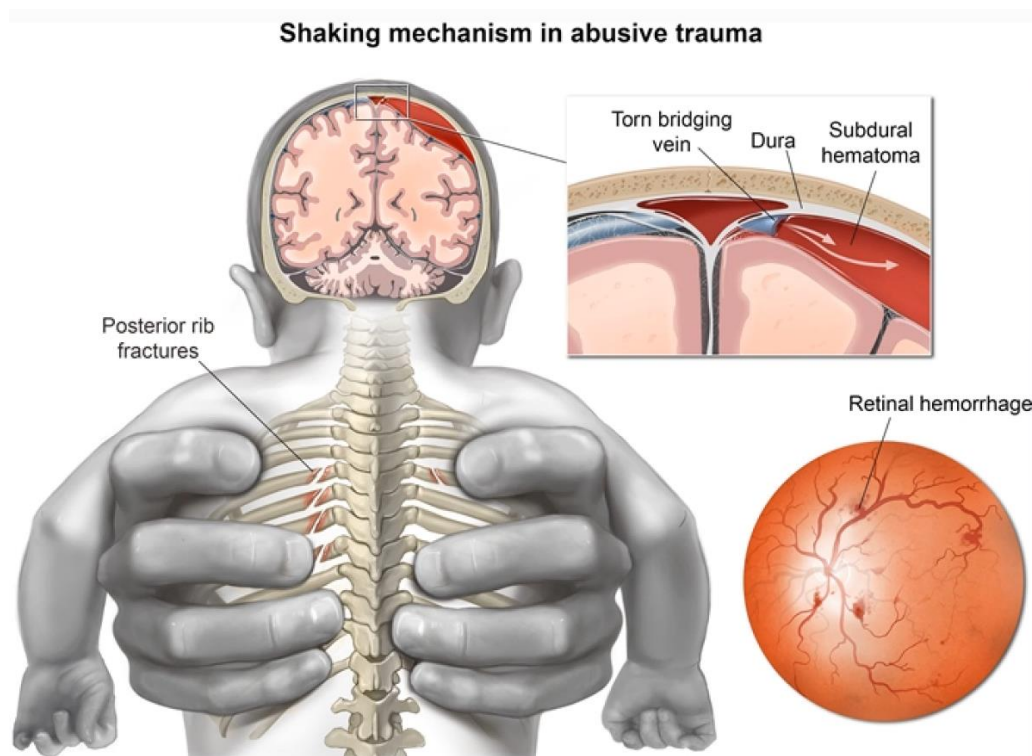
- Not a mandatory reportable offense in most states.
- Most frequent cause of injury to women in the United States.
- Abusers are typically male with a history of substance abuse, impulsivity, poor anger control, low tolerance for frustration, and poor self-esteem.
- Victims are typically financially and/or emotionally dependent with low self-esteem.
- Reasons victim returns to abuser:
  - Financial dependence on abuser.
  - No plan of escape.
- Physician should:
  - Document the abuse.
  - Ensure the safety of the abused person.
  - Help the abused person develop an emergency escape plan.
  - Encourage the abused person to report to law enforcement officials.

### Elder Abuse

- Mandatory reportable offense, age 65 and over.
- Includes: Physical, psychological, financial, neglect (most common).
- Caregiver is most frequent abuser, then spouse.
- Clinicians have ethical and moral obligations to report elder abuse, neglect, and exploitation. If there is reason to suspect abuse or neglect, the patient should be interviewed alone to avoid intimidation by possible abusers.

## Shaken baby syndrome

- Abusive head trauma (shaken baby syndrome) is the most common cause of death from child abuse.
- The most common mechanism of inflicted injury in infants involves violent shaking.
- Biological parents who are young, single, uneducated, or have a history of child abuse are the most common perpetrators.
- Infants are particularly susceptible to intracranial injury as they have a relatively large, heavy head, weak neck musculature, immature brain myelination, and a soft brain with higher water content.
- Repetitive acceleration-deceleration forces cause shearing of the dural veins and vitreoretinal traction.
- Repetitive acceleration-deceleration forces cause shearing of the dural veins and coup-contrecoup injury with brain impact on the skull. Subdural bleeding can manifest as seizures, increasing head circumference, bulging/tense anterior fontanelle, and altered mental status.
- In addition, shaking causes vitreoretinal traction and retinal hemorrhages, a virtually pathognomonic finding for abusive head trauma.
- The patient should undergo noncontrast head CT scan to evaluate for intracranial injury, fundoscopic examination to exclude retinal hemorrhage and a skeletal survey to identify other injuries.
- Hospitalization is required to ensure the child's safety from the abuser; child protective services must be notified immediately



## Human sexuality

## Definitions

- **Gender identity:** established by the age of 3, sense of maleness or femaleness.
- **Sexual identity:** based on your secondary sexual characteristics.
- **Gender role:** behavior based on your gender identity.
- **Sexual orientation:** based on your love objects.
- **Gender dysphoria:**
  - Strong, persistent cross-gender identification that leads to persistent discomfort with sex assigned at birth, causing significant distress and/or impaired functioning and is often associated with comorbid depression and anxiety. Transgender individuals may have gender dysphoric disorder.
  - Physicians should provide nonjudgmental support and encourage the involvement of supportive family/friends as early as possible.
  - Adolescents with gender dysphoria are at increased risk of depression, anxiety, and bullying, which should be monitored, and they may benefit from mental health evaluation and treatment in addition to medical interventions.
  - Transsexualism: desire to live as the opposite sex, often through surgery or hormone treatment.

Gender dysphoria	
<b>Clinical features</b>	<ul style="list-style-type: none"> <li>• Experiences persistent (≥6 months) incongruence between assigned &amp; felt gender</li> <li>• Desires to be other gender</li> <li>• Dislikes own anatomy, desires sexual traits of other gender</li> <li>• Believes feelings/reactions are of other gender</li> <li>• Feels significant distress/impairment</li> </ul>
<b>Initial management (tailored to individual needs)</b>	<ul style="list-style-type: none"> <li>• Assessment of safety</li> <li>• Support; psychotherapy (individual, family)</li> <li>• Referral to specialist services (medical &amp; mental health multidisciplinary)</li> </ul>



## Paraphilic disorders

- **Pedophilia:** sexual urges toward **children**. Most common paraphilia.
- **Exhibitionism:** recurrent desire to **expose** genitals to stranger.
- **Voyeurism:** sexual pleasure from **watching** others who are naked, grooming, or having sex. Begins early in childhood.
- **Sadism:** sexual pleasure derived from **others' pain**.
- **Masochism:** sexual pleasure derived from **being abused or dominated**.
- **Fetishism:** sexual focus on **objects**, e.g., shoes, stockings.
- **Transvestite fetishism:** fantasies or actual dressing by heterosexual men in **female clothes** for sexual arousal.
- **Frotteurism:** male rubbing of genitals against fully clothed woman to achieve orgasm; **subways and buses**.
- **Zoophilia:** **animals** preferred in sexual fantasies or practices.
- **Coprophilia:** combining sex and **defecation**.
- **Urophilia:** combining sex and **urination**.
- **Necrophilia:** preferred sex with **cadavers**.

## Sexual dysfunction

- Includes sexual **desire disorders** (hypoactive sexual desire or sexual aversion), sexual **arousal disorders** (erectile dysfunction), **orgasmic disorders** (anorgasmia, premature ejaculation), sexual **pain disorders** (dyspareunia, vaginismus).
- Differential diagnosis includes:
  - Drugs (antihypertensives "Beta blockers", neuroleptics, SSRIs, ethanol).
  - Diseases (depression, diabetes, STIs).
  - Psychological (performance anxiety).
  - Genitourinary trauma (prostatectomy).

❖ N.B:

1. Psychogenic causes of ED account for approximately 10% of cases and include performance anxiety, sexual partner dissatisfaction, and marital problems.
  - Important clues that point toward psychogenic impotence include sudden onset and the presence of morning erections.
2. Toddlers are normally curious about the human body.
  - It is normal for them to touch their own or other young children's genitals, to undress themselves or others, and make masturbatory movements. These behaviors are typically brief, intermittent, and distractible. Simulating the details of sexual acts or using age-inappropriate sexual knowledge, however, should raise concern for possible abuse.
  - These behaviors typically decrease as children approach adolescence, becoming more aware of social norms and expectations and having an increased need for privacy.

### Sexuality and aging

- Sexual interest does not decline significantly with aging.
- Changes in men:
  - Slower erection.
  - More stimulation needed.
  - Longer refractory period.
- Changes in women:
  - Vaginal dryness.
  - Vaginal thinning.
  - Can be reduced by estrogen replacement.

## Suicide

- Men commit suicide 4 times as often as women. Women attempt suicide 3 times as often as men (Women try more often; men succeed more often).
- Most common method in US is firearms; access to guns ↑ risk of suicide completion.
- The majority of completed suicides occur with the use of a firearm. Access to guns significantly increases the risk of death by suicide. Evaluation of a patient's access to guns is a key part of suicide risk assessment.
- Risk factors for suicide completion:
  - Sex (male).
  - Age (young adult or elderly).
  - Depression.
  - Previous attempt (a history of previous suicide attempt is the strongest single risk factor for suicide).
  - Ethanol or drug use.
  - Rational thinking loss (psychosis).
  - Sickness (medical illness).
  - Organized plan.
  - No spouse or other social support.
  - Stated future intent.
  - SAD PERSONS are more likely to complete suicide.
- ❖ N.B:
  - Active suicidality is associated with intent and plan for self-harm.
  - The first step in the care of patients with active suicidality is to ensure their safety by admitting them to a psychiatric unit (involuntarily, if necessary).
  - Although efforts should be made to obtain parental consent, a minor can be hospitalized without it.

Assessment & management of suicidality	
Assessment	<p><b>SAD PERSONS</b></p> <ul style="list-style-type: none"> <li>• <b>S</b>ex</li> <li>• <b>A</b>ge</li> <li>• <b>D</b>epression</li> <li>• <b>P</b>revious attempt</li> <li>• <b>E</b>tOH (or other substance) use</li> <li>• <b>R</b>ational thought loss (psychosis)</li> <li>• <b>S</b>ocial support lacking</li> <li>• <b>O</b>rganized plan</li> <li>• <b>N</b>o spouse or significant other</li> <li>• <b>S</b>ickness or injury</li> </ul>
	<p><b>High imminent risk</b> (ideation, intent &amp; plan)</p> <ul style="list-style-type: none"> <li>• Ensure safety: Hospitalize immediately (involuntarily if necessary)</li> <li>• Remove personal belongings &amp; objects in room that may present self-harm risk</li> <li>• Constant observation &amp; security may be required to hold against will</li> </ul> <p><b>High non-imminent risk</b> (ideation, intent, but <b>no plan to act in near future</b>)</p> <ul style="list-style-type: none"> <li>• Ensure close follow-up</li> <li>• Treat modifiable risk factors (underlying depression, psychosis, substance abuse, pain)</li> <li>• Recruit family or friends to support patient</li> <li>• Reduce access to potential means (secure firearms, medications)</li> </ul>

## Sleep and Sleep Disorders

## Sleep architecture

- Sleep consists of two distinct states (REM and NREM):

## A. REM: Rapid Eye Movement Sleep

- It is an awake brain in a paralyzed body (Brain on; Body off).

Characterized by:

- Saccadic eye movements.
- An aroused EEG pattern (dreaming).
- Sexual arousal.
- Elaborate visual imagery (dreaming).

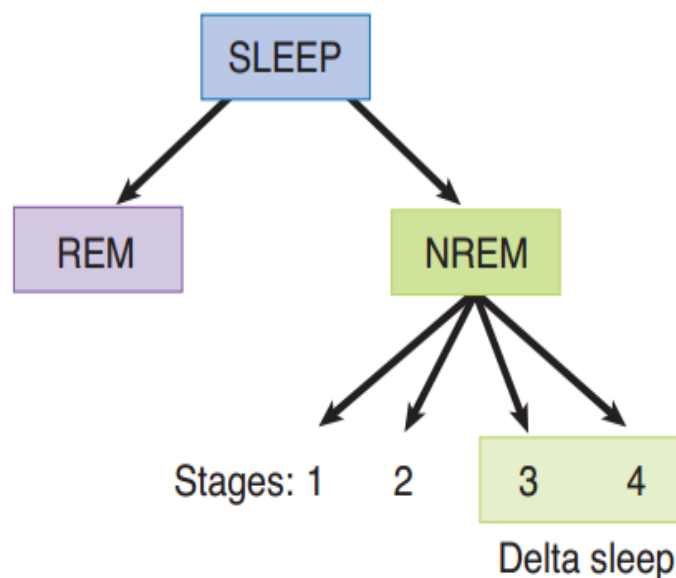
## B. NREM: Non-rapid Eye Movement Sleep

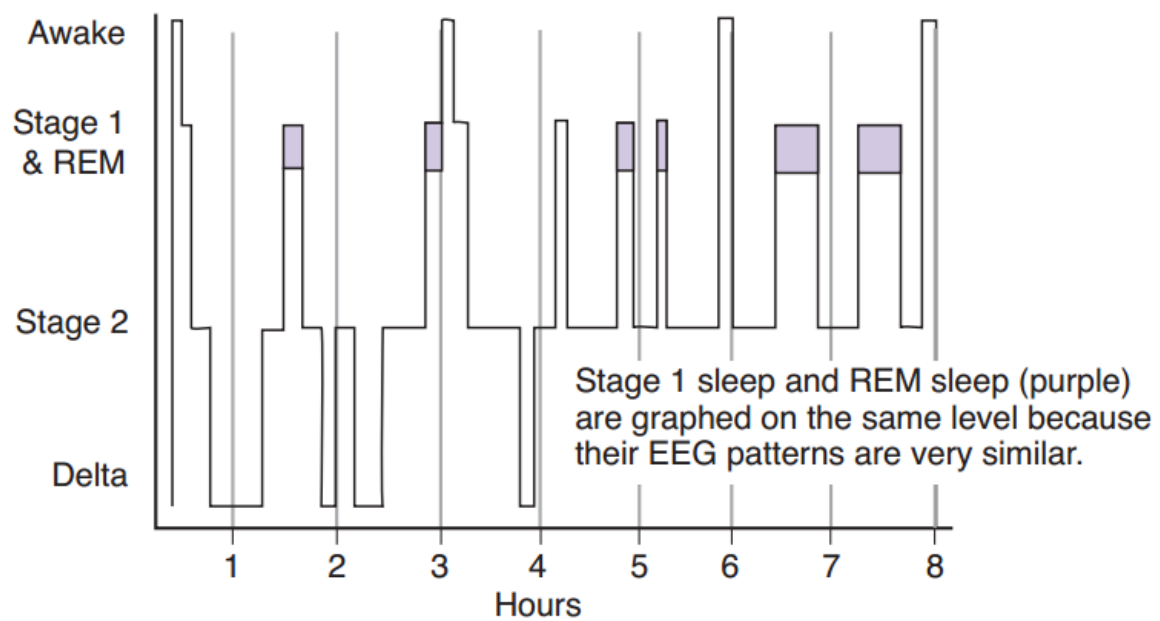
- Divided into 4 stages on the basis of EEG criteria.

- It is an idling brain in a movable body (Brain off; Body on).

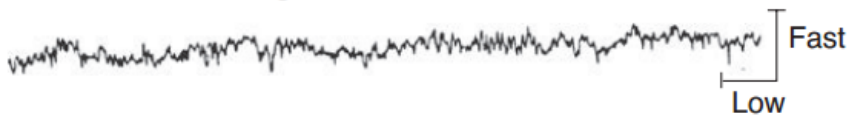
- Alternates with REM sleep throughout the sleep period and is characterized by:

- Absence of eye movements.
- Slowing of the EEG rhythms.
- Higher muscle tone.
- Absence of "thought-like" mental activity.

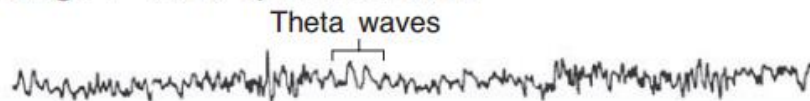




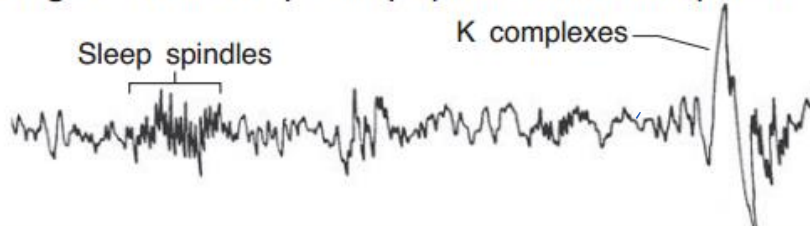
**Awake**—low voltage-random fast-beta waves



**Stage 1**—3 to 7 cps theta waves



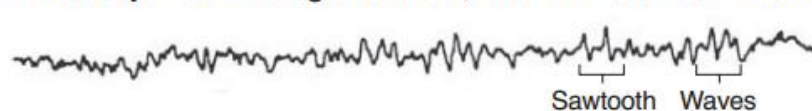
**Stage 2**—12 to 14 cps-sleep spindles and K complexes



**Delta sleep**—1/2 to 2 cps-delta waves >75



**REM sleep**—low voltage-random, fast with sawtooth waves



## Sleep disorders

## Narcolepsy

- Disordered regulation of sleep-wake cycles; 1° characteristic is **excessive daytime sleepiness**.
- **Caused by ↓ hypocretin (orexin) production in lateral hypothalamus. Loss of hypocretin results in an inability to regulate sleep.**
- Strong genetic component.
- Narcolepsy is considered as a **disorder of REM sleep**.
- Also associated with the **narcoleptic tetrad**:
  1. Sleep attacks and **excessive daytime sleepiness** (minimum 3 times per week for 3 months).
  2. **Cataplexy** (loss of all muscle tone following strong emotional stimulus, such as laughter) in some patients (**pathognomonic sign**).
  3. **Hypnagogic** (just before sleep) or **hypnopompic** (just before awakening) hallucinations:
    - Hypnag**ogic** **go**ing to sleep.
    - Hypno**pompic** "**pomp**ous upon awakening".
  4. **Sleep paralysis**.
- Treatment:
  - Treatment includes sleep hygiene, scheduled naps, and avoidance of alcohol and drugs that cause drowsiness.
  - **When medications are needed to decrease daytime somnolence, wakefulness-promoting agents such as **modafinil** are preferred.**
  - Modafinil, a nonamphetamine medication that promotes wakefulness, is considered a first-line pharmacotherapy as it **reduces daytime sleepiness**, is generally well tolerated, and has less abuse potential compared with traditional stimulants (amphetamines, methylphenidate).
  - These older drugs are effective but are generally used as second-line therapies due to a **higher risk of adverse effects** (hypertension, tachycardia, psychosis, anorexia, abuse).
  - Patients with **significant cataplexy** may also benefit from a **REM sleep-suppressing drugs**, including antidepressants and **sodium oxybate**.

Narcolepsy	
<b>DSM-5 diagnostic criteria</b>	<ul style="list-style-type: none"> <li>• Recurrent lapses into sleep or naps (minimum 3 times per week for 3 months)</li> <li>• At least 1 of the following: <ul style="list-style-type: none"> <li>◦ Cataplexy: Brief loss of muscle tone precipitated by strong emotion (eg, laughter, excitement)</li> <li>◦ Low cerebrospinal fluid levels of hypocretin-1</li> <li>◦ Shortened REM sleep latency</li> </ul> </li> </ul>
<b>Associated features</b>	<ul style="list-style-type: none"> <li>• Hypnagogic or hypnopompic hallucinations</li> <li>• Sleep paralysis</li> </ul>

## Insomnia

### Definition:

- A disorder characterized by **difficulties in initiating or maintaining sleep**.

### Risk Factors/Epidemiology:

- Typically associated with some form of anxiety or anticipatory anxiety.
- Many patients have underlying psychiatric disorders, such as depression, etc.

### Physical and Psychiatric Presenting Symptoms:

- Predominant complaint is difficulty initiating or maintaining sleep.
- Affects the patient's level of functioning.
- Frequent yawning and tiredness during the day.

### Treatment:

- **Poor sleep hygiene** is a common cause of insomnia. Strategies to improve sleep hygiene include:
  - Maintaining a regular sleep schedule and a quiet, dark, and comfortably cool bedroom.
  - Avoiding late afternoon naps and exposure to electronic devices before bedtime.
  - Avoiding nicotine, caffeine, and heavy meals in the evening.
- If these do not work, consider behavioral modification techniques such as **stimulus control**. **Stimulus control focuses on eliminating stimulating bedroom activities and getting into bed only when sleepy**. If the patient cannot fall asleep, he should not look at the clock but go to another room and **do something relaxing until he feels drowsy enough to fall asleep**.
- If medications are to be used, consider zolpidem, eszopiclone, or zaleplon.



Behavioral treatment of insomnia	
<b>Sleep hygiene</b>	<ul style="list-style-type: none"> <li>• Maintain regular sleep schedule, avoid naps</li> <li>• Avoid caffeine after lunch</li> <li>• Avoid alcohol, smoking, large meals near bedtime</li> <li>• Adjust bedroom environment to be quiet, dark &amp; cool</li> <li>• Exercise regularly, but not soon before bedtime</li> </ul>
<b>Stimulus control</b>	<ul style="list-style-type: none"> <li>• Use bed only for sleep &amp; sexual activity (no reading, television, eating)</li> <li>• Go to bed only when sleepy</li> <li>• Leave bed when unable to sleep &amp; go to another room</li> <li>• Fixed wake-up time, including weekends</li> </ul>
<b>Relaxation</b>	<ul style="list-style-type: none"> <li>• Progressive muscle relaxation (muscles contracted &amp; relaxed in sequence)</li> <li>• Relaxation response (abdominal breathing, mental focus on peaceful image)</li> </ul>
<b>Sleep restriction</b>	<ul style="list-style-type: none"> <li>• Restrict sleep to time patient is actually sleeping (based on sleep diary)</li> <li>• Increase time in bed in 15- to 30-minute intervals when sleep efficiency is &gt;90%</li> </ul>

❖ N.B:

1. **Normal age-related sleep changes** include decreased total sleep time, Increased nighttime awakenings, sleepiness earlier in the evening with earlier morning awakening, and increased daytime somnolence (napping).
  - No further workup is necessary, and patients should be **reassured** that these changes are normal.
2. **Delayed sleep phase syndrome** is a circadian rhythm disorder characterized by the inability to fall asleep at "normal" bedtimes, resulting in sleep-onset insomnia and excessive daytime sleepiness.
  - Patients sleep normally if allowed to follow their internal circadian rhythm and sleep until late morning (have chronic problems going to sleep at a societally accepted time).

### Sleep terror disorder

- Periods of terror with screaming in the middle of the night; occurs during slow-wave/deep sleep.
- Most common in **children**.
- Occurs during **non-REM sleep** (no memory of arousal) as opposed to nightmares that occur during REM sleep (memory of a scary dream).
- Cause unknown, but triggers include **emotional stress, fever, or lack of sleep**.
- **Usually self-limited (reassurance)**.

	Night Terrors	Nightmares
<b>Sleep stage</b>	Stage 4 (delta sleep)	REM
<b>Recall upon waking</b>	No	Yes

❖ N.B:

- **Nightmare disorder involves recurrent awakenings from REM sleep associated with full alertness and dream recall. It should be differentiated from non-REM sleep terrors, which are characterized by partial arousals, unresponsiveness, and lack of dream content.**

### Somnambulism (Sleep-walking)

- **Occurs in stage 4 sleep (Delta)**.
- If wakened, the person is confused and disoriented.
- Treat with benzodiazepines (decreases stage 4 sleep).

### Neurotransmitters Associated with Sleep “**SAND**man”

- **Serotonin**: helps initiate sleep.
- **Acetylcholine (ACh)**: higher during REM sleep (associated with erections in men)
- **Norepinephrine (NE)**: lower during REM sleep. Ratio of ACh and NE is the biochemical trigger for REM sleep.
- **Dopamine**: produces arousal and wakefulness. Rises with waking.

### Intelligence Quotient (IQ)

- **Definition:** a general estimate of the **functional capacities of the person**.
- 70% inherited, recent studies suggest most from mother.
- IQ is not an absolute score but a comparison among people.
- Distribution mean: 100; standard deviation: 15.

- Two methods for generating score from IQ test results:

- **Mental Age Method:** Compares across ages
  - Used only for children under age 16
  - $MA/CA \times 100 = IQ$
  - MA = mental age, CA = chronological age

An 8-year-old boy scores on his IQ test about the level of the average 10 year old. What is his IQ?

$$MA/CA \times 100 = IQ = 10/8 \times 100 = 125$$

- **Deviation from Norms Method:** Compares within same age group.
  - Scores derived based on standard deviations above or below the mean.

An 8-year-old boy scored one standard deviation above the mean on the distribution of score for 8 year olds. What is his IQ?

If mean = 100 and standard deviation = 15,  
one standard deviation above the mean = IQ of 115

- By either method, IQ is strongly related to education. People with higher IQs tend to seek and get more education.

Range	Label	Distribution
Less than 69	Intellectual disability	About 2.5% of the population
70 to 79	Borderline	
80 to 89	Low average	
90 to 109	Average	About 50% of the population
110 to 119	High average	
120 to 129	Superior	
over 130	Very superior	About 2.5% of the population

### Intellectual Disability

- **Global cognitive deficits** (vs specific learning disorder) that affect reasoning, memory, abstract, thinking, judgment, language, learning.
- Adaptive functioning is impaired, leading to major difficulties with education, employment, communication, socialization, independence.
- Treatment: psychotherapy, occupational therapy, special education.

### Specific learning disorder

- Onset during **school-age years**.
- Inability to acquire or **use information from a specific subject** (math, reading, writing) near age-expected proficiency **for  $\geq 6$  months despite focused intervention**.
- **General functioning and intelligence are normal** (vs intellectual disability).
- Treatment: academic support, counseling, extracurricular activities.

## Disorders Usually Diagnosed in Childhood

## Autism spectrum disorder

- Autism spectrum disorder is characterized by **impaired social communication/interactions and restricted, repetitive interests or behaviors**.
- It can occur **with or without language and intellectual impairment**.
- Must present in early childhood.
- More common in **boys**. Associated with ↑ head/brain size.
- Early intervention** for autism spectrum disorder (ASD) in the preschool and school-age years has been shown to **significantly improve outcomes**, if there is any concern about ASD, thorough screening and evaluation should be undertaken and educational/behavioral services offered as soon as possible.

Autism spectrum disorder	
<b>Clinical features</b>	<ul style="list-style-type: none"> <li>Deficits in social communication &amp; interactions with onset in early development               <ul style="list-style-type: none"> <li>Sharing of emotions or interests</li> <li>Nonverbal communication</li> <li>Developing &amp; understanding relationships</li> </ul> </li> <li>Restricted, repetitive patterns of behavior               <ul style="list-style-type: none"> <li>Repetitive movements or speech</li> <li>Insistence on sameness/routines</li> <li>Intense fixated interests</li> <li>Adverse responses to sensory input</li> </ul> </li> <li>May occur with or without language &amp; intellectual impairment</li> </ul>
<b>Assessment &amp; management principles</b>	<ul style="list-style-type: none"> <li>Early diagnosis &amp; intervention</li> <li>Comprehensive, multimodal treatment (speech, behavioral therapy, educational services)</li> <li>Adjunctive pharmacotherapy for psychiatric comorbidities</li> </ul>

### Rett syndrome

- X-linked dominant disorder **seen almost exclusively in girls** (affected males die in utero or shortly after birth).
- Symptoms usually become apparent **around ages 1-4**, including regression characterized by loss of development, loss of verbal abilities, intellectual disability, ataxia, **stereotyped hand-wringing**.

### Conduct disorder

- **Repetitive and pervasive behavior violating the basic rights of others or societal norms** (aggression to people and animals, setting fires, destruction of property, theft) for  $\geq 1$  year.
- **After age 18, many of these patients will meet criteria for diagnosis of antisocial personality disorder.**
- Treatment for both: psychotherapy such as CBT (cognitive behavioral therapy).

Conduct disorder	
Clinical features	<ul style="list-style-type: none"> <li>• Pattern of violating major societal norms &amp; rights of others for <math>\geq 1</math> year</li> <li>• Aggression &amp; cruelty toward people &amp; animals</li> <li>• Destruction of property, setting fires</li> <li>• Serious violation of rules (truancy, running away)</li> <li>• Deceitfulness or theft (lying, stealing)</li> </ul>
Treatment	<ul style="list-style-type: none"> <li>• Cognitive-behavioral therapy, family therapy</li> <li>• Parent management training</li> </ul>

### Oppositional defiant disorder

- Oppositional defiant disorder is a behavioral disorder of childhood characterized by argumentative and defiant behavior toward authority figures **in the absence of serious violations of social norms**.
- It does not involve the more severe violations of the basic rights of others seen in conduct disorder.
- Treatment: psychotherapy such as CBT.

### Separation anxiety disorder

- Common onset at 7-9 years.
- Overwhelming fear of separation from home or loss of attachment figure.
- May lead to factitious physical complaints to avoid going to or staying at school.
- Treatment: CBT, play therapy, family therapy.

### Tourette syndrome

- Onset before age 18.
- It occurs more frequently in **males**.
- Characterized by sudden, rapid, recurrent, nonrhythmic, **stereotyped motor and vocal tics that persist for > 1 year**.
- Tics are usually **preceded by irresistible urges and followed by feelings of relief**. Tics are exacerbated by stress and fatigue.
- **Motor tics** frequently observed include grimacing, eye blinking, nose twitching, head jerking, and shoulder shrugging.
- **Vocal tics** include barking, grunting, squeaking, coughing, and throat clearing.
- **Coprolalia** (involuntary obscene speech) found in only **10–20% of patients**.
- Patients with Tourette syndrome have high rates of psychiatric comorbidity, with a **significantly increased risk for attention-deficit hyperactivity disorder (ADHD) and/or obsessive-compulsive disorder (OCD)**.
- Treatment:
  - Tourette disorder is best treated with antipsychotic medications and habit reversal training. Haloperidol and pimozide are FDA approved, **but second-generation antipsychotics such as risperidone are well studied and are increasingly preferred due to their favorable side effect profile**.

Tourette disorder	
DSM-5	<ul style="list-style-type: none"> <li>Both <b>multiple motor &amp; one or more vocal tics</b> (not necessarily concurrent, &gt;1 year) <ul style="list-style-type: none"> <li>Motor: Facial grimacing, blinking, head/neck jerking, shoulder shrugging, tongue protrusion, sniffing</li> <li>Vocal: Grunts, snorts, throat clearing, barking, yelling, coprolalia (obscenities)</li> </ul> </li> <li>Onset before age 18</li> </ul>
Treatment	<ul style="list-style-type: none"> <li>Antipsychotics</li> <li>Alpha adrenergic receptor agonists</li> <li>Behavioral therapy</li> </ul>

### Attention-deficit hyperactivity disorder

- Onset before age 12.
- Limited attention span and poor impulse control.
- Characterized by hyperactivity, impulsivity, and/or inattention for  $\geq 6$  months in at least 2 settings (school, home, places of worship, etc).
- Inattentive symptoms include making careless mistakes, forgetfulness, not listening, and avoidance/lack of follow-through with tasks.
- Hyperactive/impulsive symptoms include difficulty staying seated, hyperactivity, talkativeness, impulsivity, difficulty waiting his turn, and interrupting others.
- Normal intelligence, but commonly coexists with difficulties in school.
- Teacher evaluations are an important tool for assessing behavior in the school environment.
- Continues into adulthood in as many as 50% of individuals.
- Treatment:
  - Stimulant medications (methyphenidate, amphetamines) are first-line agents in school-aged children with ADHD. They work by increasing the availability of norepinephrine and dopamine in the prefrontal cortex. They have a rapid onset of action and are generally well tolerated. The most common adverse effect is decreased appetite.



- Monstimulant options include the norepinephrine reuptake inhibitor atomoxetine and alpha-2 adrenergic agonists.

Attention-deficit hyperactivity disorder	
<b>Clinical features</b>	<ul style="list-style-type: none"> <li>• Inattentive &amp;/or hyperactive/impulsive symptoms for <math>\geq 6</math> months             <ul style="list-style-type: none"> <li>◦ <b>Inattentive symptoms:</b> Difficulty focusing, distractible, does not listen or follow instructions, disorganized, forgetful, loses/misplaces objects</li> <li>◦ <b>Hyperactive/impulsive symptoms:</b> Fidgety, unable to sit still, "driven by a motor," hyper-talkative, interrupts, blurts out answers</li> </ul> </li> <li>• Several symptoms present <b>before age 12</b></li> <li>• Symptoms occur in at least 2 settings (home, school) &amp; cause functional impairment</li> <li>• Subtypes: Predominantly inattentive, predominantly hyperactive/impulsive, combined type</li> </ul>
<b>Treatment</b>	<ul style="list-style-type: none"> <li>• Stimulants (methylphenidate, amphetamines)</li> <li>• Non-stimulants (atomoxetine, alpha-2 adrenergic agonists)</li> <li>• Behavioral therapy</li> </ul>

❖ N.B:

- Pyromania is characterized by **intentional and repeated fire setting with no obvious motive**.
- Individuals with conduct disorder can also have a history of fire setting, but other features (lying, theft, cruelty to others) are also present.

Pyromania
<b>DSM-5 diagnosis</b> <ul style="list-style-type: none"> <li>• Deliberate fire setting on more than 1 occasion</li> <li>• Tension, arousal prior to act</li> <li>• Fascination with fire &amp; its consequences</li> <li>• Pleasure or relief when setting/witnessing fires</li> <li>• No external gain, revenge, or political motivation; not done to attract attention</li> <li>• Not better explained by conduct disorder, manic episode, psychosis, antisocial personality disorder, or impaired judgment (neurocognitive disorder, substance intoxication)</li> </ul>

## Psychosis

- **Distorted perception of reality** characterized by delusions, hallucinations, and/or disorganized thinking. Can occur in patients with medical illness, psychiatric illness, or both.

## Delusions

- Unique, **false beliefs that persist despite the facts** (thinking aliens are communicating with you).
- **Delusional disorder is characterized by  $\geq 1$  delusions lasting  $\geq 1$  month in the absence of other psychotic symptoms.** Behavior is not obviously bizarre and functioning is not significantly impaired apart from the direct impact of the delusions.
- In comparison to schizophrenia, **individuals with delusional disorder are typically higher functioning and lack other psychotic symptoms**; they do not have prominent hallucinations or grossly disorganized behavior.
- Can be shared by individuals in close relationships (**folie à deux**). **In shared psychotic disorder, the dominant person's delusion is transferred to a more submissive partner. It is important to separate the individuals to determine the degree of impairment in each. Separation can also be used as a therapeutic measure to break the cycle of mutual reinforcement.**

Delusional disorder	
<b>Clinical features</b>	<ul style="list-style-type: none"> <li>• <math>\geq 1</math> delusions for <math>\geq 1</math> months</li> <li>• Other psychotic symptoms absent or not prominent</li> <li>• Ability to function apart from delusion; behavior not obviously bizarre or odd</li> <li>• Subtypes: Erotomantic, grandiose, jealous, persecutory &amp; somatic</li> </ul>
<b>Differential diagnosis</b>	<ul style="list-style-type: none"> <li>• Schizophrenia: Other psychotic symptoms present (eg, hallucinations, disorganization, negative symptoms); greater functional impairment</li> <li>• Personality disorders: Pervasive pattern of suspiciousness (paranoid), grandiosity (narcissistic), or odd beliefs (schizotypal), but no clear delusions</li> </ul>
<b>Treatment</b>	<ul style="list-style-type: none"> <li>• Antipsychotics</li> <li>• Cognitive-behavioral therapy</li> </ul>

### Disorganized thought

- Speech may be **incoherent** ("word salad"), tangential, or derailed ("loose associations").

### Hallucinations

- **Perceptions in the absence of external stimuli** (seeing a light that is not actually present).
- Contrast with illusions, misperceptions of real external stimuli.
- Types include:
  - **Visual:** more commonly a feature of **medical illness** (drug intoxication) than psychiatric illness.
  - **Auditory:** **more commonly a feature of psychiatric illness** (schizophrenia) than medical illness.
  - **Tactile:** **common in alcohol withdrawal and stimulant use** (cocaine, amphetamines), delusional parasitosis, "cocaine crawlies".
  - **Hypnagogic:** occurs while **going** to sleep.
  - **Hypnopompic:** occurs while waking from sleep ("**pompous** upon awakening"). Sometimes seen in **narcolepsy**.
  - **Olfactory:** often occur as an aura of temporal lobe **epilepsy** (burning rubber) and in brain tumors.
  - **Gustatory:** rare, but seen in **epilepsy**.

## Schizophrenia

- Chronic mental disorder with periods of psychosis, disturbed behavior and thought, and decline in functioning **lasting at least 6 months**.
- Associated with ↑ dopaminergic activity in mesolimbic system, Current hypotheses posit ↑ serotonin as a cause of both positive and negative symptoms in schizophrenia.
- Diagnosis requires at least 2 of the following, and at least 1 of these should include 1-3 (first 4 are “positive symptoms”):
  1. Delusions.
  2. Hallucinations (often auditory).
  3. Disorganized speech.
  4. Disorganized or catatonic behavior.
  5. Negative symptoms (affective flattening, avolition, anhedonia, asociality, alogia).
- **Positive** symptoms are those symptoms which are **present in schizophrenic individuals but are not found in normal people**.
- **Negative** symptoms are those symptoms which are **absent in schizophrenic individuals but are found in normal people** (five A's).
- **Schizophreniform disorder:** Schizophreniform disorder is differentiated from schizophrenia by the duration of symptoms. In schizophreniform disorder, symptoms must last for **>1 month but <6 months**. If symptoms persist beyond 6 months, the diagnosis is changed to schizophrenia.
- **Brief psychotic disorder:** **lasting < 1 month**, usually stress related.
- **Schizoaffective disorder:** is characterized by a significant mood episode (depressive or manic) with concurrent psychotic symptoms in addition to psychosis without mood symptoms for at least 2 weeks.
- The diagnosis of schizoaffective disorder **requires assessing the longitudinal course of the illness and determining if the patient has had at least 2 weeks of psychotic symptoms in the absence of a mood episode**. Schizoaffective disorder is distinguished from schizophrenia by the presence of mood symptoms for a significant portion of the illness.
- Frequent cannabis use is associated with psychosis/schizophrenia in teens.
- Lifetime prevalence: 1.5% (males = females, African Americans = Caucasians).
- Presents **earlier in men** (late teens to early 20s vs late 20s to early 30s in women).
- Patients are at **↑ risk for suicide**.

- Neuroimaging studies have frequently shown **loss of cortical tissue volume with ventricular enlargement** in a subset of patients with schizophrenia, with **lateral ventricular enlargement being the most widely replicated finding**.
- Treatment: atypical antipsychotics (risperidone) are first line.

Differential diagnosis of DSM-5 psychotic disorders	
<b>Brief psychotic disorder</b>	<b>&gt;1 day &amp; &lt;1 month</b> , sudden onset, full return to function
<b>Schizophreniform disorder</b>	<b>&gt;1 month &amp; &lt;6 months</b> , same symptoms as schizophrenia, functional decline not required
<b>Schizophrenia</b>	<b>At least 6 months</b> (includes at least 1 month of active symptoms, can include prodromal & residual periods), requires functional decline
<b>Schizoaffective disorder</b>	Concurrent mood episode, active-phase symptoms of schizophrenia + at least 2-week lifetime history of delusions or hallucinations in the absence of prominent mood symptoms
<b>Delusional disorder</b>	<b>One or more delusions &gt;1 month</b> , <b>no other psychotic symptoms</b> , normal functioning apart from direct impact of delusions

❖ N.B:

- Acutely psychotic patients should be assessed for suicidal/homicidal ideation, command hallucinations to hurt self or others, and ability to care for self.
- Indications for involuntary psychiatric hospitalization include being a danger to self or others and/or grave disability**, inability to care for self due to mental illness).

2. Although antipsychotic medication is the primary treatment for schizophrenia, integrating psychosocial interventions into a broader treatment program can improve outcomes.
  - Patients with schizophrenia who have critical, hostile or over-involved family members have a higher risk of relapse, while patients have a decreased risk of relapse if the home atmosphere is stable and family stressors are kept to a minimum.
3. Capacity is a patient's ability to understand the illness, treatment options, and consequences and to express a choice reflecting a preference. It is used in medical situations to determine if someone has the ability to give informed consent to receive or refuse a specific intervention.
  - Assessing capacity is especially important when someone's cognition may be impaired, such as in neurological conditions (dementia) or severe psychiatric illness.
  - Patients with psychiatric diagnoses can give informed consent as long as they have capacity, meaning that their judgment and decision-making abilities are determined to be intact at the time of treatment.

Assessment of decision-making capacity	
Criterion	Patient task
<b>Communicates</b> a choice	Patient able to clearly indicate preferred treatment option
<b>Understands</b> information provided	Patient understands condition & treatment options
<b>Appreciates</b> consequences	Patient acknowledges having condition & likely consequences of treatment options, including no treatment
<b>Rationale</b> given for decision	Patient able to weigh risks & benefits & offer reasons for decision

4. The sudden onset of psychosis in a child or adolescent is rare, and it is important to search for potentially reversible conditions such as medical disorders or substance use.
  - Common medical conditions to rule out include systemic lupus erythematosus, thyroiditis, metabolic or electrolyte disorders, central nervous system infection, and epilepsy.
5. Medication-induced psychosis is characterized by delusions and/or hallucinations that are temporally associated with the use of a new medication and rapid onset of symptoms while the medication is being used.
  - Glucocorticoids, particularly at high doses, are often implicated in new-onset psychotic symptoms in patients who may have no current underlying psychiatric illness.

### Mood disorder

- Characterized by an abnormal range of moods or internal emotional states and loss of control over them.
- Severity of moods **causes distress and impairment in social and occupational functioning**.
- Includes major depressive disorder, bipolar disorder, dysthymic disorder, and cyclothymic disorder. Episodic superimposed psychotic features (delusions or hallucinations) may be present.

	Mild	Severe
Stable	Persistent Depressive Disorder	Major depression
Alternating	Cyclothymia	Bipolar (manic-depression)

### Major depressive disorder

- Episodes characterized by **at least 5 of the following 9 symptoms for 2 or more weeks (symptoms must include patient reported depressed mood or anhedonia)**.
- **Persistent depressive disorder (dysthymia)**: depression, often milder, lasting **at least 2 years**.
- **SIG E CAPS**:
  - **Depressed mood**.
  - **Sleep disturbance**.
  - **Loss of Interest (anhedonia)**.
  - **Guilt or feelings of worthlessness**.
  - **Energy loss and fatigue**.
  - **Concentration problems**.
  - **Appetite/weight changes**.
  - **Psychomotor retardation or agitation**.
  - **Suicidal ideations**.
- Screen for history of manic or hypomanic episodes to **rule out bipolar disorder**.



Signs & symptoms of major depression - SIGECAPS
<ul style="list-style-type: none"> <li>• Sleep (increased or decreased)</li> <li>• Interest deficit (anhedonia)</li> <li>• Guilt (worthless, hopeless)</li> <li>• Energy deficit</li> <li>• Concentration deficit</li> <li>• Appetite (increased or decreased)</li> <li>• Psychomotor retardation or agitation</li> <li>• Suicidality</li> </ul>

- Patients with depression typically have the following changes in their sleep stages:
  - ↓ REM latency (the time from sleep onset until the start of the first REM sleep period).
  - ↑ REM early in sleep cycle.
  - ↑ total REM sleep.
  - Repeated nighttime awakenings.
  - Early-morning waking (terminal insomnia).
- Major depressive disorder is associated with hyperactivity of the hypothalamic-pituitary-adrenal axis, resulting in increased cortisol levels.
- Treatment:
  - CBT and SSRIs are first line.
  - SNRIs, mirtazapine, bupropion can also be considered.
  - Electroconvulsive therapy (ECT) in select patients.
- ❖ N.B:
  1. Periods of sadness are a normal part of human experience and should not be diagnosed as a psychiatric disorder unless criteria are met for **severity, duration, and clinically significant distress or impairment**.
    - Evaluation of depressive symptoms occurring in response to psychosocial stressors must take into account **severity, duration, and degree of functional impairment**. Mild or brief sadness without significant interference in psychosocial functioning is consistent with normal sadness.
  2. Severe depression, especially in older adults, may present with features similar to dementia and is known as **pseudodementia or reversible cognitive impairment**.
    - Depression with pseudodementia should be considered in the differential diagnosis of elderly patients with cognitive impairment and depressive symptoms.
    - Antidepressants are the treatment of choice and should result in reversal of cognitive deficits.



### Major depressive disorder with psychotic features

- MDD accompanied by **hallucinations or delusions**.
- Psychotic features are typically mood congruent (depressive themes of inadequacy, guilt, punishment, nihilism, disease, or death).
- Psychotic features occur only in the context of the major depressive episode (**vs schizoaffective disorder**).
- Treatment: antidepressant with atypical antipsychotic, ECT.

### Persistent Depressive Disorder (dysthymia)

- **≥ 2 depressive symptoms lasting ≥ 2 years** with no more than 2 months without depressive symptoms.
- Often **milder**, Patient is **functional, but at a suboptimal level**.
- Not severe enough for hospitalization.

### Depression with Seasonal Pattern (seasonal affective disorder)

- **Lasting ≥ 2 years with ≥ 2 major depressive episodes associated with seasonal pattern** (usually **winter**) and absence of nonseasonal depressive episodes.
- Atypical symptoms common (**hypersomnia, hyperphagia, leaden paralysis**).
- May be related to **abnormal melatonin metabolism**.
- **Treat with bright light therapy (not melatonin tablets)**.

### Depression with atypical features

- Differs from classical forms of depression.
- Characterized by **mood reactivity** (being able to experience improved mood in response to positive events), “reversed” vegetative symptoms (**hypersomnia, hyperphagia**), **leaden paralysis** (heavy feeling in arms and legs), long-standing interpersonal **rejection sensitivity**.
- Most common subtype of depression.

- Treatment: CBT and SSRIs are first line. MAO inhibitors are effective but not first line because of their risk profile.

### Manic episode

- Distinct period of abnormally and persistently elevated, expansive, or irritable mood and abnormally and persistently ↑ activity or energy **lasting ≥ 1 week**. Often disturbing to patient.
- Manic episodes can occur with or without psychotic features (delusions, hallucinations).
- Diagnosis requires hospitalization or marked functional impairment with ≥ 3 of the following (manics DIG FAST):
  - Distractibility.
  - Irresponsibility: seeks pleasure without regard to consequences (hedonistic).
  - Grandiosity: inflated self-esteem.
  - Flight of ideas: racing thoughts.
  - ↑ in goal-directed Activity/psychomotor Agitation.
  - ↓ need for Sleep.
  - Talkativeness or pressured speech.

### Hypomanic episode

- Like manic episode except mood disturbance is **not severe enough to cause marked impairment in social and/or occupational functioning or to necessitate hospitalization**.
- **No psychotic features**.
- Lasts **≥ 4 consecutive days**.

### Bipolar disorder (manic depression)

- Alternates between depression and mania.
- Subtypes:
  - **Bipolar I:** mania and major depression. **Most bipolar I patients will experience both major depressive and manic episodes, but depressive episodes are not required for diagnosis.**
  - **Bipolar II:** major depression plus **hypomanic** episodes.
- **Bipolar I disorder includes manic episode(s) with or without a history of major depressive episodes.** Bipolar II is distinguished from bipolar I by hypomanic episodes (**less severe, less functional impairment, no psychotic symptoms**) and a history of one or more depressive episodes.

- Patient's mood and functioning usually return to normal between episodes.
- Use of antidepressants can precipitate mania.
- High suicide risk.
- Treatment:
  - Mood stabilizers (lithium, valproic acid, carbamazepine), atypical antipsychotics.

### Cyclothymic disorder

- Milder form of bipolar disorder lasting  $\geq 2$  years, fluctuating between mild depressive and hypomanic symptoms with symptoms present at least half of the time, with any remission lasting  $\leq 2$  months.

### Electroconvulsive therapy

- Electroconvulsive therapy (ECT) uses a small electric current to produce a generalized seizure for 20-30 seconds under general anesthesia. ECT seems to cause changes in brain chemistry that can quickly reverse symptoms of certain mental health conditions.
- Used mainly for:
  - Treatment-refractory depression.
  - Depression with psychotic symptoms. Antidepressants typically take up to 6-8 weeks for response and must be combined with an antipsychotic medication to effectively treat major depression with psychotic features.
  - Acutely suicidal patients.
  - Severely depressed geriatric patients who are not eating or drinking and require a rapid intervention
- Adverse effects include disorientation, temporary headache, partial anterograde/retrograde amnesia usually resolving in 6 months.
- Safe in pregnancy.

Bipolar & related disorders	
<b>Manic episode</b> <ul style="list-style-type: none"> <li>• Symptoms more <b>severe</b></li> <li>• <b>1 week</b> unless hospitalized</li> <li>• <b>Marked impairment</b> in social or occupational functioning or <b>hospitalization</b> necessary</li> <li>• May have <b>psychotic features</b>; makes episode manic by definition</li> </ul>	<b>Hypomanic episode</b> <ul style="list-style-type: none"> <li>• Symptoms <b>less severe</b></li> <li>• <b>≥4 consecutive days</b></li> <li>• Unequivocal, observable change in functioning from patient's baseline</li> <li>• Symptoms not severe enough to cause marked impairment or necessitate hospitalization</li> <li>• <b>No psychotic features</b></li> </ul>
<b>Bipolar I</b> <ul style="list-style-type: none"> <li>• <b>Manic episode(s)</b></li> <li>• Depressive episodes common, but not required for diagnosis</li> </ul>	
<b>Bipolar II</b> <ul style="list-style-type: none"> <li>• <b>Hypomanic episode(s)</b></li> <li>• ≥1 major depressive episodes required</li> </ul>	
<b>Cyclothymic disorder</b> <ul style="list-style-type: none"> <li>• At least <b>2 years</b> of fluctuating, mild hypomanic &amp; depressive symptoms that do not meet criteria for hypomanic episodes or major depressive episodes</li> </ul>	

❖ N.B:

1. Cancer patients may have somatic symptoms that overlap those of depression (**sleep disturbance, appetite change, poor energy**).
  - However, if there are additional symptoms such as guilt, loss of interest, feelings of hopelessness, or suicidal thoughts, **major depression should be considered, with a low threshold for beginning treatment to provide relief and improve quality of life.**
2. **All depressed patients should be screened for suicidal ideation, intent, and plan.**
  - **Actively suicidal patients with intent and plan will often need to be hospitalized for stabilization and to maintain their safety.**

**Suicide assessment – ideation, intent & plan****Evaluate ideation**

- Wish to die, not wake up (passive)
- Thoughts of killing self (active)
- Frequency, duration, intensity, controllability

**Evaluate intent**

- Strength of intent to attempt suicide; ability to control impulsivity
- Determine how close patient has come to acting on a plan (rehearsal, aborted attempts)

**Evaluate plan**

- Specific details: method, time, place, access to means (eg, weapons, pills), preparations (eg, gathering pills, changing will)
- Lethality of method
- Likelihood of rescue

## Postpartum mood disturbances

- Postpartum depression has a high incidence and is often underreported.
- Therefore, all women (regardless of prior psychiatric history) require screening for postpartum depression (**Edinburgh Postnatal Depression Scale**).

## Maternal (postpartum) “blues”

- **50–85%** incidence rate.
- Characterized by depressed affect, tearfulness, and fatigue starting **2-3 days after delivery**.
- **Normal physical activity continues, and care of self and baby is seen.**
- Usually **resolves within 10 days**.
- Treatment:
  - **Supportive (reassure the patient and encourage her to call if the symptoms do not remit spontaneously)**. Follow up to assess for possible postpartum depression.
- **Women with depressive symptoms persisting beyond 2 weeks should be evaluated for postpartum depression.**

## MDD with peripartum onset

- **10–15%** incidence rate.
- Formerly called postpartum depression.
- Meets MDD criteria with onset no later than 1 year after delivery.
- The patient often does not get out of bed with **care of self and baby neglected**.
- Treatment: CBT and SSRIs are first line.

### Postpartum psychosis

- 0.1–0.2% incidence rate.
- Characterized by mood-congruent delusions, hallucinations, and thoughts of harming the baby or self.
- Risk factors include history of bipolar or psychotic disorder, first pregnancy, family history, recent discontinuation of psychotropic medication.
- Treatment:
  - Postpartum psychosis is a medical emergency. Management involves hospitalization to ensure safety (suicide, infanticide) and antipsychotic medication; if insufficient, ECT may be used.

Postpartum blues, depression & psychosis			
	Postpartum blues	Postpartum depression	Postpartum psychosis
Prevalence	40%-80%	8%-15%	0.1%-0.2%
Onset	2-3 days (resolves within 14 days)	Within 4 weeks	Variable: Days to weeks
Symptoms	Mild depression, tearfulness, irritability	Moderate to severe depression, sleep or appetite disturbance, low energy, psychomotor changes, guilt, concentration difficulty, suicidal ideation	Delusions, hallucinations, thought disorganization, bizarre behavior
Management	Reassurance & monitoring	Antidepressants, psychotherapy	Antipsychotics, antidepressants, mood stabilizers Hospitalization; do not leave mother alone with infant (risk of infanticide)

## Grief

- The five stages of grief per the Kübler-Ross model are denial, anger, bargaining, depression, and acceptance (may occur in any order).
- Other normal grief symptoms include shock, guilt, sadness, anxiety, yearning, and somatic symptoms that usually occur in waves. Hallucinations of the deceased person are common (hearing the deceased speaking). Duration varies widely; usually resolves within 6-12 months.
- Persistent complex bereavement disorder involves **obsessive preoccupation with the deceased and causes functional impairment, lasting at least 12 months (6 months in children)**.
- Can meet criteria for major depressive episode. In normal grief, pervasive anhedonia worthlessness, and suicidality are not present.

Five stages of grief – terminal illness	
Denial	Denies illness, severity, or prognosis
Anger	Directly expressed or may be displaced onto physician or others
Bargaining	Tries to "strike a bargain" in return for surviving illness
Depression	Becomes sad, detached, hopeless
Acceptance	Comes to terms with impending death, "at peace"

## ❖ N.B:

- Loss of a loved one can trigger the onset of a major depressive episode.
- Bereaved patients who develop major depression should be considered for treatment with both psychotherapy and a trial of antidepressants.
- Major depressive disorder must be differentiated from normal grief (Table).
- In normal grief, feelings of sadness **revolve around the deceased**, are **less pervasive**, and typically **occur in waves following reminders of the deceased**.
- Suicidal Ideation is less common, and self-esteem is preserved. If thoughts of dying are present, these typically **involve joining the deceased**. Intensity should decrease over time and antidepressant treatment is unnecessary.



Major depressive episode	Grief reaction (bereavement)
<ul style="list-style-type: none"> <li>• Five of the following 9 symptoms: Sleep disturbances, appetite change, low energy, psychomotor changes, low mood, anhedonia, guilt, focus/concentration difficulty, suicidal ideation</li> <li>• Low mood or anhedonia must be present</li> <li>• May occur in response to a variety of stressors, including loss of loved one</li> <li>• Duration <math>\geq 2</math> weeks</li> <li>• Social &amp; occupational dysfunction</li> <li>• Suicidality related to hopelessness &amp; worthlessness</li> </ul>	<ul style="list-style-type: none"> <li>• Normal reaction to loss</li> <li>• Feelings of loss &amp; emptiness</li> <li>• Symptoms revolve around the deceased</li> <li>• Functional decline less severe</li> <li>• "Waves" of grief at reminders</li> <li>• Worthlessness, self-loathing, guilt &amp; suicidality less common</li> <li>• Sad feelings are more specific to deceased</li> <li>• Thoughts of dying involve joining the deceased</li> <li>• Intensity decreases over time (weeks to months)</li> </ul>

### Anxiety disorder

- Inappropriate experience of fear/worry and its physical manifestations (anxiety) incongruent with the magnitude of the perceived stressor.
- Symptoms **interfere with daily functioning**.
- Includes panic disorder, phobias, generalized anxiety disorder, and selective mutism.
- Treatment: CBT, **SSRIs**, SNRIs.

### Generalized anxiety disorder

- Anxiety **lasting  $\geq 6$  months** unrelated to a specific person, situation, or event **resulting in functional impairment**.
- Associated with 3 or more of the following symptoms:
  - Restlessness.
  - Fatigue.
  - Poor concentration.
  - Irritability.
  - Muscle tension.
  - Impaired sleep.
- In GAD, the anxiety is **chronic, excessive, difficult to control, and causes significant distress or impairment**.
- Treatment:
  - Treatment of GAD includes cognitive behavioral psychotherapy, medication, or a combination of both.
  - **First-line medications for GAD include selective serotonin reuptake inhibitors (SSRIs) such as escitalopram or serotonin-norepinephrine reuptake inhibitors (SNRIs).**
  - Buspirone, TCAs, benzodiazepines are second line.

Generalized anxiety disorder	
<b>DSM-5 criteria</b>	<ul style="list-style-type: none"> <li>• Excessive worry, anxiety (multiple issues) <math>\geq 6</math> months</li> <li>• Difficult to control</li> <li>• <math>\geq 3</math> of the following symptoms: <ul style="list-style-type: none"> <li>○ Restlessness/feeling on edge</li> <li>○ Fatigue</li> <li>○ Difficulty concentrating</li> <li>○ Irritability</li> <li>○ Muscle tension</li> <li>○ Sleep disturbance</li> </ul> </li> <li>• Significant distress or impairment</li> <li>• Not due to substances, another mental disorder, or medical condition</li> </ul>
<b>Treatment</b>	<ul style="list-style-type: none"> <li>• Cognitive behavioral therapy</li> <li>• SSRIs or SNRIs</li> </ul>

SNRI = serotonin-norepinephrine reuptake inhibitor; SSRI = selective serotonin reuptake inhibitor.

### Adjustment disorder

- Emotional symptoms (anxiety, depression) **within 3 months of the onset of the stressor** causing impairment following an identifiable psychosocial stressor (divorce, illness) and **lasting < 6 months**.
- If symptoms persist > 6 months after stressor ends, it is GAD.
- Symptoms do not meet criteria for MDD.
- Treatment:
  - CBT, SSRIs. The treatment of choice is **psychotherapy** that focuses on improving coping skills and promoting a return to functioning.

Differential diagnosis of depressed mood	
<b>Major depressive disorder</b>	<ul style="list-style-type: none"> <li>• <math>\geq 2</math> weeks</li> <li>• <b><math>\geq 5</math> of 9 symptoms:</b> depressed mood &amp; SIGECAPS</li> <li>• Significant functional impairment</li> <li>• No lifetime history of mania</li> </ul>
<b>Persistent depressive disorder (dysthymia)</b>	<ul style="list-style-type: none"> <li>• Chronic depressed mood <math>\geq 2</math> years</li> <li>• <math>\geq 2</math> of the following: appetite disturbance, sleep disturbance, low energy, low self-esteem, poor concentration, hopelessness</li> </ul>
<b>Adjustment disorder with depressed mood</b>	<ul style="list-style-type: none"> <li>• Onset within 3 months of identifiable stressor</li> <li>• Marked distress &amp;/or functional impairment</li> <li>• Does not meet criteria for another DSM-5 disorder</li> </ul>
<b>Normal stress response</b>	<ul style="list-style-type: none"> <li>• Not excessive or out of proportion to severity of stressor</li> <li>• No significant functional impairment</li> </ul>

### Phobias

- Severe, persistent ( $\geq 6$  months) fear or anxiety due to presence or anticipation of a specific object or situation.
- Person recognizes fear is excessive.
- Can be treated with systematic desensitization.

#### A. Social anxiety disorder (social phobia):

- Exaggerated fear of embarrassment in social situations (public speaking, using public restrooms).
- Treatment:
  - CBT, SSRIs, venlafaxine.
  - For only occasional anxiety-inducing situations, benzodiazepine or  $\beta$ -blocker (propranolol).

#### B. Agoraphobia:

- Agoraphobia is an anxiety disorder characterized by symptoms of anxiety in situations where the person perceives their environment to be unsafe with no easy way to escape.
- Exaggerated fear of open or enclosed places, using public transportation, being in line or in crowds, or leaving home alone.
- Associated with panic disorder.

- Treatment:
  - CBT, SSRIs, MAO inhibitors.
  - Behavioral therapy has been shown to be superior to pharmacologic treatment in specific phobia. Behavioral therapy involves exposure to the phobic stimulus in a gradual manner (systematic desensitization), which results in decreased anxiety overtime through habituation and extinction.

Specific phobia	
History & clinical features	<ul style="list-style-type: none"> <li>• Marked anxiety about a <b>specific</b> object or situation (the phobic stimulus) for &gt;6 months</li> <li>• Common types: Flying, heights, animals, injections, blood</li> <li>• Avoidance behavior (avoiding bridges and elevators, refusing work requiring travel)</li> <li>• Common, 10% of population</li> <li>• Usually develops in childhood; can develop after traumatic event</li> </ul>
Treatment	<ul style="list-style-type: none"> <li>• Cognitive-behavioral therapy with exposure is treatment of choice</li> <li>• Short-acting benzodiazepines may help acutely (therapist unavailable, insufficient time) but have a limited role</li> </ul>

## Obsessive-compulsive disorder

- Obsessive-compulsive disorder (OCD) is a condition characterized by **time-consuming, recurrent, unwanted thoughts** (obsessions) and **repetitive behaviors that the patient feels compelled to perform** (compulsions).
- Recurring intrusive thoughts, feelings, or sensations (obsessions) that cause severe distress; relieved in part by the performance of repetitive actions (compulsions).
- **Ego-dystonic**: behavior inconsistent with one's own beliefs and attitudes (vs obsessive-compulsive personality disorder).
- **Associated with Tourette syndrome.**
- Treatment:
  - CBT, SSRIs, and clomipramine are first line.
  - **Exposure and response prevention-based psychotherapy and selective serotonin reuptake inhibitors are first-line treatments for obsessive-compulsive disorder.**
  - Exposure and response prevention involve repeated exposure to thoughts, images, and situations that provoke obsessional fears followed by prevention of the accompanying compulsion.

Obsessive-compulsive disorder	
<b>Clinical features</b>	<ul style="list-style-type: none"> <li>• <b>Obsessions</b> <ul style="list-style-type: none"> <li>○ Recurrent, intrusive, anxiety-provoking thoughts, urges, or images</li> </ul> </li> <li>• <b>Compulsions</b> <ul style="list-style-type: none"> <li>○ Response to obsessions with repeated behaviors or mental acts</li> <li>○ Behaviors not connected realistically with preventing feared event</li> </ul> </li> <li>• Time-consuming (&gt;1 hr/day) or causing significant distress or impairment</li> </ul>
<b>Treatment</b>	<ul style="list-style-type: none"> <li>• Selective serotonin reuptake inhibitor</li> <li>• Cognitive-behavioral therapy (exposure &amp; response prevention)</li> </ul>



**Body dysmorphic disorder**

- **Preoccupation with minor or imagined defect in appearance** → significant emotional distress or impaired functioning; patients often repeatedly seek cosmetic treatment.
- Treatment: CBT.

Body dysmorphic disorder	
<b>Clinical features</b>	<ul style="list-style-type: none"><li>• Preoccupation with <math>\geq 1</math> perceived physical defects</li><li>• Defects are not observable or appear slight to others</li><li>• Repetitive behavior or mental acts performed in response to the preoccupation</li><li>• Significant distress or impairment</li><li>• Specific insight (good, poor, absent/delusional beliefs)</li></ul>
<b>Management</b>	<ul style="list-style-type: none"><li>• Antidepressants (selective serotonin reuptake inhibitors)</li><li>• Cognitive-behavioral therapy</li></ul>



## Panic disorder

- Defined by recurrent panic attacks (periods of intense fear and discomfort +/- a known trigger, peaking in 10 minutes with  $\geq 4$  of the following):
  - Palpitations.
  - Paresthesias.
  - dePersonalization or derealization.
  - Abdominal distress or Nausea.
  - Intense fear of dying.
  - Intense fear of losing control or "going crazy".
  - llight-headedness.
  - Chest pain.
  - Chills.
  - Choking.
  - Sweating.
  - Shaking.
  - Shortness of breath.
  - Strong genetic component.
- $P_3AN[ICS]_3$
- Diagnosis requires attack followed by  $\geq 1$  month of  $\geq 1$  of the following:
  - Persistent concern of additional attacks.
  - Behavioral change related to attacks.
  - Worrying about consequences of attack.
- Diagnosis requires differentiation from other anxiety disorders that may include triggered panic attacks and ruling out medical and substance-induced causes.
- Treatment:
  - Benzodiazepines provide rapid relief of anxiety and are indicated for the management of acutely symptomatic and functionally impaired patients with panic disorder.
  - An SSRI would be the preferred choice in patient who is not acutely symptomatic and has a history of alcohol abuse.
  - SSRIs, venlafaxine and cognitive-behavioral therapy are preferred for long-term treatment.



### Post-traumatic stress disorder

- Exposure to prior trauma (witnessing death, experiencing serious injury or rape) → persistent **H**yperarousal, **A**voidance of associated stimuli, intrusive **R**eexperiencing of the event (nightmares, flashbacks), changes in cognition or mood (fear, horror, **D**istress)
- Having PTSD is **HARD**.
- Disturbance **lasts ≥ 1 month** with significant distress or impaired social-occupational functioning.
- Returning combat veterans and survivors of sexual assault are at high risk for developing post-traumatic stress disorder.
- Treatment:
  - Trauma-focused cognitive-behavioral therapy and selective serotonin reuptake inhibitors/serotonin-norepinephrine reuptake inhibitors are first-line treatments for post-traumatic stress disorder.

Post-traumatic stress disorder	
<b>Clinical features</b>	<ul style="list-style-type: none"> <li>Exposure to life-threatening trauma</li> <li>Nightmares, flashbacks, intrusive memories</li> <li>Avoidance of reminders, amnesia for event</li> <li>Emotional detachment, negative mood, decreased interest in activities</li> <li>Sleep disturbance, hypervigilance, irritability</li> <li>Duration ≥1 month</li> </ul>
<b>Treatment</b>	<ul style="list-style-type: none"> <li>Trauma-focused cognitive-behavioral therapy</li> <li>Antidepressants (SSRIs, SNRIs)</li> </ul>

SNRI = serotonin-norepinephrine reuptake inhibitor; SSRI = selective serotonin reuptake inhibitor.

### Acute stress disorder

- Acute stress disorder is a severe anxiety response characterized by re-experiencing of trauma, dissociation, negative mood, avoidance, and hyperarousal **lasting >3 days and <1 month after exposure to a traumatic event**.
- Treatment:
  - CBT; pharmacotherapy is usually not indicated.

### Trichotillomania

- Compulsively pulling out one's own hair.
- Causes significant distress and persists despite attempts to stop.
- Presents with areas of thinning hair or baldness on any area of the body.
- Commonly affected sites include the scalp, eyebrows, and eyelids.
- Incidence highest in childhood but spans all ages.
- Treatment:
  - Psychotherapy is first line; medications (clomipramine) may be considered.

Trichotillomania (hair pulling disorder)	
DSM-5	<ul style="list-style-type: none"> <li>• Recurrent hair pulling resulting in hair loss</li> <li>• Repeated attempts to decrease/stop hair pulling</li> <li>• Significant distress or impairment</li> <li>• Not due to a medical/dermatological condition (eg, alopecia areata)</li> <li>• Not due to another mental disorder (eg, body dysmorphic disorder)</li> </ul>
Treatment	<ul style="list-style-type: none"> <li>• Cognitive behavioral therapy (habit reversal training)</li> </ul>

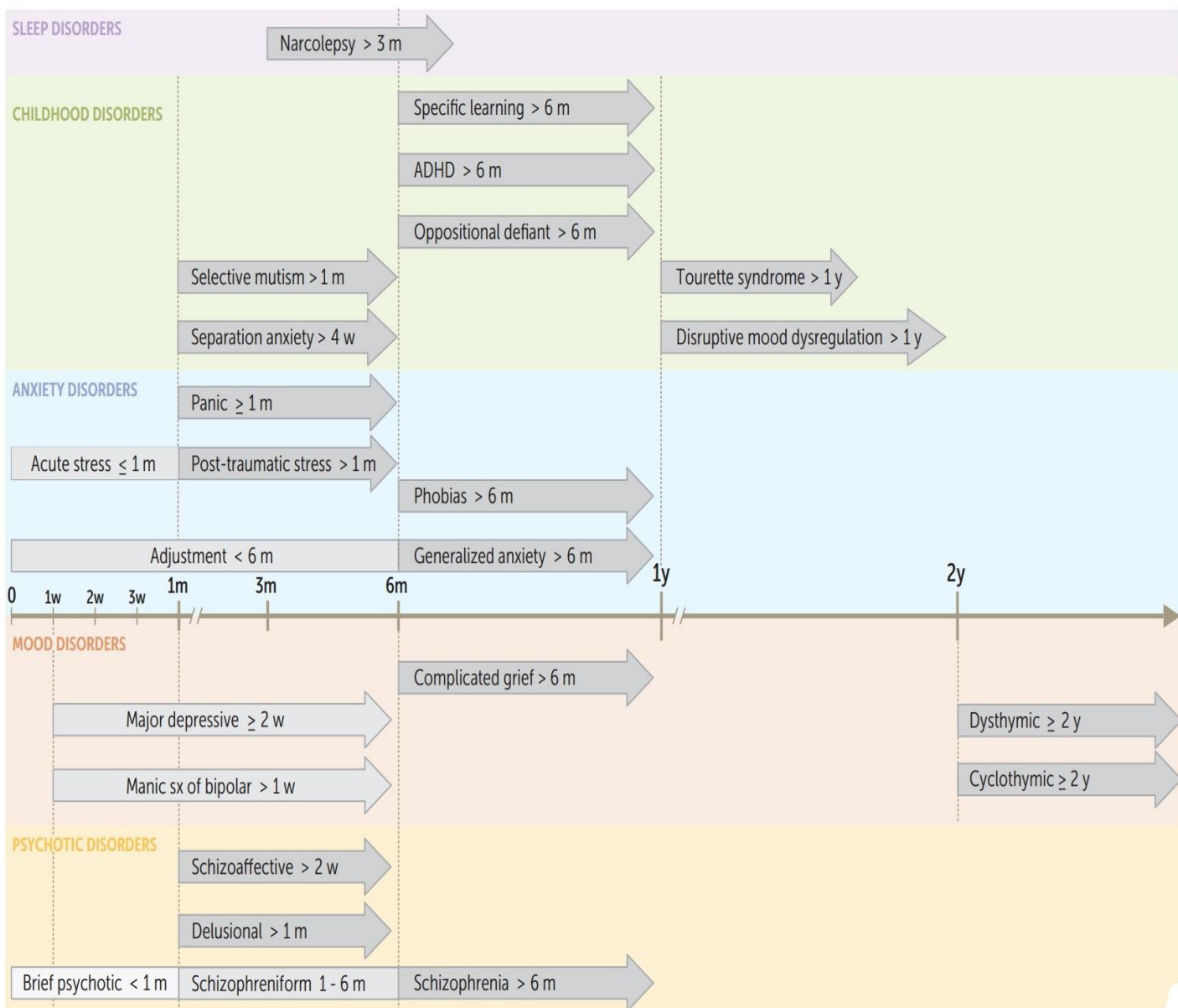
### Selective mutism

- Children (Onset before age 5) with selective mutism are verbal and talkative at home but refuse to speak in specific social settings, commonly at school.
- It is considered an anxiety disorder and should be treated early to prevent long-term educational and social impairment.
- This diagnosis requires consistent ( $\geq 1$  month) failure to talk in situations in which it is expected (school) despite speaking in other situations.
- Refusal to speak at school can impair both academic and social development and should not be considered normal shyness.

## Hoarding disorder

- Hoarding disorder is characterized by **accumulation of a large number of possessions that may clutter living areas to the point that they are unusable.**
- Patients experience **intense distress when attempting to discard possessions regardless of their actual value.**
- Social isolation due to embarrassment (being unable to Invite people to their homes) may also occur.

## Diagnostic criteria by symptom duration



## Somatic symptom and related disorders

- Category of disorders characterized by **physical symptoms causing significant distress and impairment**.
- Both illness production and motivation are **unconscious driven**. Symptoms not intentionally produced or feigned.
- More common in **women**.
- **It is best treated with cognitive-behavioral therapy**.

A. **Somatic symptom disorder:**

- **≥ 1 somatic symptoms (pain, fatigue) causing distress and functional impairment for ≥ 6 months duration.**
- It involves excessive preoccupation and overestimation of the seriousness of ≥ 1 somatic complaints and is **associated with high levels of medical care utilization**.
- Associated with **excessive, persistent thoughts and anxiety about symptoms**.
- **Initial management of somatic symptom disorder consists of regularly scheduled visits with the same physician to develop the physician-patient relationship and minimize unnecessary medical testing, interventions, and subspecialty referrals.**
- **Because symptoms often worsen during periods of stress, patients should be asked about their current emotional stressors and counseled regarding stress reduction.**

Somatic symptom disorder	
<b>Clinical features</b>	<ul style="list-style-type: none"> <li>• ≥1 somatic symptom(s) causing distress &amp; functional impairment</li> <li>• Excessive thoughts or behaviors related to somatic symptoms               <ul style="list-style-type: none"> <li>○ Unwarranted, persistent thoughts about seriousness of symptoms</li> <li>○ Persistent anxiety about health or symptoms</li> <li>○ Excessive time &amp; energy devoted to symptoms</li> </ul> </li> <li>• ≥6 months duration</li> </ul>
<b>Management</b>	<ul style="list-style-type: none"> <li>• Regularly scheduled visits with same provider</li> <li>• Limit unnecessary workup &amp; specialist referrals</li> <li>• Legitimize symptoms but make functional improvement the goal</li> <li>• Focus on stress reduction &amp; improving coping strategies</li> <li>• Mental health referral if patient will accept</li> </ul>

B. **Conversion disorder (functional neurologic symptom disorder):**

- Conversion disorder is characterized by sudden onset of neurological symptoms (paralysis, blindness, mutism) and clinical findings that are incompatible with recognized neurological conditions.
- Conversion disorder is often precipitated by stress (relationship conflicts), and patients can present as hysterical or **strangely indifferent ("la belle indifférence") to their symptoms**.
- First-line treatment includes education, encouragement, and support for patients and family members about the disorder and self-help techniques. If patients do not respond to education, cognitive behavioral therapy is offered as second-line option.

<b>Conversion disorder (functional neurological symptom disorder)</b>	
<b>Common presenting symptoms</b>	<ul style="list-style-type: none"> <li>• Weakness &amp;/or paralysis</li> <li>• Nonepileptic seizures</li> <li>• Movement disorders</li> <li>• Speech or visual impairment</li> <li>• Swallowing difficulty</li> <li>• Sensory disturbances</li> <li>• Cognitive symptoms</li> </ul>
<b>Diagnostic criteria</b>	<ul style="list-style-type: none"> <li>• Symptoms of altered neurological function - voluntary motor or sensory</li> <li>• Often precipitated by psychological stressor</li> <li>• Not feigned or intentionally produced (as in factitious disorder or malingering)</li> <li>• Findings incompatible with recognized neurological conditions</li> <li>• Symptoms cause significant social or occupational impairment</li> </ul>
<b>Stepwise treatment options</b>	<ul style="list-style-type: none"> <li>• Education &amp; self-help techniques - first-line</li> <li>• Cognitive behavioral therapy - second-line</li> <li>• Physical therapy for motor symptoms</li> </ul>

C. **Illness anxiety disorder (hypochondriasis):**

- Excessive preoccupation with acquiring or having a serious illness, often **despite medical evaluation and reassurance**; minimal somatic symptoms.

D. **Pseudocyesis:**

- Pseudocyesis is a rare psychiatric condition in which a woman presents with nearly all signs and symptoms of pregnancy (amenorrhea, enlargement of the breasts and abdomen, morning sickness, weight gain, sensation of fetal movement and reported positive urine pregnancy test per the patient); however, ultrasound reveals a normal endometrial stripe and negative pregnancy test.

## Factitious disorders

- Patient **consciously** creates physical and/or psychological symptoms in order **to obtain attention and receive protracted care (to assume the sick role)**.
- They **lack conscious awareness of why they do it**.
- Behaviors may include deceptive reporting of symptoms, manipulating laboratory samples, ingesting a substance (insulin), altering medical records, or inducing illness (injecting fecal matter to produce an abscess).

	Somatic Symptom	Factitious	Malingering
Symptom production	Unconscious	Intentional	Intentional
Motivation	Unconscious	Unconscious	Intentional

A. **Factitious disorder imposed on self (Munchausen syndrome):**

- Chronic factitious disorder with predominantly physical signs and symptoms.
- Characterized by a history of multiple hospital admissions and willingness to undergo invasive procedures.

B. **Factitious disorder imposed on another (Munchausen syndrome by proxy):**

- Illness in a child or elderly patient is caused or fabricated by the caregiver.
- Motivation is to assume a sick role by proxy.
- **Form of child/elder abuse.**



### Malingering

- Patient **consciously** fakes, profoundly exaggerates, or claims to have a disorder **in order to attain a specific 2° (external) gain (avoiding work, narcotics, obtaining financial compensation)**.
- Poor compliance with treatment or follow-up of diagnostic tests.
- Complaints cease after gain (vs factitious disorder).

Key features of somatic symptom & related disorders	
<b>Somatic symptom disorder</b>	Excessive anxiety & preoccupation with ≥1 unexplained symptoms
<b>Illness anxiety disorder</b>	Fear of having a serious illness despite few or no symptoms & consistently negative evaluations
<b>Conversion disorder (functional neurologic symptom disorder)</b>	<b>Neurologic</b> symptom incompatible with any known neurologic disease; often acute onset associated with stress
<b>Factitious disorder</b>	Intentional falsification or inducement of symptoms with goal to assume <b>sick role</b>
<b>Malingering</b>	Falsification or exaggeration of symptoms to obtain external incentives ( <b>secondary gain</b> )

## Dissociative disorders

## Depersonalization/derealization

- Episodes of depersonalization are characterized by a feeling of detachment or estrangement from the self or a sense of being an outside observer of the self.
- Derealization is a subjective sense of detachment or unreality regarding surroundings.

## Dissociative amnesia

- Inability to recall important personal information, usually subsequent to severe trauma or stress.

## Dissociative identity disorder

- Formerly known as multiple personality disorder. Presence of 2 or more distinct identities or personality states.
- More common in women.
- Associated with history of sexual abuse, PTSD, depression, substance abuse, borderline personality, somatoform conditions.

Dissociative disorders	
<b>Depersonalization/ derealization disorder</b>	<ul style="list-style-type: none"> <li>• Persistent or recurrent experiences of 1 or both: <ul style="list-style-type: none"> <li>◦ Depersonalization (feelings of detachment from, or being an outside observer of, one's self)</li> <li>◦ Derealization (experiencing surroundings as unreal)</li> </ul> </li> <li>• Intact reality testing</li> </ul>
<b>Dissociative amnesia</b>	<ul style="list-style-type: none"> <li>• Inability to recall important personal information, usually of a traumatic or stressful nature</li> <li>• Not explained by another disorder (eg, substance use, post-traumatic stress disorder)</li> </ul>
<b>Dissociative identity disorder</b>	<ul style="list-style-type: none"> <li>• Marked discontinuity in identity &amp; loss of personal agency with fragmentation into ≥2 distinct personality states</li> <li>• Associated with severe trauma/abuse</li> </ul>



## Eating disorders

- Most common in **young females**.

## Anorexia nervosa

- Patients with anorexia nervosa restrict their energy intake to maintain a **body weight that is below a minimal level for age and sex (typically a BMI <18.5)**. As a result, they develop an emaciated body type and signs and symptoms secondary to starvation.
- Anorexia nervosa can be **divided into 2 subtypes** restricting and binge eating/purging:
  - In the restricting type:** weight loss occurs through dieting and/or intensive exercising.
  - In the binge eating/purging subtype:** the anorectic patient engages in purging behavior (self-induced vomiting, misuse of laxatives, diuretics, enema). Patients who induce vomiting may have **parotid gland hypertrophy, dental caries, halitosis, and calluses on the dorsum of their hands (Russell sign)**.
- Associated with **compression fracture** ( $\downarrow$  bone density), severe weight loss, metatarsal stress fractures, **amenorrhea** (due to loss of pulsatile GnRH secretion), lanugo (fine, downy body hair), anemia, **electrolyte disturbances** (hypokalemia, hypochloremia, metabolic alkalosis) and **vital sign derangements** (hypotension, hypothermia, bradycardia). Commonly coexists with depression.
- Although amenorrhea is common, not all patients exhibit this finding and it is no longer required for diagnosis in DSM-5.
- Psychotherapy and nutritional rehabilitation are first line. **Patients with anorexia nervosa require hospitalization for nutritional rehabilitation when they have unstable vital signs, cardiac dysrhythmias, electrolyte derangements, or severely low body weight.**

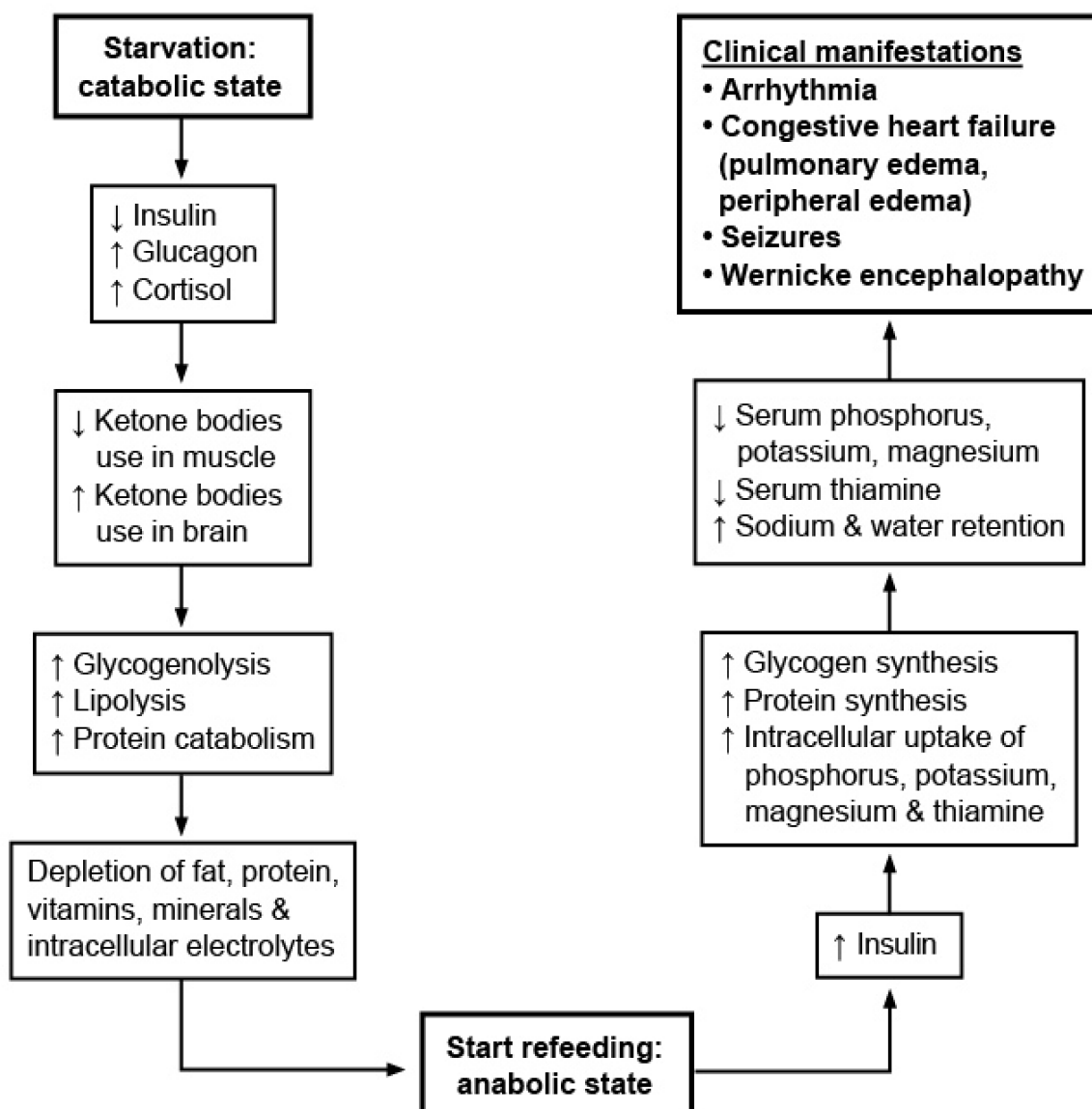
Anorexia nervosa	
<b>Clinical features</b>	<ul style="list-style-type: none"> <li>BMI &lt;18.5</li> <li>Intense fear of weight gain</li> <li>Distorted views of body weight &amp; shape</li> </ul>
<b>Treatment</b>	<ul style="list-style-type: none"> <li>Cognitive-behavioral therapy</li> <li>Nutritional rehabilitation</li> <li>Olanzapine for severe cases</li> </ul>
<b>Complications</b>	<ul style="list-style-type: none"> <li>Hypothermia</li> <li>Malnutrition</li> <li>Dehydration</li> <li>Orthostatic hypotension</li> <li>Arrhythmia</li> <li>Refeeding syndrome</li> </ul>



## ❖ N.B:

- **Chronic starvation** and acute refeeding are potentially life-threatening in patients with anorexia nervosa.
- Refeeding syndrome is the constellation of pathologic derangements resulting from a surge in insulin activity as the body resumes anabolism (Flow chart).
- **Carbohydrate ingestion, whether enteral or intravenous, causes pancreatic insulin secretion and cellular uptake of phosphorus, potassium, and magnesium.**
- Phosphorus is the primary deficient electrolyte as it is **required for energy** (adenosine triphosphate).
- Deficiencies in potassium and magnesium potentiate **cardiac arrhythmias** in a heart that is already atrophic from prolonged malnutrition.
- **Therefore, aggressive initiation of nutrition without adequate electrolyte repletion can quickly precipitate arrhythmias and cardiopulmonary failure.**

### Pathogenesis of refeeding syndrome



### Bulimia nervosa

- Binge eating with **recurrent inappropriate compensatory behaviors** to prevent weight gain (self-induced vomiting, using laxatives or diuretics, fasting, excessive exercise) occurring **weekly for at least 3 months** and overvaluation of body image.
- **Body weight often maintained within normal range to overweight, in contrast to individuals with anorexia nervosa.**
- Associated with parotitis, enamel erosion, electrolyte disturbances, alkalosis, dorsal hand calluses from induced vomiting (Russell sign).
- Treatment: psychotherapy, nutritional rehabilitation, antidepressants.

Bulimia nervosa	
Clinical features	<ul style="list-style-type: none"> <li>• Recurrent episodes of binge eating</li> <li>• Binges followed by compensatory behaviors to prevent weight gain (eg, vomiting, fasting, exercise, laxatives)</li> <li>• Excessive preoccupation with body weight &amp; shape</li> <li>• Body weight within or above normal range</li> </ul>
Treatment	<ul style="list-style-type: none"> <li>• Selective serotonin reuptake inhibitor (fluoxetine)</li> <li>• Nutritional rehabilitation</li> <li>• Cognitive-behavioral therapy</li> </ul>

### Binge eating disorder

- Regular episodes of excessive, uncontrollable eating **without inappropriate compensatory behaviors.**
- ↑ risk of diabetes.
- Treatment:
  - Psychotherapy such as CBT is first-line; SSRIs.

## Pica

- **Recurring episodes of eating non-food substances** (dirt, hair, paint chips) over  $\geq 1$  month that are not culturally or developmentally recognized as normal.
- May provide temporary emotional relief.
- Common in **children**; also common during **pregnancy**.
- Associated with malnutrition, anemia, developmental disabilities, emotional trauma.
- Treatment:
  - Varies by age and suspected cause, but typically includes psychotherapy and nutritional rehabilitation (first line); SSRIs (second line).

Eating disorders	
Diagnosis	Clinical features
<b>Anorexia nervosa</b>	<ul style="list-style-type: none"> <li>• <b>Significantly low weight</b></li> <li>• Intense fear of weight gain</li> <li>• Distorted views of body weight &amp; shape</li> <li>• Subtypes: Binge/purge, restricting</li> </ul>
<b>Bulimia nervosa</b>	<ul style="list-style-type: none"> <li>• Recurrent episodes of binge eating</li> <li>• <b>Compensatory behavior</b> (vomiting, exercise, fasting) to prevent weight gain</li> <li>• Excessive worry about body shape &amp; weight</li> <li>• Maintains <b>normal body weight</b></li> </ul>
<b>Binge eating disorder</b>	<ul style="list-style-type: none"> <li>• Recurrent binge eating with lack of control</li> <li>• <b>No compensatory behaviors</b></li> </ul>

### Orientation

- Patient's ability to know who he or she is, where he or she is, and the date and time.
- Common causes of loss of orientation: alcohol, drugs, fluid/electrolyte imbalance, head trauma, hypoglycemia, infection, nutritional deficiencies.
- Order of loss: 1<sup>st</sup>: time; 2<sup>nd</sup>: place; last: person.

### Amnesias

#### A. Retrograde amnesia:

- Inability to remember things that **occurred before a CNS insult**.

#### B. Anterograde amnesia:

- Inability to remember things that **occurred after a CNS insult** (↓ acquisition of new memory).

#### C. Korsakoff syndrome:

- Amnesia (anterograde > retrograde) caused by **vitamin B<sub>1</sub> deficiency** and associated destruction of mammillary bodies.
- Seen in alcoholics as a late neuropsychiatric manifestation of Wernicke encephalopathy. Confabulations are characteristic.

#### D. Dissociative amnesia:

- Inability to recall important personal information (**isolated impairment in autobiographical memory**), usually subsequent to severe trauma or stress.
- May be accompanied by dissociative fugue (abrupt travel or wandering during a period of dissociative amnesia, associated with traumatic circumstances).

## Delirium

- “Waxing and waning” level of consciousness with acute onset; rapid ↓ in attention span and level of arousal.
  - Characterized by disorganized thinking, hallucinations (often visual), illusions, misperceptions, disturbance in sleep-wake cycle, cognitive dysfunction.
  - Usually 2° to other illness (CNS disease, infection, trauma, substance abuse/withdrawal, metabolic/electrolyte disturbances, hemorrhage, urinary/fecal retention).
  - Most common presentation of altered mental status in inpatient setting.
  - Commonly, diffuse slowing EEG.
  - Treatment is aimed at identifying and addressing underlying condition. Haloperidol may be used as needed. Use benzodiazepines for alcohol withdrawal.
  - Delirium = changes in sensorium.
  - May be caused by medications (anticholinergics), especially in the elderly.
  - Reversible.
  - TA-DA approach (Tolerate, Anticipate, Don’t Agitate) helpful for management.
- ❖ N.B:
- Delirium-induced psychosis is differentiated from primary psychotic disorders by fluctuating levels of consciousness, acuity of onset, and association with an underlying condition and/or offending medications. Although antipsychotics can be used to target the psychotic manifestations of delirium, the primary treatment is the identification and treatment of the underlying condition.

## Dementia

- ↓ in intellectual function **without affecting level of consciousness**.
  - Characterized by memory deficits, apraxia, aphasia, agnosia, loss of abstract thought, behavioral/personality changes, impaired judgment.
  - A patient with dementia can develop delirium (patient with Alzheimer disease who develops pneumonia is at ↑ risk for delirium).
  - Irreversible causes: Alzheimer disease, Lewy body dementia, Huntington disease, Pick disease, cerebral infarct, Creutzfeldt-Jakob disease, chronic substance abuse (due to neurotoxicity of drugs).
  - Reversible causes: hypothyroidism, depression, vitamin B12 deficiency, normal pressure hydrocephalus, neurosyphilis.
  - ↑ incidence with age. EEG usually normal.
  - “De**m**entia” is characterized by **m**emory loss.
  - Usually **irreversible**.
  - In elderly patients, depression and hypothyroidism may present like dementia (pseudodementia). Screen for depression and measure TSH, B12 levels.
- ❖ N.B:
1. Delirium is a reversible, acute-onset confusional state characterized by a fluctuating level of consciousness with deficits in attention, memory, and executive function. In contrast, dementia is of gradual onset, is irreversible, and does not involve fluctuations in consciousness.
  2. Normal age-related cognitive changes include occasional forgetfulness and word-finding difficulty that do not impact activities of daily living.
    - Cognitive deficits that interfere with independence in everyday activities are a key feature that distinguishes dementia (major neurocognitive disorder) from normal age-related changes. Patients with dementia have functional impairments that necessitate assistance.

Clinical features of delirium, dementia & depression in the elderly			
	Delirium	Dementia	Depression
Onset	Acute	Gradual (months to years)	Gradual (months)
Consciousness	Impaired	Intact	Intact
Course	Fluctuating	Progressive	Episodic
Prognosis	Reversible	Irreversible	Reversible
Memory impairment	Global impairment	Remote memory spared	Moderately impaired focus/concentration

	Normal aging	Dementia (major cognitive disorder)
Memory loss	<ul style="list-style-type: none"> <li>• Can provide details about incidents of forgetfulness</li> <li>• Patient is concerned about memory loss</li> <li>• Recent memory for important events &amp; conversations is intact</li> </ul>	<ul style="list-style-type: none"> <li>• Cannot remember specific instances of forgetfulness</li> <li>• Family is more concerned than patient</li> <li>• Has notable decline in memory for recent important events &amp; conversations</li> </ul>
Word-finding difficulty	<ul style="list-style-type: none"> <li>• Occasional (expressive aphasia)</li> <li>• No receptive aphasia</li> </ul>	<ul style="list-style-type: none"> <li>• Frequent, with substitutions</li> <li>• Some receptive aphasia</li> </ul>
Independence & functioning	<ul style="list-style-type: none"> <li>• Maintains independence in ADLs</li> <li>• Is able to operate common appliances</li> <li>• Maintains interpersonal social skills</li> <li>• Does not get lost in familiar territory (may have to pause briefly to reorient)</li> </ul>	<ul style="list-style-type: none"> <li>• Becomes dependent on others for ADLs</li> <li>• Is unable to operate common appliances</li> <li>• Loses interest in social activities</li> <li>• Can get lost for hours in familiar territory while driving or walking</li> </ul>

ADL = activities of daily living.



## Personality

A. Personality trait:

- An enduring, repetitive pattern of perceiving, relating to, and thinking about the environment and oneself.

B. Personality disorder:

- Inflexible, maladaptive, and rigidly pervasive pattern of behavior causing subjective distress and/or impaired functioning; person is usually not aware of problem (**Ego- syntonic**).
- Usually presents by early adulthood.
- Three clusters, A, B, and C; remember as **Weird**, **Wild**, and **Worried** based on symptoms.

## Cluster A personality disorders

- Odd or eccentric; inability to develop meaningful social relationships. No psychosis; **genetic association with schizophrenia**.
- "**Weird**" (**Accusatory**, **Aloof**, **Awkward**).

A. Paranoid:

- **Pervasive distrust and suspiciousness; projection is the major defense mechanism.**

B. Schizoid:

- **Voluntary** social withdrawal, limited emotional expression, content with social isolation (**vs avoidant**).
- **Individuals with schizoid personality disorder are socially detached and prefer to be alone.**
- **They can be differentiated from individuals with avoidant personality disorder, who desire relationships but avoid them due to fears of rejection. They also lack the eccentric cognitions and perceptual distortions characteristic of schizotypal personality disorder.**
- Schizoid = **distant**.

C. Schizotypal:

- **Eccentric appearance, odd beliefs or magical thinking, idea of reference, interpersonal awkwardness.**
- Schizotypal = magical **thinking**.

**PARANOID PERSONALITY DISORDER****SCHIZOID PERSONALITY DISORDER****SCHIZOTYPAL PERSONALITY DISORDER****Cluster B personality disorders**

- Dramatic, emotional, or erratic; **genetic association with mood disorders and substance abuse.**
- "Wild" (Bad to the Bone).

**A. Antisocial:**

- **Disregard for and violation of rights of others, criminality, impulsivity; males > females; must be ≥ 18 years old and have history of conduct disorder before age 15.**
- Conduct disorder if < 18 years old.
- Antisocial = sociopath.

**B. Borderline:**

- Unstable mood and interpersonal relationships, impulsivity, self-mutilation (cutting, burning), suicidality, sense of emptiness; females > males; **splitting is a major defense mechanism.**
- They experience extreme mood reactivity to interpersonal stresses and frequently alternate between extremes of idealizing and devaluing others (defense mechanism of splitting).

- A history of childhood trauma (physical and sexual abuse, neglect) is common in patients with BPD. Insecure attachment to the primary caregiver may underlie the unstable relationships and fears of abandonment commonly seen in the disorder.

- Psychotherapy is the treatment of choice for BPD, with the best evidence for dialectical behavioral therapy (DBT). DBT is a form of cognitive-behavioral therapy developed specifically for BPD. It integrates techniques of emotion regulation and principles of mindfulness and distress tolerance to target unstable moods, impulsivity, and suicidality. Pharmacological treatments do not treat the core pathology of BPD and are used adjunctively.

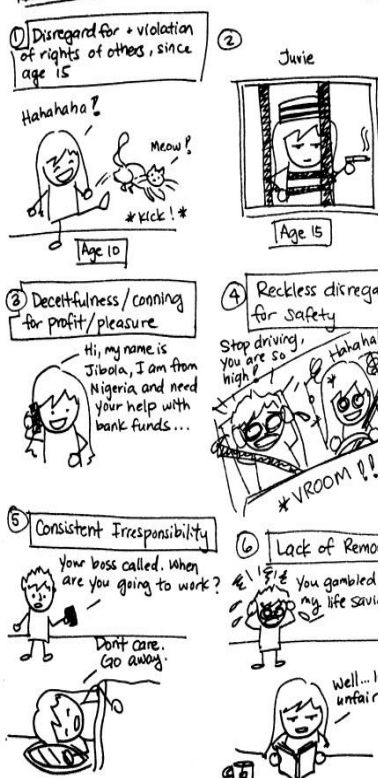
### C. Histrionic:

- Excessive emotionality and excitability, attention seeking, sexually provocative, overly concerned with appearance.

### D. Narcissistic:

- Grandiosity, sense of entitlement; lacks empathy and requires excessive admiration; often demands the "best" and reacts to criticism with rage.

### ANTISOCIAL PERSONALITY DISORDER



### BORDERLINE PERSONALITY DISORDER



### HISTRIONIC PERSONALITY DISORDER



### NARCISSISTIC PERSONALITY DISORDER





## Cluster C personality disorders

- Anxious or fearful; **genetic association with anxiety disorders.**
- "**Worried**" (Cowardly, **C**ompulsive, **C**lingy).

A. Avoidant:

- Hypersensitive to rejection, socially inhibited, timid, feelings of inadequacy, **desires relationships with others (vs schizoid).**
- Patients with avoidant personality disorder typically have very limited social relationships due to fears of being judged, embarrassed, or rejected. They struggle with feelings of inadequacy and pursue relationships only when they feel assured of uncritical acceptance. Occupational dysfunction due to difficulties interacting with coworkers or turning down promotions due to fear of criticism is common.

B. Obsessive-compulsive:

- Preoccupation with order, perfectionism, and control; ego-syntonic: behavior consistent with one's own beliefs and attitudes (vs OCD).
- It is differentiated from obsessive-compulsive disorder by the lack of true obsessions and compulsions.

C. Dependent:

- Submissive and clingy, excessive need to be taken care of, low self-confidence.
- Patients often get stuck in abusive relationships.

## || AVOIDANT PERSONALITY DISORDER ||



## || OBSESSIVE-COMPULSIVE PERSONALITY DISORDER ||



## || DEPENDENT PERSONALITY DISORDER ||



## DSM-5 personality disorders

<b>Cluster A</b> Odd/eccentric	<ul style="list-style-type: none"> <li>• <b>Paranoid:</b> suspicious, distrustful, hypervigilant</li> <li>• <b>Schizoid:</b> prefers to be a loner; detached, unemotional</li> <li>• <b>Schizotypal:</b> unusual thoughts, perceptions &amp; behavior</li> </ul>
<b>Cluster B</b> Dramatic/erratic	<ul style="list-style-type: none"> <li>• <b>Antisocial:</b> disregard &amp; violation of the rights of others</li> <li>• <b>Borderline:</b> chaotic relationships, abandonment fears, labile mood, impulsivity, inner emptiness, self-harm</li> <li>• <b>Histrionic:</b> superficial, theatrical, attention-seeking</li> <li>• <b>Narcissistic:</b> grandiosity, lack of empathy</li> </ul>
<b>Cluster C</b> Anxious/fearful	<ul style="list-style-type: none"> <li>• <b>Avoidant:</b> avoidance due to fears of criticism &amp; rejection</li> <li>• <b>Dependent:</b> submissive, clingy, needs to be taken care of</li> <li>• <b>Obsessive-compulsive:</b> rigid, controlling, perfectionistic</li> </ul>

## ❖ N.B:

- Kleptomania is an impulse control disorder. **These individuals experience impulses to steal objects that are of low monetary value or not needed for personal use.** In contrast, stealing by typical shoplifters may be premeditated and for personal gain.
- In kleptomania, overwhelming feelings of tension or anxiety precede impulses and are relieved with the act of theft. **Feelings of guilt and shame typically follow these acts, and these individuals may return or give away stolen items.**
- Kleptomania can be treated with psychotherapy as well as medications. Psychotherapy involves a cognitive behavioral therapy orientation, focusing on techniques to resist and manage urges and anxiety. Medications that have been used include selective serotonin reuptake inhibitors.

## Kleptomania

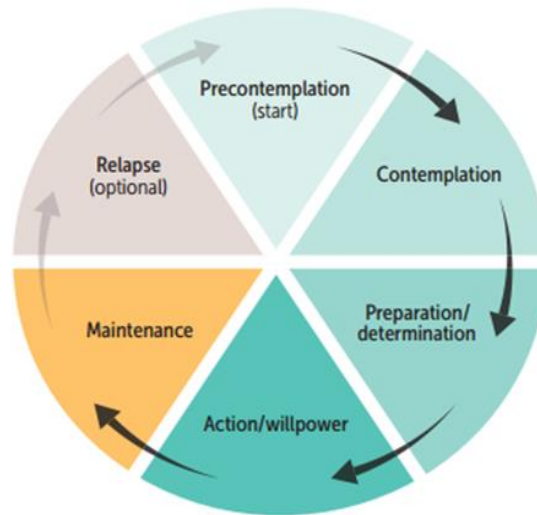
Kleptomania	
<b>Clinical features</b>	<ul style="list-style-type: none"> <li>• Rare impulse control disorder with typical onset in adolescence</li> <li>• Repetitive failure to resist impulses to steal</li> <li>• Stolen objects have little value</li> <li>• Increasing tension prior to theft; pleasure or relief when committing theft</li> <li>• Stolen objects given away, discarded, or returned; guilt &amp; remorse are common</li> </ul>
<b>Differential diagnosis</b>	<ul style="list-style-type: none"> <li>• Shoplifting: Theft for personal gain; much more common</li> <li>• Antisocial personality disorder: General pattern of antisocial behavior</li> <li>• Bipolar disorder, manic episode: Impulsivity, impaired judgment</li> <li>• Psychotic disorders: Stealing in response to delusions, hallucinations</li> </ul>

## Substance use disorder

- Maladaptive pattern of substance use defined as 2 or more of the following signs in 1 year:
  - Tolerance: need more to achieve same effect.
  - Withdrawal.
  - Substance taken in larger amounts, or over longer time, than desired.
  - Persistent desire or unsuccessful attempts to cut down.
  - Significant energy spent obtaining, using, or recovering from substance.
  - Important social, occupational, or recreational activities reduced because of substance use.
  - Continued use despite knowing substance causes physical and/or psychological problems.
  - Craving.
  - Recurrent use in physically dangerous situations.
  - Failure to fulfill major obligations at work, school, or home due to use.
  - Social or interpersonal conflicts related to substance use.

## Stages of change in overcoming substance addiction

1. **Precontemplation:** not yet acknowledging that there is a problem.
2. **Contemplation:** acknowledging that there is a problem, but not yet ready or willing to make a change.
3. **Preparation/determination:** getting ready to change behaviors.
4. **Action/willpower:** changing behaviors.
5. **Maintenance:** maintaining the behavior changes.
6. **Relapse:** returning to old behaviors and abandoning new changes.



### Psychoactive drug intoxication and withdrawal

#### Depressants

- Intoxication:
  - Nonspecific: mood elevation, ↓ anxiety, sedation, behavioral disinhibition, respiratory depression.
- Withdrawal:
  - Nonspecific: anxiety, tremor, seizures, insomnia.

#### A. Alcohol:

- Intoxication:
  - Emotional lability, **slurred speech, ataxia**, coma, blackouts. Serum  $\gamma$ -glutamyltransferase (sensitive indicator of alcohol use).
  - AST value is twice ALT value.
- Withdrawal:
  - Alcohol withdrawal should be suspected in any **hospitalized patient with a history of alcohol abuse**:
    - Early symptoms include anxiety, insomnia, tremors, and diaphoresis.
    - Hallucinations and withdrawal seizures can also occur with progression to delirium tremens within 48-96 hours if left untreated.
    - **Alcoholic hallucinosis is a type of alcohol withdrawal syndrome that typically develops within 12-24 hours of the last drink and resolves within 24-43 hours.** Unlike delirium tremens, **sensorium is intact and vital signs are usually stable.**
    - **Benzodiazepines are the treatment of choice for patients with alcohol withdrawal.**

Alcohol withdrawal syndrome		
Manifestations	Symptoms/signs	Onset since last drink (hours)
Mild withdrawal	Anxiety, insomnia, tremors, diaphoresis, palpitations, gastrointestinal upset, intact orientation	6-24
Seizures	Single or multiple generalized tonic-clonic	12-48
Alcoholic hallucinosis	Visual, auditory, or tactile; intact orientation; stable vital signs	12-48
Delirium tremens	Confusion, agitation, fever, tachycardia, hypertension, diaphoresis, hallucinations	48-96

## ❖ N.B:

- Alcohol is a central nervous system (CNS) depressant that binds to the GABAA receptor complex, **enhancing the inhibitory action of GABA** (the major inhibitory neurotransmitter in the brain).
- Chronic alcohol consumption leads to decreased GABA sensitivity, and alcohol tolerance develops (the need to increase the dose to achieve the desirable effect). Abrupt cessation decreases inhibitory tone and results in CNS excitation (withdrawal).
- Alcohol, barbiturates, and benzodiazepines have similar effects on GABA receptors and act by enhancing GABA inhibitory action.
- Benzodiazepines are used as first-line therapy for psychomotor agitation associated with alcohol withdrawal and to prevent progression to seizures and delirium. Diazepam, chlordiazepoxide are preferred in the majority of patients.** They have a prolonged half-life and are metabolized by the liver into active metabolites.

B. **Opioids:**▪ Intoxication:

- Euphoria, respiratory and CNS depression, ↓ gag reflex, **constipation**, pupillary constriction (**pinpoint pupils**), seizures (overdose).
- Most common cause of drug overdose death.
- Treatment: **naloxone**.

▪ Withdrawal:

- Heroin withdrawal should be suspected in patients with muscle and joint aches, abdominal cramping, nausea, diarrhea, rhinorrhea, and pupillary dilation. These subjective symptoms are often severe but generally not life-threatening.**
- Treatment: long-term support, methadone, buprenorphine.



## ❖ N.B:

1. Opioids are prescribed for their analgesic properties, but they also have euphoric effects with the potential for tolerance, dependence, and abuse. Both prescription and street drugs can be abused.
  - Treatment of addiction includes the use of alternative opioid agonists with **less euphoric effect and less potential for acute withdrawal and craving**, thereby allowing patients to function more productively on a daily basis.
  - **Methadone is a drug of choice for maintenance treatment of opioid abuse**. It is a potent, long-acting opioid agonist with good bioavailability and can be given in **once- daily oral dosing**. Its prolonged effects suppress withdrawal symptoms and cravings, allowing for more productive patient functioning. It is a potent opioid agonist with high affinity for the opioid receptor, which blocks the euphoric effects of other opioids and also accounts for its potent analgesic effects.
2. **Neonatal abstinence syndrome is caused by infant withdrawal to opiates and usually presents in the first few days of life**. It is characterized by irritability, a high-pitched cry, poor sleeping, tremors, seizures, sweating, sneezing, tachypnea, poor feeding, vomiting, and diarrhea.

C. **Barbiturates:**

- **Intoxication:**
  - Low safety margin, **marked** respiratory depression.
  - **Treatment:** symptom management (assist respiration, ↑ BP).
- **Withdrawal:**
  - Delirium, life-threatening cardiovascular collapse.

D. **Benzodiazepines:**

- **Intoxication:**
  - Greater safety margin.
  - Ataxia, **minor** respiratory depression.
  - **When vital sign derangements or respiratory depression are seen, co-ingestion with other sedative-hypnotics should be suspected.**
  - **Treatment:** **flumazenil** (benzodiazepine receptor antagonist).
- **Withdrawal:** Sleep disturbance, depression, rebound anxiety, **seizure**.

## Heroin addiction

- Users at ↑ risk for hepatitis, HIV, abscesses, bacteremia, right-heart endocarditis.
- Heroin detoxification medications:
  - Methadone: Long-acting oral opiate used for heroin detoxification or long-term maintenance therapy.
  - Buprenorphine + naloxone (Suboxone): Sublingually, buprenorphine (partial agonist) is absorbed and used for maintenance therapy. Naloxone (antagonist, not orally bioavailable) is added to lower IV abuse potential.
  - Naltrexone Long-acting opioid antagonist used for relapse prevention once detoxified.
- ❖ N.B:
  - Inhalant abuse usually occurs in boys age 14-17 and may involve multiple common household chemicals.
  - Commonly abused inhalants include glue, toluene, nitrous oxide ("whippets"), amyl nitrite ("poppers"), and spray paints.
  - The effects are often rapid and transient but can be life-threatening. Inhalants are highly lipid soluble and produce immediate effects that typically last 15-45 minutes. They act as central nervous system depressants and may cause death.
  - Users may also display characteristic perioral skin changes (glue sniffer's rash).



## Stimulants

- Intoxication:
  - Nonspecific: mood elevation, psychomotor agitation, insomnia, cardiac arrhythmias, tachycardia, anxiety.
- Withdrawal:
  - Nonspecific: post-use "crash," including depression, lethargy, ↑ appetite, sleep disturbance, vivid nightmares.
- A. Amphetamines:
  - Intoxication:
    - Amphetamine intoxication can present with psychiatric symptoms, including irritability, agitation, and psychosis.
    - Common physical signs include tachycardia, hypertension, hyperthermia, diaphoresis, and mydriasis.
    - Severe: cardiac arrest, seizures.
    - Treatment: benzodiazepines for agitation and seizures.
  - ❖ N.B:
    - "Bath salts" are synthetic cathinones, which consist of a large family of amphetamine analogs. As such: they may increase the release, or inhibit the reuptake, of norepinephrine, dopamine, and serotonin.
    - "Bath salts" have amphetamine properties that can cause severe agitation, combativeness, delirium, and psychosis. In contrast to other stimulants and hallucinogens, which have a much shorter duration of effect, the effects of bath salt intoxication may take several days or weeks to subside.
- B. Cocaine:
  - Intoxication:
    - Impaired judgment, pupillary dilation, hallucinations (including tactile), paranoid ideations, angina, sudden cardiac death. Chronic use may lead to perforated nasal septum due to vasoconstriction and resulting ischemic necrosis.
    - Cocaine abuse should be suspected in an individual with weight loss, behavioral changes, and erythema of the turbinates and nasal septum.
    - Treatment: α-blockers, benzodiazepines. β-blockers not recommended.
  - Withdrawal: Cocaine withdrawal is characterized by the development of acute depression accompanied by fatigue, vivid dreams, hypersomnia, and hyperphagia.

C. **Caffeine:**

- **Intoxication:**
  - Restlessness, ↑ diuresis, muscle twitching.
- **Withdrawal:**
  - Headache, difficulty concentrating, flu-like symptoms.

D. **Nicotine:**

- **Intoxication:** Restlessness.
- **Withdrawal:**
  - Irritability, anxiety, restlessness, difficulty concentrating.
- **Treatment:** Nicotine replacement therapy (nicotine patch, gum), bupropion or varenicline are first-line treatments for smoking cessation. They should be used in conjunction with counseling and supportive therapy.

## Hallucinogens

A. **Phencyclidine (PCP):**

- PCP is a hallucinogen that works primarily as an N-methyl-D-aspartate (NMDA) glutamate receptor antagonist.
- **Intoxication:**
  - **Violence**, impulsivity, **psychomotor agitation**, **horizontal and vertical nystagmus**, tachycardia, hypertension, analgesia, psychosis, delirium, seizures. Fatalities are often associated not with direct PCP intoxication but with related trauma due to **combative behavior**.
- **Treatment:** benzodiazepines, rapid-acting antipsychotic.

B. **Lysergic acid diethylamide (LSD):**

- **Intoxication:**
  - Perceptual distortion (**visual**, auditory), **depersonalization**, anxiety, paranoia, psychosis, possible flashbacks.

## ❖ N.B:

1. Phencyclidine (PCP) and lysergic acid diethylamide (LSD) intoxication present similarly, but agitation, aggression, and nystagmus occur more often in patients using PCP. Visual hallucinations and intensified perceptions are hallmarks of LSD use.
2. The commonly used over-the-counter cough suppressant **dextromethorphan** may cause a **false-positive result for phencyclidine (PCP)** in Standard urine drug screens (UDS).

**C. Marijuana (cannabinoid):**

- Marijuana (cannabis) is one of the most commonly used drugs in the United States. It is a cannabinoid that contains the active ingredient tetrahydrocannabinol (THC).
- Intoxication:
  - Euphoria, anxiety, paranoid delusions, perception of slowed time, impaired judgment, social withdrawal, ↑ appetite, dry mouth, conjunctival injection, tachycardia, hallucinations.
  - Pharmaceutical form is dronabinol: used as antiemetic (chemotherapy) and appetite stimulant (in AIDS).
  - Marijuana is metabolized in the liver, distributed and stored in lipophilic tissues, and slowly released. It remains in the body for a long time; depending on the amount and frequency of use, it can be detected in the urine up to 30 days after daily use has ceased.
- Withdrawal:
  - Irritability, anxiety, depression, insomnia, restlessness, ↓ appetite.

**D. MDMA (ecstasy):**

- MDMA (3,4-methylenedioxy-methamphetamine) is a synthetic amphetamine with hallucinogenic properties.
- Intoxication:
  - Hallucinogenic stimulant: euphoria, disinhibition, increased sexual desire, hyperactivity, distorted sensory and time perception, teeth clenching.
  - Life-threatening effects include hypertension, tachycardia, hyperthermia, hyponatremia, serotonin syndrome.
- Withdrawal:
  - Depression, fatigue, change in appetite, difficulty concentrating, anxiety.

## Psychopharmacology

## Typical Antipsychotics (first-generation antipsychotics)

- Drugs:
  - Haloperidol, trifluoperazine, fluphenazine, thioridazine, chlorpromazine (haloperidol + “-azines”).
- Clinical Use:
  - Schizophrenia (primarily positive symptoms), psychosis, bipolar disorder, delirium, Tourette syndrome, Huntington disease, OCD.
- Mechanism of action:
  - All typical antipsychotics block dopamine D<sub>2</sub> receptors (↑ [cAMP]).
- Potency:
  - High potency:
    - Trifluoperazine, Fluphenazine, Haloperidol (Try to Fly High) → neurologic side effects (extrapyramidal symptoms [EPS]) and drug-induced parkinsonism.
  - Low potency:
    - Chlorpromazine, Thioridazine (Cheating Thieves are low) → non-neurologic side effects (anticholinergic, antihistamine, and α<sub>1</sub>-blockade effects).

First-generation antipsychotics side effects		
Type	Side effects	Examples
Low-potency (non-neurological)	<ul style="list-style-type: none"> <li>• Sedation (histaminergic blockade)</li> <li>• Anticholinergic side effects (cholinergic blockade)</li> <li>• Orthostatic hypotension (alpha-1 adrenergic blockade)</li> </ul>	<ul style="list-style-type: none"> <li>• Chlorpromazine</li> <li>• Thioridazine</li> </ul>
High-potency (neurological)	Extrapyramidal symptoms: <ul style="list-style-type: none"> <li>• Acute dystonia</li> <li>• Akathisia</li> <li>• Parkinsonism</li> </ul>	<ul style="list-style-type: none"> <li>• Haloperidol</li> <li>• Fluphenazine</li> </ul>

■ Adverse effects:

- Lipid soluble → stored in body fat → slow to be removed from body.
- Endocrine:
  - Dopamine receptor antagonism → hyperprolactinemia → galactorrhea, oligomenorrhea, gynecomastia.
- Metabolic:
  - Dyslipidemia, weight gain, hyperglycemia.
- Antimuscarinic:
  - Dry mouth, constipation.
- Antihistamine:
  - Sedation.
- $\alpha_1$ -blockade:
  - Orthostatic hypotension.
- Cardiac:
  - QT prolongation.
- Ophthalmologic:
  - Chlorpromazine: Corneal deposits.
  - Thioridazine → retinal deposits.
- Extrapyramidal system side effects:
  - Onset of EPS → ADAPT.
  - Hours to days: Acute Dystonia (muscle spasm, stiffness, oculogyric crisis).
  - Days to months: Akathisia (inner restlessness) and Parkinsonism (bradykinesia). Akathisia is frequently misdiagnosed because the restlessness is misinterpreted as worsening psychotic agitation. The patient's antipsychotic dose is often increased rather than decreased, exacerbating the akathisia. Treatment of akathisia includes antipsychotic dose reduction and treatment with beta blocker (propranolol) or a benzodiazepine (lorazepam).
  - Months to years: Tardive dyskinesia [it typically occurs after prolonged (>6 months) antipsychotic exposure and is characterized by dyskinetic movements that typically involve the mouth/face/trunk/extremities (lip smacking, grimacing, choreoathetoid movements)].

## ❖ N.B:

- Acute dystonia can develop abruptly any time between 4 hours and 4 days after receiving an antipsychotic medication. The condition is characterized by a **sudden involuntary contraction of a major muscle group**.
- Examples of acute dystonia include **spasmodic torticollis**, **oculogyric crisis** (a forced, sustained elevation of the eyes in an upward position), **opisthotonus** (arching of the back and head thrown backward), and, rarely, laryngospasm.
- Acute dystonic reactions are theorized to result from the antipsychotic property of D<sub>2</sub> antagonism in the nigrostriatal pathway. In the striatum, **the inhibitory effects of dopaminergic neurons (D<sub>2</sub>) are normally balanced by the excitatory actions of muscarinic cholinergic neurons (M)**.
- Strong dopaminergic blockade causes an **excess of cholinergic activity**, resulting in extrapyramidal side effects (acute dystonic reactions, akathisia, parkinsonism).
- Medications with Muscarinic receptor antagonist properties, such as **benztropine** or the antihistamine **diphenhydramine**, help re-establish the dopaminergic-cholinergic balance and effectively treat acute dystonia.
- Tardive dyskinesia (TD) develops in the setting of **prolonged exposure to dopamine-blocking agents, which is thought to result in the upregulation and supersensitivity of dopamine receptors**. TD is characterized by **abnormal involuntary movements of the mouth, tongue, trunk, and extremities and can first appear during treatment or following antipsychotic dose reduction or discontinuation**. When discontinuing the antipsychotic is not feasible, **switching to clozapine is preferred**.

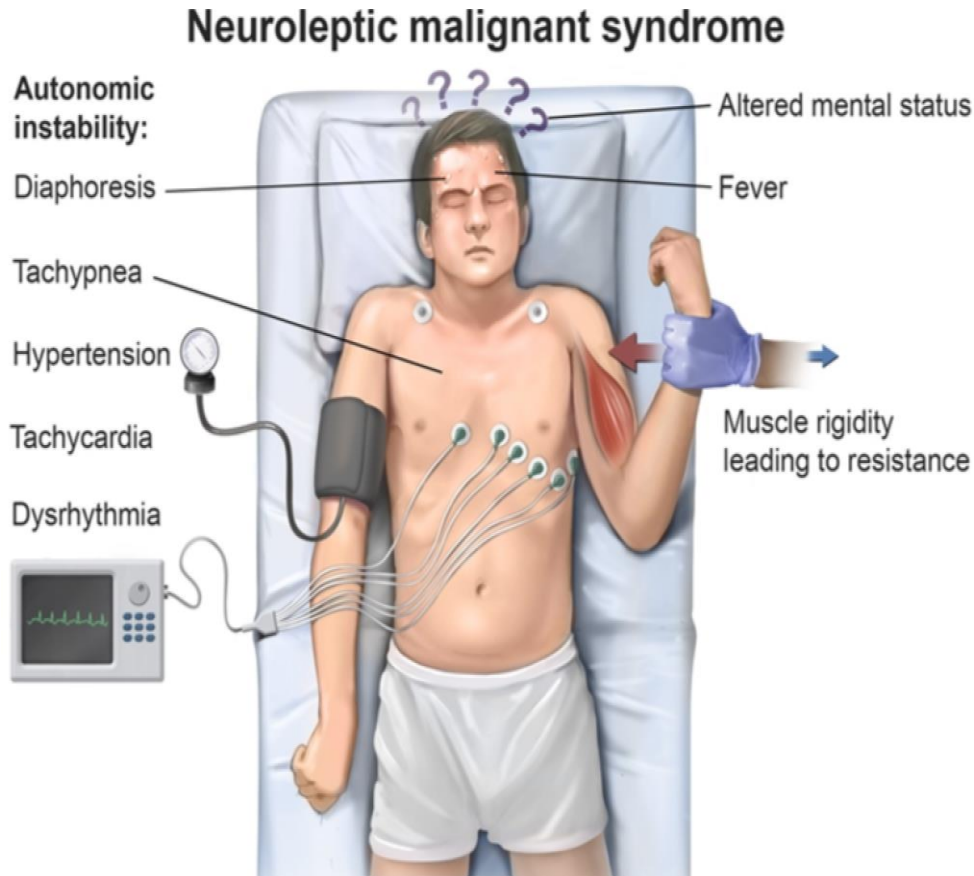
Antipsychotic extrapyramidal effects		Pharmacotherapy <sup>*</sup>
<b>Acute dystonia</b>	<ul style="list-style-type: none"> <li>Sudden, sustained contraction of the neck, mouth, tongue &amp; eye muscles</li> </ul>	<ul style="list-style-type: none"> <li>Benzotropine</li> <li>Diphenhydramine</li> </ul>
<b>Akathisia</b>	<ul style="list-style-type: none"> <li>Subjective restlessness, inability to sit still</li> </ul>	<ul style="list-style-type: none"> <li>Beta blocker (propranolol)</li> <li>Benzodiazepine (lorazepam)</li> <li>Benzotropine</li> </ul>
<b>Parkinsonism</b>	<ul style="list-style-type: none"> <li>Gradual-onset tremor, rigidity, bradykinesia</li> </ul>	<ul style="list-style-type: none"> <li>Benzotropine</li> <li>Amantadine</li> </ul>
<b>Tardive dyskinesia</b>	<ul style="list-style-type: none"> <li>Gradual onset after prolonged therapy (&gt;6 months): Dyskinesia of the mouth, face, trunk &amp; extremities</li> </ul>	<ul style="list-style-type: none"> <li>Valbenazine</li> </ul>



<sup>\*</sup>Management may include reducing the dose or switching to another antipsychotic, depending on the clinical scenario.



- **Other toxicities (Neuroleptic malignant syndrome):**
  - Neuroleptic malignant syndrome is a rare, idiosyncratic, and potentially life-threatening condition that can occur after administration of antipsychotic medications.
  - Although it is more commonly associated with the use of high-potency, first-generation antipsychotics (haloperidol), it can occur with every class of antipsychotics, including second-generation drugs (olanzapine).
  - It may occur at any time but usually develops within the first 2 weeks of treatment.
  - For NMS, think **FEVER**: Fever, Encephalopathy, Vitals unstable, ↑ Enzymes (CK), Rigidity of muscles.
  - Symptoms include high fevers, lead-pipe rigidity, altered mental status, and autonomic instability. Creatine kinase level and white blood cell count may be elevated.
  - Rhabdomyolysis followed by myoglobinuria that can cause acute renal failure, is a known complication.
  - Treatment: Treatment includes discontinuation of all antipsychotics, supportive intensive care (aggressive cooling, antipyretics, fluid and electrolyte repletion), and possible use of dantrolene (a skeletal muscle relaxant) or dopaminergic agents (Bromocriptine).



### Atypical antipsychotics (second-generation antipsychotics)

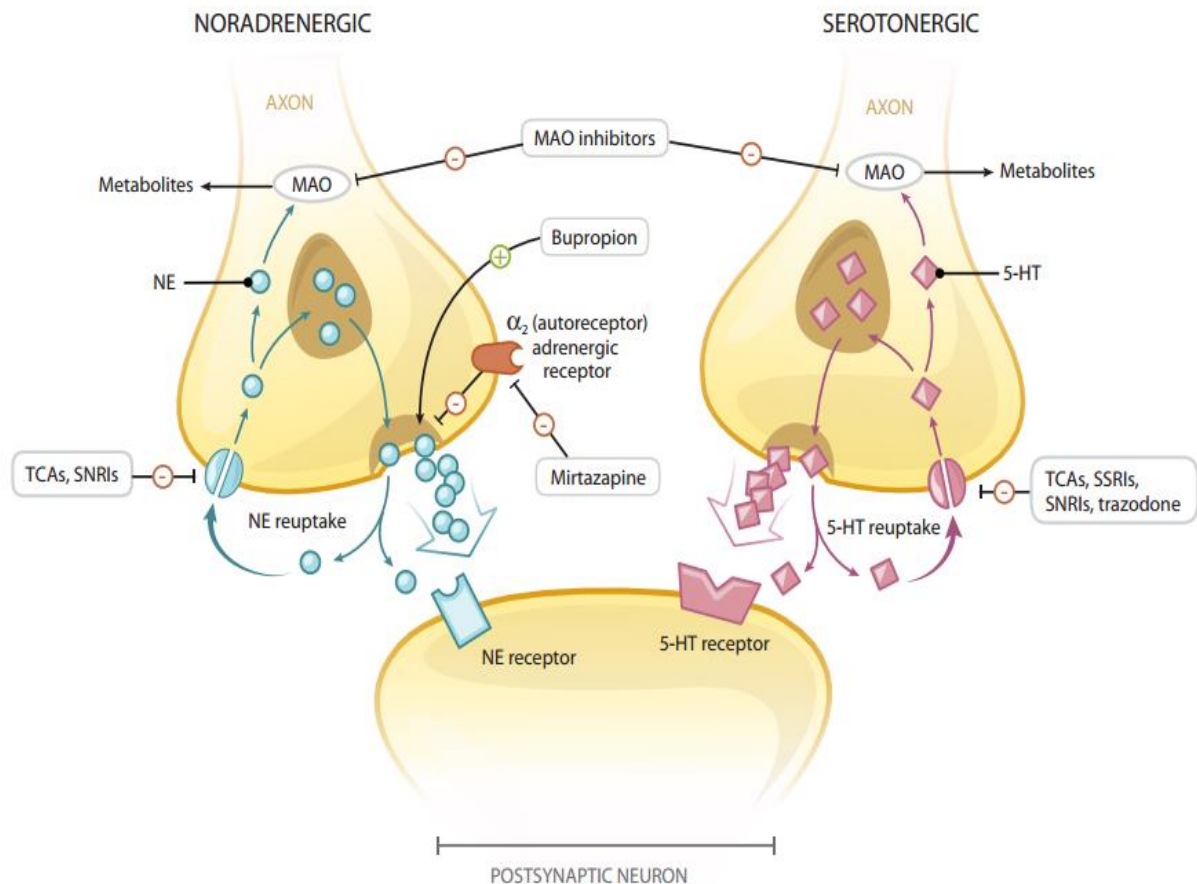
- Drugs:
  - Aripiprazole, asenapine, clozapine, iloperidone, lurasidone, olanzapine, paliperidone, quetiapine, risperidone, ziprasidone.
- Mechanism of action:
  - Not completely understood.
  - Most are D<sub>2</sub> antagonists; aripiprazole is D<sub>2</sub> partial agonist.
  - Varied effects on 5-HT<sub>2</sub>, dopamine, and  $\alpha$ - and H<sub>1</sub>-receptors.
- Clinical Use:
  - Schizophrenia (both positive and negative symptoms). Also used for bipolar disorder, OCD, anxiety disorder, depression, mania, Tourette syndrome.
  - Clozapine is a uniquely effective antipsychotic medication. Clozapine is unique in that it has shown superiority in treatment-resistant schizophrenia and schizophrenia associated with persistent suicidality. Clozapine has affinity for multiple dopamine and serotonin receptors, but the precise pharmacological mechanism responsible for its superiority is unknown.
  - Clozapine: balancing safety with superior antipsychotic efficacy.
- Adverse effects:
  - All of them cause prolonged QT interval, fewer EPS and anticholinergic side effects than typical antipsychotics.
  - “-pines” —metabolic syndrome (weight gain, diabetes, hyperlipidemia). Olanzapine → Obesity.
  - Clozapine: agranulocytosis (monitor WBC weekly) and seizures (dose related). Must watch bone marrow closely with clozapine.
  - Clozapine and olanzapine carry a high risk of metabolic effects, whereas ziprasidone, aripiprazole, and lurasidone are associated with the lowest risk.
  - Antipsychotic medications exert their antipsychotic effects through dopamine antagonism. The blocking of dopamine results in hyperprolactinemia, which can lead to galactorrhea, amenorrhea, and infertility. The second-generation antipsychotic risperidone is most likely to increase prolactin.

Metabolic effects of second-generation antipsychotics	
<b>Metabolic syndrome</b>	<ul style="list-style-type: none"> <li>• Weight gain</li> <li>• Dyslipidemia</li> <li>• Hyperglycemia (including new-onset diabetes)</li> </ul>
<b>Highest risk drugs</b>	<ul style="list-style-type: none"> <li>• Clozapine</li> <li>• Olanzapine</li> </ul>
<b>Monitoring guidelines</b>	Baseline & regular follow-up <ul style="list-style-type: none"> <li>• Body mass index</li> <li>• Fasting glucose &amp; lipids</li> <li>• Blood pressure</li> <li>• Waist circumference</li> </ul>

## ❖ N.B:

- Antipsychotic medications are first-line treatment for psychosis.
- Second-generation antipsychotics are often chosen due to a comparatively lower risk of extrapyramidal side effects and tardive dyskinesia.
- Due to the risk of agranulocytosis, **clozapine is reserved for patients who have failed at least 2 antipsychotic trials.**
- If further evaluation indicates a pattern of repeated medication nonadherence, **switching to a long-acting injectable antipsychotic could be considered.** However, this should be done only after the patient's ability to tolerate the oral formulation is established, making long-acting injectable antipsychotics inappropriate choices as initial agents.

## Antidepressants



- The major neurotransmitters involved in the pathophysiology of depression are **serotonin and norepinephrine (and dopamine to a lesser extent)**. Most available antidepressant medications affect serotonin or both serotonin and norepinephrine at the synapse.
- Antidepressants can induce mania in susceptible patients, especially those with unrecognized bipolar disorder. Patients treated with antidepressants should be monitored for mood elevation and symptoms suggestive of mania that require emergency treatment. Management consists of discontinuing the antidepressant and treating the patient with a mood stabilizer if manic symptoms persist.
- Patients with a single episode of major depressive disorder should continue antidepressants for an **additional 6 months following acute response to reduce the risk of relapse**. Patients with recurrent, chronic, or severe episodes should be considered for maintenance treatment (1-3 years or indefinitely).
- Patients who fail to respond to an initial antidepressant trial should be considered for a switch to another first-line antidepressant. Other options include augmenting with a second agent or switching to or adding psychotherapy.

### Selective serotonin reuptake inhibitors (SSRIs)

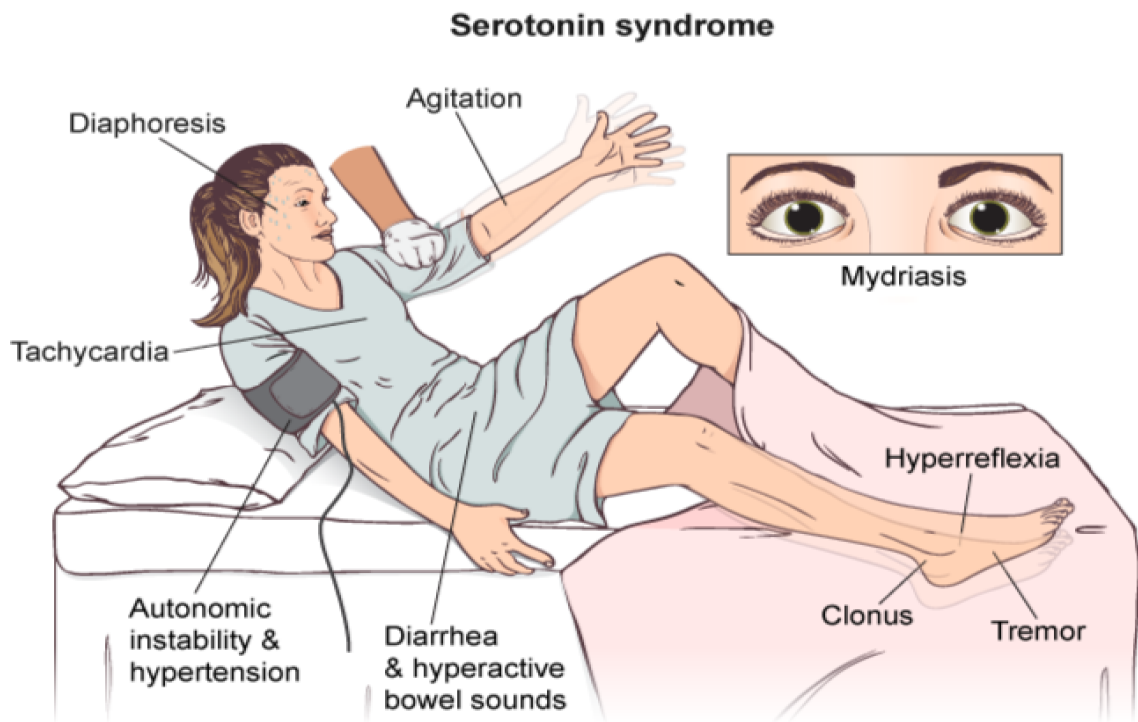
- Drugs:
  - Fluoxetine, paroxetine, sertraline, citalopram. Flashbacks paralyze senior citizens.
- Mechanism of action:
  - Selective serotonin reuptake inhibitors are commonly used first-line antidepressants that work by blocking the serotonin transporter. This prevents the normal reuptake of serotonin into the presynaptic neuron, resulting in increased availability of serotonin in the synaptic space. It normally takes 4–8 weeks for antidepressants to have an effect.
- Clinical Use:
  - Depression, generalized anxiety disorder, panic disorder (Pharmacotherapy of panic disorder includes selective serotonin reuptake inhibitors and benzodiazepines).
  - SSRIs are often preferred to benzodiazepines due to the lack of physiological dependence and abuse potential), OCD, bulimia, social anxiety disorder, PTSD, premature ejaculation, premenstrual dysphoric disorder.
- Adverse effects:
  - Fewer than TCAs. GI distress, SIADH, sexual dysfunction (anorgasmia, ↓ libido).
  - Bupropion, a norepinephrine dopamine reuptake inhibitor, is a first-line treatment for major depressive disorder that does not cause sexual dysfunction.

### Serotonin-norepinephrine reuptake inhibitors (SNRIs)

- Drugs:
  - Venlafaxine, desvenlafaxine, duloxetine, levomilnacipran, milnacipran.
- Mechanism of action:
  - Inhibit 5-HT and norepinephrine reuptake.
- Clinical Use:
  - Depression, general anxiety disorder, diabetic neuropathy. Venlafaxine is also indicated for social anxiety disorder, panic disorder, PTSD, OCD.
- Adverse effects:
  - ↑ BP most common; also, stimulant effects, sedation, nausea.

❖ Serotonin syndrome:

- Can occur with any drug that ↑ 5-HT (MAO inhibitors, SNRIs, TCAs).
- Serotonin syndrome most commonly occurs when SSRIs are given in conjunction with other serotonergic agents such as monoamine oxidase inhibitors (MAOIs) or triptans. It may also occur with a single agent if an excess dose is taken. However, a multitude of other medications have been implicated in precipitating serotonin syndrome, and it may be difficult to obtain an adequate medication history in patients with altered mental status. Therefore, it is important to maintain a high index of suspicion.
- Characterized by 3 A's: neuromuscular Activity (clonus, hyperreflexia, hypertonia, tremor, seizure), Autonomic stimulation (hyperthermia, diaphoresis, diarrhea), and Agitation.
- Symptoms of NMS overlap and can be confused with serotonin syndrome. Although serotonin syndrome can also present with mental status changes, hyperthermia, and autonomic instability, it typically presents with neuromuscular hyperactivity (shivering, clonus, and hyperreflexia) as opposed to the diffuse rigidity and bradyreflexia seen in NMS. Nausea, vomiting, and diarrhea are more common in serotonin syndrome; hyperthermia and rigidity, when present, are less severe than in patients with NMS.
- Treatment:
  - Pharmacologic therapy for severe cases involves treatment with serotonin receptor antagonists such as cyproheptadine which is a first-generation histamine antagonist with nonspecific serotonin receptor antagonistic properties.



### Tricyclic antidepressants (TCAs)

- Drugs:
  - Amitriptyline, nortriptyline, imipramine, desipramine, clomipramine, doxepin, amoxapine.
- Mechanism of action:
  - Block reuptake of norepinephrine and 5-HT.
- Clinical Use:
  - Major depression, OCD (clomipramine), peripheral neuropathy, chronic pain, migraine prophylaxis.
  - TCAs are commonly used for the treatment of painful diabetic neuropathy and are thought to be more effective for short-term pain relief than many newer generation anticonvulsants, also used for neuropathy.
- Adverse effects:
  - Sedation,  $\alpha_1$ -blocking effects including postural hypotension, and atropine-like (anticholinergic) side effects (tachycardia, urinary retention, dry mouth).
  - 3° TCAs (amitriptyline) have more anticholinergic effects than 2° TCAs (nortriptyline).
  - Should be used with caution in patients with benign prostatic hyperplasia (BPH), as they may cause urinary retention.
  - Can prolong QT interval.
- Tri-C's: Convulsions, Coma, Cardiotoxicity (Tricyclic antidepressants inhibit fast sodium channel conduction, resulting in arrhythmias - the most common cause of death in patients with antidepressant intoxication); also, respiratory depression, hyperpyrexia.
- Confusion and hallucinations in elderly due to anticholinergic side effects (use nortriptyline).
- Treatment:
  - Fluid resuscitation with normal saline and hypertonic sodium bicarbonate administration are crucial in these patients.

### Monoamine oxidase inhibitors (MAOIs)

- Drugs:
  - Tranylcypromine, **Phenelzine**, Isocarboxazid, Selegiline (selective MAO-B inhibitor). (MAO Takes Pride In Shanghai).
- Mechanism of action:
  - Monoamine oxidase (MAO) is an enzyme located in presynaptic nerve terminals that is responsible for the breakdown of monoamine neurotransmitters (serotonin, norepinephrine, dopamine).
  - Monoamine oxidase inhibitor work by irreversibly binding and inhibiting MAO A and B. This results in increased availability of monoamine neurotransmitters, thereby increasing their release into the synaptic cleft. Because it irreversibly inhibits MAO, it may take up to 2 weeks following discontinuation of the drug before the enzyme is resynthesized to levels adequate for normal monoamine degradation.
- Clinical Use:
  - Atypical depression, anxiety.
- Adverse effects:
  - Hypertensive crisis (most notably with ingestion of tyramine, which is found in many foods such as aged cheese and wine); CNS stimulation. Contraindicated with SSRIs, TCAs, St. John's wort, meperidine, dextromethorphan (to prevent serotonin syndrome).
- Wait 2 weeks after stopping MAO inhibitors before starting serotonergic drugs or stopping dietary restrictions.
- ❖ N.B:
  - The acute onset of headache following a meal in a patient treated with phenelzine raises concern for hypertensive crisis.
  - MAOIs inhibit the metabolism of the monoamines epinephrine, dopamine, and serotonin, and are typically not used as first-line therapy due to drug-drug interactions and dietary restrictions involving foods containing tyramine.
  - Tyramine may be present in aged cheeses, aged or cured meats, aged or fermented soy products, overripe fruits, and some alcoholic beverages.
  - Tyramine is a sympathomimetic monoamine that can facilitate the release of other sympathomimetic monoamines, such as adrenaline.
  - Tyramine metabolism is inhibited in the presence of MAOIs which causes an increased sympathomimetic (adrenergic) effect that can result in a severe "hypertensive crisis." This commonly presents first as a headache but can lead to intracranial bleeding, stroke, and death.



## Atypical antidepressants

## Bupropion

- Mechanism of action:
  - ↑ norepinephrine and dopamine via unknown mechanism.
- Clinical uses:
  - Bupropion is an antidepressant with mild stimulant properties that can be particularly helpful for depressed patients with low energy, impaired concentration and hypersomnia.
  - Bupropion has a favorable side effect profile (no weight gain or sexual side effects) and activating effects, making it a good choice for patients with weight gain or SSRI-related sexual side effects.
  - Also used for smoking cessation.
- Toxicity:
  - Stimulant effects (tachycardia, insomnia), headache.
  - It is associated with an increased seizure risk at high doses. Bupropion is contraindicated in patients with seizure disorders, anorexia, and bulimia nervosa.

## Mirtazapine

- Mechanism of action:
  - $\alpha_2$ -antagonist (↑ release of NE and 5-HT).
- Toxicity:
  - Sedation (which may be desirable in depressed patients with insomnia), ↑ appetite → weight gain (which may be desirable in elderly or anorexic patients), dry mouth.

## Trazodone

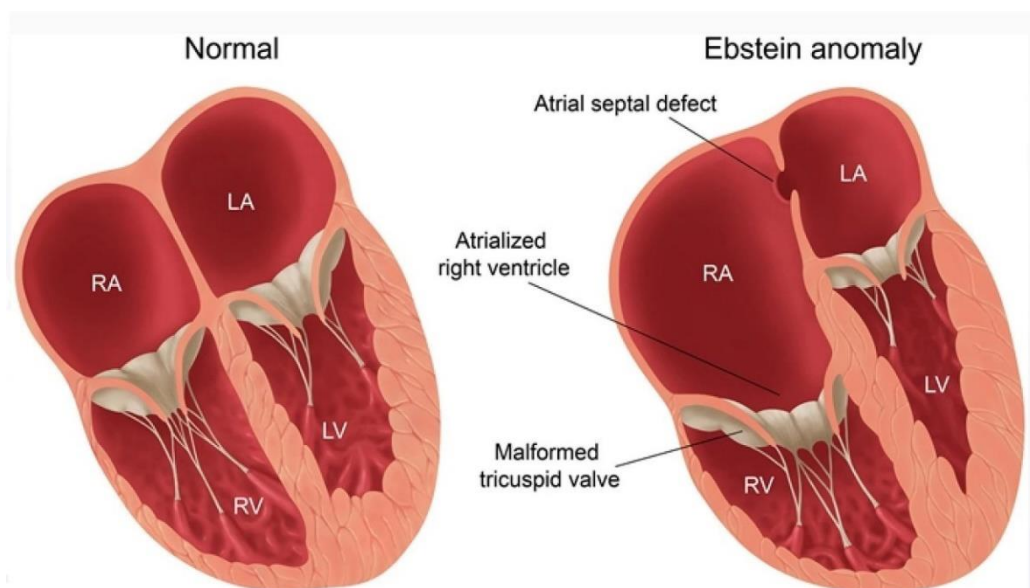
- Mechanism of action:
  - Used primarily for insomnia, as high doses are needed for antidepressant effects.
- Toxicity:
  - Sedation, nausea, priapism, postural hypotension.
  - Called traZZobone due to sedative and male-specific side effects.

**Varenicline**

- Mechanism of action:
  - Nicotinic ACh receptor partial agonist. **Used for smoking cessation.**
- Toxicity: sleep disturbance.

**Lithium**

- Mechanism of action:
  - Not established; possibly related to inhibition of phosphoinositol cascade.
- Clinical Use:
  - Mood stabilizer for bipolar disorder; blocks relapse and acute manic events.
- Adverse effects:
  - Tremor, **hypothyroidism**, polyuria (**causes nephrogenic diabetes insipidus**), hyperparathyroidism with **hypercalcemia**, teratogenesis.
  - Causes **Ebstein anomaly** in newborn if taken by pregnant mother.
  - Narrow therapeutic window requires close monitoring of serum levels. Almost exclusively excreted by kidneys; most is reabsorbed at PCT with Na. **Thiazide use is implicated in lithium toxicity in bipolar patients.**
  - **Calcium, renal function, and thyroid function should be monitored prior to starting lithium and periodically during therapy. When hypothyroidism develops, it can be treated with T4 and does not necessarily require lithium discontinuation.**



▪ **LiTHIUM:**

- Low **T**hyroid (hypothyroidism).
- **H**eat (Ebstein anomaly).
- **I**nsipidus (nephrogenic diabetes insipidus).
- **U**nwanted **M**ovements (tremor).

❖ **N.B:**

- Bipolar disorder is a highly recurrent illness requiring maintenance treatment with mood stabilizers to decrease the risk of recurrent mood episodes.
- First-line medications for bipolar maintenance treatment include **lithium, the anticonvulsant valproate and the second-generation antipsychotic quetiapine, Lamotrigine**, another anticonvulsant used in maintenance treatment, has been found to be more effective in preventing depression than mania.
- **A mild rash may develop in up to 10% of those treated with lamotrigine. whereas life-threatening Stevens-Johnson syndrome or toxic epidermal necrolysis may occur in 0.1%. Any occurrence of rash during the treatment of lamotrigine requires immediate discontinuation of the drug.**
- The anticonvulsant mood stabilizer valproate can cause **elevated aminotransferases and in rare cases hepatic failure, most commonly in the first 6 months of treatment.**
- **Antidepressant monotherapy should be avoided in bipolar maintenance treatment due to the risk of mood destabilization.**
- Patients with inadequate response to monotherapy and/or severe episodes (psychotic features, aggression, high risk of suicide, frequent episodes with marked impairment requiring hospitalization) often require combination therapy. **Lithium or valproate combined with a second-generation antipsychotic (quetiapine) is recommended as first-line treatment.**

Mood stabilizers in bipolar disorder		
Drug	Indications	Side effects
<b>Lithium</b>	<ul style="list-style-type: none"> <li>• Manic &amp; depressive episodes, maintenance</li> </ul>	<ul style="list-style-type: none"> <li>• Diabetes insipidus</li> <li>• Hypothyroidism</li> <li>• Tremor</li> <li>• Ebstein anomaly</li> </ul>
<b>Valproate</b>	<ul style="list-style-type: none"> <li>• Manic episodes, maintenance</li> <li>• <b>Absence, generalized tonic-clonic, myoclonic seizures</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Hepatotoxicity</b></li> <li>• Neural tube defects</li> </ul>
<b>Carbamazepine</b>	<ul style="list-style-type: none"> <li>• Manic episodes, maintenance</li> <li>• Partial &amp; generalized seizures</li> <li>• <b>Trigeminal neuralgia</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Agranulocytosis</b></li> <li>• Hyponatremia (syndrome of inappropriate antidiuretic hormone)</li> <li>• Neural tube defects</li> </ul>
<b>Lamotrigine</b>	<ul style="list-style-type: none"> <li>• Depressive episodes, maintenance</li> <li>• Focal seizures</li> </ul>	<ul style="list-style-type: none"> <li>• Benign rash</li> <li>• <b>Stevens-Johnson syndrome</b></li> </ul>

## CNS stimulants

- Drugs:
    - Methylphenidate, dextroamphetamine, methamphetamine.
  - Mechanism of action:
    - ↑ catecholamines in the synaptic cleft, especially norepinephrine and dopamine.
  - Clinical Use:
    - **ADHD, narcolepsy**, appetite control.
  - Side effects:
    - Common side effects include **decreased appetite**, weight loss and insomnia.
- ❖ N.B:
- The etiology of narcolepsy is believed to be due to low levels of the stimulatory neurotransmitter orexin (hypocretin), which is involved in maintaining wakefulness and suppressing REM sleep-related phenomena.
  - Treatment is with agents that promote wakefulness (psychostimulants). **Modafinil, a non-amphetamine stimulant, has become the first line agent because it is effective, well tolerated, and drug abuse is rare.** Its mechanism of action is not well described, but it is thought to enhance dopaminergic signaling. Amphetamines are second line agents due to their sympathomimetic side effects (HTN, arrhythmia, psychosis) and risk for dependency.

## Preferred medications for selected psychiatric conditions

PSYCHIATRIC CONDITION	PREFERRED DRUGS
ADHD	Stimulants (methylphenidate, amphetamines)
Alcohol withdrawal	Benzodiazepines (eg, chlordiazepoxide, lorazepam, diazepam)
Bipolar disorder	Lithium, valproic acid, atypical antipsychotics
Bulimia nervosa	SSRIs
Depression	SSRIs
Generalized anxiety disorder	SSRIs, SNRIs
Obsessive-compulsive disorder	SSRIs, venlafaxine, clomipramine
Panic disorder	SSRIs, venlafaxine, benzodiazepines
PTSD	SSRIs, venlafaxine
Schizophrenia	Atypical antipsychotics
Social anxiety disorder	SSRIs, venlafaxine
Tourette syndrome	Performance only: $\beta$ -blockers, benzodiazepines Antipsychotics (eg, fluphenazine, pimozide), tetrabenazine

## **CHAPTER 4**

# **Miscellaneous Topics**

## Human development

## Early development milestones

- You have to know what "normal" is, so you can:
  - Calm parents.
  - Recognize pathology.
  - Interact and talk with children in a developmentally appropriate manner.
- Traditionally, development is tracked by milestone (median for a skill to be attained).
- Children not meeting milestones may need assessment for potential developmental delay.

AGE	MOTOR	SOCIAL	VERBAL/COGNITIVE
Infant	Parents	Start	Observing,
0–12 mo	<p><b>P</b>rimitive reflexes disappear—Moro (by 3 mo), rooting (by 4 mo), palmar (by 6 mo), Babinski (by 12 mo)</p> <p><b>P</b>osture—lifts head up prone (by 1 mo), rolls and sits (by 6 mo), crawls (by 8 mo), stands (by 10 mo), walks (by 12–18 mo)</p> <p><b>P</b>icks—passes toys hand to hand (by 6 mo), <b>P</b>incer grasp (by 10 mo)</p> <p><b>P</b>oints to objects (by 12 mo)</p>	<p><b>S</b>ocial smile (by 2 mo)</p> <p><b>S</b>tranger anxiety (by 6 mo)</p> <p><b>S</b>eparation anxiety (by 9 mo)</p>	<p><b>O</b>rients—first to voice (by 4 mo), then to name and gestures (by 9 mo)</p> <p><b>O</b>bject permanence (by 9 mo)</p> <p><b>O</b>ratory—says “mama” and “dada” (by 10 mo)</p>
Toddler	Child	Rearing	Working,
12–36 mo	<p><b>C</b>ruises, takes first steps (by 12 mo)</p> <p><b>C</b>limbs stairs (by 18 mo)</p> <p><b>C</b>ubes stacked—number = age (yr) × 3</p> <p><b>C</b>ultured—feeds self with fork and spoon (by 20 mo)</p> <p><b>K</b>icks ball (by 24 mo)</p>	<p><b>R</b>ecreation—parallel play (by 24–36 mo)</p> <p><b>R</b>approchement—moves away from and returns to mother (by 24 mo)</p> <p><b>R</b>ealization—core gender identity formed (by 36 mo)</p>	<p><b>W</b>ords—200 words by age 2 (<b>2 zeros</b>), 2-word sentences</p>
Preschool	Don't	Forget, they're still	Learning!
3–5 yr	<p><b>D</b>rive—tricycle (<b>3</b> wheels at <b>3</b> yr)</p> <p><b>D</b>rawings—copies line or circle, stick figure (by 4 yr)</p> <p><b>D</b>exterity—hops on one foot (by 4 yr), uses buttons or zippers, grooms self (by 5 yr)</p>	<p><b>F</b>reedom—comfortably spends part of day away from mother (by 3 yr)</p> <p><b>F</b>riends—cooperative play, has imaginary friends (by 4 yr)</p>	<p><b>L</b>anguage—1000 words by age <b>3</b> (<b>3 zeros</b>), uses complete sentences and prepositions (by 4 yr)</p> <p><b>L</b>egends—can tell detailed stories (by 4 yr)</p>

## Reflexes

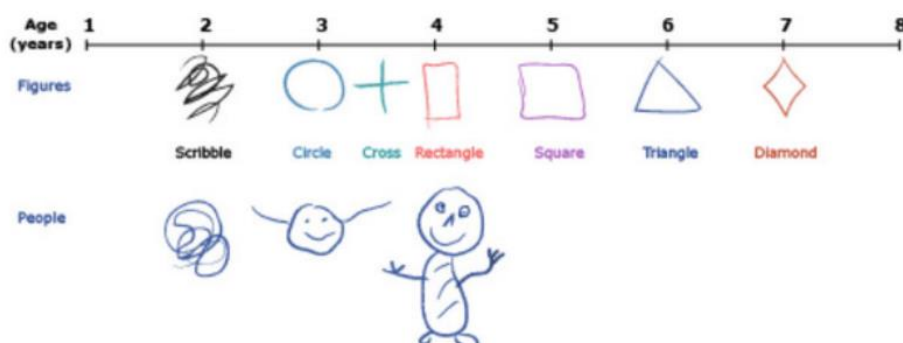
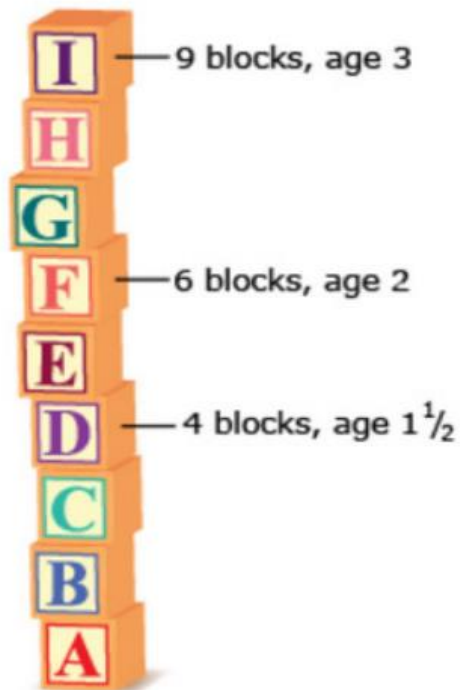
Name	Description	Usually Gone By
Stepping	Step against pressure on foot bottom	6 weeks
Moro	Limb extension when startled (skydiving)	3 months
Rooting	Turns to seek nipple	4 months
Palmar grasp	Grabs objects placed in palm	6 months
Babinski	Dorsiflexion of big toe if sole of foot stroked	12 months

## ❖ Mnemonic:

- Order of reflex disappearance:

- See
- My
- Reflexes
- Pull
- Back

## Block Tower Clues to Age



### Stranger anxiety

- Child is upset when unknown people are present.
- Roughly 6 to 12 months of age.
- Can happen even when parent is present.

### Separation anxiety

- Child is upset when separated from caregiver.
- Roughly 9 months to 2 years of age.
- May not be seen if many people are caregivers.
- If not resolved:
  - Reappears as separation anxiety disorder (school phobia).
  - Treat by acclimating parents and child to be apart, not by rearranging school setting.



### Disease prevention

- A. Primary:
- Prevent disease before it occurs (HPV vaccination).
- B. Secondary:
- Screen early for and manage existing but asymptomatic disease (Pap smear for cervical cancer).
- C. Tertiary:
- Treatment to reduce complications from disease that is ongoing or has long-term effects (chemotherapy).
- D. Quaternary:
- Identifying patients at risk of unnecessary treatment, protecting from the harm of new interventions (electronic sharing of patient records to avoid duplicating recent laboratory and imaging studies).

### Major medical insurance plans

#### Health Maintenance Organization

- Patients are restricted (except in emergencies) to a **limited panel** of providers who are in the network.
- Payment is denied for any service that does not meet established, evidence-based guidelines.
- **Requires referral from primary care provider** to see a specialist.

#### Point of Service

- Patients are **allowed to see providers outside of the network**, but have **higher out-of-pocket costs**, including higher copays and deductibles, for out-of-network services.
- **Requires referral from primary care provider to see a specialist.**

#### Exclusive Provider Organization

- Patients are **limited** (except in emergencies) to a network of doctors, specialists, and hospitals.
- **Does not require referral** from primary care provider to see a specialist.

### Preferred Provider Organization

- Patients are **allowed to see physicians who are within or outside of the network**. All services have higher copays and deductibles.
- **Does not require referral from primary care provider to see a specialist.**

### Healthcare payment models

#### Fee-for-service

- Patient pays for each individual service.

#### Discounted fee-for service

- Patient pays for each individual service at a predetermined, discounted rate.

#### Capitation

- **Physicians receive a set amount per patient assigned to them per period of time, regardless of how much the patient uses the healthcare system.**

#### Bundled payment

- Healthcare organization receives a set amount per service, regardless of ultimate cost, to be divided among all providers and facilities involved.

#### Global payment

- Patient pays for all expenses associated with a single incident of care with a single payment. **Most commonly used during elective surgeries**, as it covers the cost of surgery as well as the necessary pre- and postoperative visits.

### Medicare and Medicaid

- Medicare and Medicaid: federal social healthcare programs that originated from amendments to the Social Security Act.
- Medicare is available to patients **≥ 65 years old, < 65 with certain disabilities, and those with end-stage renal disease**.
- Medicaid is joint federal and state health assistance for people **with limited income and/ or resources**.

- Medicare is for Elderly.
- Medicaid is for Destitute.
- The 4 parts of Medicare:
  - **Part A:** Hospital insurance, home hospice care.
  - **Part B:** Basic medical bills (doctor's fees, diagnostic testing).
  - **Part C:** (parts A + B = Combo) delivered by approved private companies.
  - **Part D:** Prescription Drugs.

### Hospice care

- Medical care focused on **providing comfort and palliation instead of definitive cure**. Available to patients on Medicare or Medicaid and in most private insurance plans whose life expectancy is < 6 months.
- During end-of-life care, priority is given to improving the patient's comfort and relieving pain, and care often includes opioid medications. Facilitating comfort is prioritized over potential side effects (respiratory depression). This prioritization of positive effects over negative effects is known as the **principle of double effect**.
- Patients with advanced metastatic cancers or other terminal illnesses and a life expectancy of <6 months should be evaluated for hospice care.

Hospice model
<ul style="list-style-type: none"> <li>• Focus on quality of life, not cure or life prolongation</li> <li>• Symptom control (pain, nausea, dyspnea, agitation, anxiety, depression)</li> <li>• Interdisciplinary team (medical, nursing, psychosocial, spiritual, bereavement care)</li> <li>• Services provided at home, assisted living facility, or dedicated facility</li> <li>• Requires survival prognosis of <math>\leq 6</math> months</li> </ul>

**Common causes of death (US) by age**

	< 1 YR	1–14 YR	15–34 YR	35–44 YR	45–64 YR	65+ YR
#1	Congenital malformations	Unintentional injury	Unintentional injury	Unintentional injury	Cancer	Heart disease
#2	Preterm birth	Cancer	Suicide	Cancer	Heart disease	Cancer
#3	SIDS	Congenital malformations	Homicide	Heart disease	Unintentional injury	Chronic respiratory disease

**Conditions with frequent hospital readmissions**

Readmissions may be reduced by discharge planning and outpatient follow-up appointments. The table below is based on readmission for any reason within 30 days of discharge.

	MEDICARE	MEDICAID	PRIVATE INSURANCE	UNINSURED
#1	Congestive HF	Mood disorders	Maintenance of chemotherapy or radiotherapy	Mood disorders
#2	Septicemia	Schizophrenia/psychotic disorders	Mood disorders	Alcohol-related disorders
#3	Pneumonia	Diabetes mellitus with complications	Complications of surgical procedures or medical care	Diabetes mellitus with complications

## Quality and safety

## Safety culture

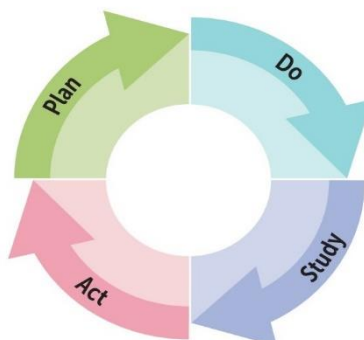
- Organizational environment in which everyone can freely bring up safety concerns without fear of censure.
- Facilitates error identification.
- Event reporting systems collect data on errors for internal and external monitoring.

## Human factors design

- **Forcing functions** (those that prevent undesirable actions [connecting feeding syringe to IV tubing]) are the most effective.
- **Standardization** improves process reliability (clinical pathways, guidelines, checklists).
- **Simplification** reduces wasteful activities (consolidating electronic medical records).
- Deficient designs hinder workflow and lead to staff workarounds that bypass safety features (patient ID barcodes affixed to computers due to unreadable wristbands).

## PDSA cycle

- Process improvement model to test changes in real clinical setting. Impact on patients:
  - **Plan:** define problem and solution.
  - **Do:** test new process.
  - **Study:** measure and analyze data.
  - **Act:** integrate new process into workflow.

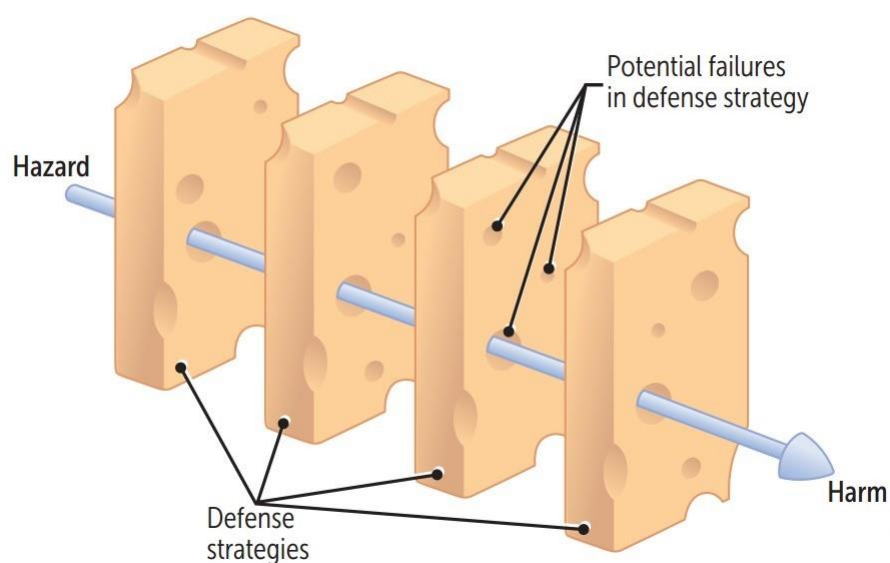


## Quality measurements

	Measure	Example
<b>Structural</b>	Physical equipment, resources, facilities	Number of diabetes educators
<b>Process</b>	Performance of system as planned	Percentage of diabetic patients whose HbA1c was measured in the past 6 months
<b>Outcome</b>	Impact on patients	Average HbA1c of patients with diabetes
<b>Balancing</b>	Impact on other systems/outcomes	Incidence of hypoglycemia among patients who tried an intervention to lower HbA1c

## Swiss cheese model

- Focuses on systems and conditions rather than an individual's error.
- The risk of a threat becoming a reality is mitigated by differing layers and types of defenses.
- Patient harm can occur despite multiple safeguards when “the holes in the cheese line up”.



### Types of medical errors

- May involve patient identification, diagnosis, monitoring, nosocomial infection, medications, procedures, devices, documentation, handoffs.
- Medical errors should be disclosed to patients, independent of immediate outcome (harmful or not).

#### A. Active error:

- Occurs at level of frontline operator (wrong IV pump dose programmed).
- Immediate impact.

#### B. Latent error:

- Occurs in processes indirect from operator but impacts patient care (different types of IV pumps used within same hospital).
- Accident waiting to happen.

### Medical error analysis

	Design	Methods
<b>Root cause analysis</b>	<ul style="list-style-type: none"> <li>▪ <b>R</b>etrospective approach.</li> <li>▪ Applied after failure event to prevent recurrence.</li> </ul>	Uses records and participant interviews to identify all the underlying problems (process, people, environment, equipment, materials, management) that led to an error.
<b>Failure mode and effects analysis</b>	<ul style="list-style-type: none"> <li>▪ <b>F</b>orward-looking approach.</li> <li>▪ Applied before process implementation to prevent failure occurrence.</li> </ul>	Uses inductive reasoning to identify all the ways a process might fail and prioritizes them by their probability of occurrence and impact on patients.

## ❖ N.B:

1. Preventable medical errors involve harm to the patient by an act of commission or omission rather than from the underlying disease and are the result of failure to follow evidence-based best practice guidelines.
2. Sleep deprivation in physicians often causes cognitive impairment, resulting in medical errors. Although mandated resident work-hour limitations are in place, it is the responsibility of all physicians to self-regulate their workloads to promote patient safety.
3. A discharge checklist detailing medication changes and follow-up appointments can significantly facilitate a patient's transition from the hospital and improve adherence to outpatient treatment. Individuals who experience a smooth transition from the inpatient to the outpatient setting are at lower risk for early rehospitalization.
4. Communication failures between physicians during patient handoffs are a large contributor to medical errors and adverse patient outcomes.
  - Medical errors resulting from communication failures between medical providers are most effectively addressed by implementing a systematic signout process that includes checklists to improve efficacy and accuracy.
  - Checklists are an important tool to prevent undesired medical outcomes that result from physician communication failures during the patient handoff process.
5. Patients' misunderstanding of medication use can result in medication errors, including potential overdose, toxicity, and withdrawal.
  - Physicians must assess the patient's understanding and provide targeted education to address misconceptions.
6. Avoiding the use of unsafe abbreviations and trailing zeros in medication orders can help reduce the incidence of medication errors.
7. Risk of wrong-site surgery can be reduced by requiring "dual identifiers" (usually a nurse and physician) to independently confirm that they have the correct patient, site, and procedure. Checks must be truly independent to ensure patient safety.
8. Effective discharge planning requires collaboration of multiple disciplines (physician, nurse, social worker). A social worker can be instrumental in assessing whether the patient has adequate family or caregiver support at home.



## **CHAPTER 5**

# **Ethics**

## Physician-Patient Relationship

- The physician-patient relationship is a potent healing partnership based on trust.

## General rules

1. Patient is number one; always place the interests of the patient first:

- Choose the patient's comfort and safety over yours or anyone else's.
  - Make it a point to ask about and know the patient's wishes.
2. Nothing should be between you and patient (no barriers):
- Get rid of tables and computers. If you must have a table, pick the smallest one.
  - Ask family members to leave the room. If patient says that he or she wants them to stay, then that is okay.
  - In situations in which a parent's presence may interfere with obtaining honest answers from an adolescent patient, physicians should politely ask the parent to wait outside and interview the patient privately. This is also important when discussing drugs, alcohol, tobacco, and sexual activity with teenagers.

3. Tell the patient everything, even if he or she does not ask:

- Answer any question that is asked.
- Patient should know what you know and as soon as you know it.
- Do not force a patient to hear bad news if he does not want it at that moment, but do try to discuss it with him or her as soon as possible.
- If you have only partial information, say that it is partial and tell what you know.
- We tell them so they tell us. Make reciprocity the norm.
- Information should flow through the patient to the family, not the reverse.
- Patients' misunderstanding of medication use can result in medication errors, including potential overdose, toxicity, and withdrawal. Physicians must assess the patient's understanding and provide targeted education to address misconceptions.

4. Work on long-term relationships with patients, not just short-term problems:
  - Make eye contact.
  - Defined touch: tell him or her what you are doing.
  - Both patient and physician should both be sitting at the same eye level if at all possible.
5. Listening is better than talking:
  - Be an “information sponge”. You know what matters, but they don’t.
  - Getting the patient to talk is generally better than having the physician talk.
  - Ask what the patient knows before explaining.
  - End encounter by asking, “Is there anything else?”
  - Listen without interrupting.
  - Allow silences while patients search for words.
6. Negotiate rather than order:
  - Treatment choices are the result of agreement, not commands by the physician.
  - Remember, the patient makes medical decisions from the choices provided by the physician.
  - Relationship and agreement support adherence.
7. Admit to the patient when you make a mistake:
  - Everything is your responsibility.
  - Take responsibility. Don’t blame it on the nursing staff or on a medical student.
  - Admit the mistake even if it was corrected and the patient is fine.
8. Never “pass off” your patient to someone else:
  - Refer to psychiatrist or other specialist when beyond your expertise (usually the wrong answer).
9. Express empathy, then give control: “I’m sorry, what would you like to do?”
  - Important when faced with a patient who is grieving or is angry.
  - Important when faced with angry or upset family members.

- When interacting with difficult patients, it is best to try to calm them, explain your position and inquire more about what troubles them by using open-ended questions.
10. Agree on problem before moving to solution:
- Discuss diagnosis fully before moving to treatment options.
  - Ask what patient knows about diagnosis before explaining it.
  - Tell the patient your perceptions and conclusions about the condition before moving to treatment recommendations.
  - Informed consent requires the patient to fully understand what is wrong.
  - Offering a correct treatment before the patient understands his or her condition is wrong.
11. Patients do not get to select inappropriate treatments:
- Patients select treatments, but only from presented, appropriate choices.
  - If a patient asks for an inappropriate medication that he heard advertised, explain why it is not indicated.
  - Make conversations positive. Talk about options that are available; don't just say no to a patient's request.
12. Never lie:
- There is no such thing as a "white lie".
  - Do not lie to patients, their families, or insurance companies.
  - Do not deceive to protect a colleague.
13. Accept the health beliefs of patients:
- Be accepting of benign folk medicine practices. Expect them.
  - Diagnoses need to be explained in the way patients can understand, even if not technically precise.
14. Accept patients' religious beliefs and participate if possible:
- Your goal is to make the patient comfortable. Religion is a source of comfort to many.
  - When an ill patient requests your prayers in an acute setting, it is appropriate to offer your personal support without interjecting your personal beliefs into the interaction. The overriding goal in these situations is to "do no harm". This can be achieved by not disagreeing with the patient, not entering

into a religious debate with them, and not displacing responsibility for the care of the patient onto others

- Of course, you are not expected to do anything against your own religious or moral beliefs, or anything which risks patient's health.

15. Anything that increases communication is good:

- Take the time to talk with patients, even if others are waiting.
- Ask "why?"
- Ask about the patient beyond the disease: job, family, children, etc.
- Be available. Take calls. Answer emails.

### Types of Questions and Statements

A. Open-ended question:

- Open-ended questions and statements are **the most effective way to begin the interview** "Please tell me more about your pain".
- Once the patient provides an initial history, the physician can use closed-ended and follow-up questions to clarify certain points and fill gaps in the history.

B. Closed-ended question: limits answer (**yes or no questions**).

C. Leading question: suggests or indicates preferred answer.

D. Confrontation: brings to the patient's attention some aspect of appearance or demeanor.

E. Facilitation: gets the patient to continue a thought, talk more, "tell me about that...".

## Legal issues related to medical practice

1. Patients have the sole right to determine what treatments they shall and shall not accept (Autonomy):
  - **Autonomy, ethically, is more important than beneficence.** Beneficence, trying to do good for others, is generally a good thing-but trying to help someone is not as important as following her wishes.
  - **Every individual has autonomy over his/her own body**, including all reproductive health decisions (sterilization, abortion, contraception). **Consent is obtained from the patient alone.** Although the physician can encourage the patient to share and discuss her decision to undergo the procedure with her partner, **consent from a spouse (or unmarried partner) is not required.**
  - **When a patient refuses potentially life-saving treatment, it is important to fully discuss the specific reasons for the decision before honoring it.**
2. Competent patients have the right to refuse medical treatment:
  - Patients have control over their own bodies. These are not exceptions:
    - Preserving life.
    - It's like a suicide.
    - Professional ethics.
3. Assume that the patient is competent (unless **clear** behavioral evidence indicates otherwise):
  - The patient does not have to prove to you that he is competent. You have to have clear evidence to assume that he is not.
  - Competence is a legal, not a medical issue.
  - Clear behavioral evidence would be:
    - Gross **psychosis**.
    - Cognitive capacity prevents communication (**Dementia**).
    - **Suicide** attempt.
4. When surrogates make decisions for a patient, they should use the following criteria and in this order:
  - A. Subjective standard:
    - Actual intent, advance directive.
    - **What did the patient say in the past?**
  - B. Substituted judgment:
    - Who best represents the patient?
    - **What would patient say if he or she could?**

C. **Best-interest standard:**

- Burdens versus benefits.
- Interests of patient, not preferences of the decision-maker.

5. If patient is incompetent to make decisions, physician may rely on advance directives:

- Advance directives Instructions given by a patient in anticipation of the need for a medical decision. Details vary per state law.

▪ **Order of Decision Making:**A. **A patient with capacity supersedes all else.**B. **Medical power of attorney:**

- **Patient designates an agent to make medical decisions in the event that he/she loses decision-making capacity.** The proxy overrules all other possible surrogate decision makers, including family members.

C. **Living will:**

- The living will **is a document outlining a patient's wishes.**
- A document clearly stating, "I never want dialysis" is more valid than a family member or friend saying, "From what I know about him, he would not want dialysis," or "He told me he never wants dialysis."
- Advance directives are a matter of documentation. A written living will that makes concrete statements such as "I never want blood transfusion or chemotherapy" is valid.

D. **Persons clearly familiar with the patient's wishes:**

- The problem with this is one of documentation. If the patient loses capacity, it is difficult for a friend to document that she knew the patient's wishes better than the family.
- **If the case clearly states that a friend knows and can prove that she knew the patient's wishes, then this is the plan of care that is followed.**

E. **Family:**

- In general, the order of decision making starts with a **spouse.**
- **If there is no spouse, then it goes to adult children, then parents, then siblings.**

F. **Ethics Committee:**

- The ethics committee is important when a patient has lost capacity to make decisions and **the advance directive is missing or unclear.**
- The ethics committee is also important on **issues of medical futility.** This is when the healthcare proxy is asking for tests and treatments that may have no benefit.

G. Court Order:

- The court order is important when the patient has no capacity to understand and **the family is in disagreement**. It is like a house being left equally to four children who cannot agree what to do with it. Examples of when court order is the right answer:

- A patient has no capacity and no proxy; **his family is split about whether to continue care**.
- Caregivers want to withdraw care and the ethics committee cannot reach a conclusion.

6. Feeding tube is a medical treatment and can be withdrawn at the patient's request:

- Not considered killing the patient, but stopping treatment at patient's request.

- A competent person can refuse even lifesaving hydration and nutrition.

7. Do nothing to actively assist the patient to die sooner:▪ Physician-Assisted Suicide:

- **Physician-assisted suicide is always a wrong answer.**

- Physician assisted suicide is **administered by the patient**, but this is still unethical for the physician.

▪ Euthanasia:

- Euthanasia is **the physician administering treatment** intended to end or shorten the life of the patient.

- **It is always wrong answer.**

▪ Terminal Sedation and Law of Double Effect:

- It is acceptable to administer pain medication even if there is the possibility of the treatment shortening the patient's life.

- For example, **it is acceptable to give pain medications to a person with COPD who has metastatic cancer even if the only way to relieve pain is to give enough opiates that breathing may be impaired, causing the patient to die earlier.**

- The question is one of intent: If the medications are given with the intent to relieve pain, and as an adverse effect they shorten life, it is ethical. If the primary intent is to shorten life, it is unethical.

8. Brain death is considered death in U.S legal system:

- **If the patient is brain dead, you do not need consent to stop therapy such as mechanical ventilation or antibiotics.**

- **Court order and ethics committee are not correct answers.**



9. The physician decides when the patient is dead:

- If the physician thinks continued treatment is futile (the patient has shown no improvement), but the surrogate insists on continued treatment, the treatment should continue.
- If there are no more treatment options (the patient is brain dead), and the family insists on treatment, there is nothing the physician can do; treatment must stop (futile care).

10. Never abandon a patient:

- Lack of financial resources or lack of results are never reasons to stop treatment of a patient.
- An annoying or difficult patient is still your patient.
- You cannot ever threaten abandonment.
- All patients who present to the emergency department must receive an appropriate screening medical exam and stabilization of their condition, regardless of ability to pay.
- Conscientious refusal of treatment occurs when a provider refuses to provide care due to moral conflict. Providers who cannot, in good conscience, provide treatment that a patient requests, are obligated to refer the patient in a timely fashion to another provider who can.

11. Keep the physician - patient relationship within bounds:

- Intimate social contact with anyone who is or has been a patient is prohibited. AMA guidelines say, "for at least 2 years".
- Do not date parents of pediatric patients or children of geriatric patients.
- Do not treat friends or family.
- If patients are inappropriate, gently but clearly let them know what acceptable behavior would be.
- Any gift from a patient beyond a small token (cards, photographs, cookies) should be declined.

12. Stop harm from happening:

- Beyond "do no harm", you must stop anyone from hurting himself or others.
- Take whatever action is required to prevent harm.
- Harm can be spreading disease, physical assault, psychological abuse, neglect, infliction of pain or anything which produces notable distress.
- You must also protect your patient, or anyone not your patient, from being hurt by another.

### 13. Always obtain informed consent:

- Full, informed consent requires that the patient has received and understood five pieces of information:
    - Nature of procedure.
    - Purpose or rationale.
    - Benefits.
    - Risks.
    - Availability of alternatives.
  - **Exceptions to informed consent:**
    - **Emergency** (Implied consent in an emergency).
    - **Waiver by patient** (patient explicitly waives the right of informed consent).
    - **Patient is incompetent** (Patient lacks decision-making capacity or is legally incompetent).
    - **Therapeutic privilege**: withholding information when disclosure would severely harm the patient or undermine informed decision-making capacity.
  - Consent **can be oral**.
  - A signed paper the patient has not read or does not understand does NOT constitute informed consent.
  - Patient must be informed that he or she can revoke written consent at any time, even orally.
  - **Physicians must ensure the appropriate use of medical interpreters to promote adequate patient understanding and participation in the decision-making process. This is particularly important during the informed consent process.**
  - **Patients who are temporarily incapacitated should not be allowed to make important health care decisions. Health care decisions should instead be made by surrogate decision makers, such as close family members or the patient's personal physician. When an incapacitated patient presents alone in an emergent setting, however, consent to treatment is presumed.**
- ❖ N.B:
- **Physicians must respect parents' medical decisions for their children, with the exception of refusal of life-saving treatment. Physicians must counsel parents about the health risks of refusing vaccination and document the discussion in the medical chart. In addition, physicians should be aware of the vaccination exemption laws in their state.**
  - Currently, all states allow medical exemption from vaccination (allergy to vaccine components). Some states also allow for exemption based on a parent's religious and/or personal beliefs. **If a child is unvaccinated and is not exempt, he/she may not be able to enroll in day care or school, depending on the state.**

- The physician must respect the mother's decision but is obligated to inform her about the health-associated risks and benefits as well as the potential consequences (school enrollment). The discussion should be fully documented in the medical record.

14. Special rules apply with children:

- Children **younger than 18 years** are minors and are legally incompetent.

- **Exceptions:**

A. Emancipated minors:

- If older than 13 years and **taking care of self** (living alone) treat as an adult.
- **Marriage** makes a child emancipated, as does serving in the **military**.

B. Partial emancipation:

- Many states have special ages of consent, generally, age 14 and older for certain issues only (**confidentiality should be also maintained in this exceptions**):
  - Substance drug treatment.
  - Prenatal care.
  - Sexually transmitted disease treatment.
  - Birth control (contraception).

❖ N.B:

- **Unemancipated minors normally cannot consent to their own medical treatment. Parents or legal guardians must provide consent on the minor's behalf before the physician can proceed, although there are exceptions in emergencies and other situations.**

Circumstances in which minors do not require consent	
Medical circumstances	<ul style="list-style-type: none"> <li>• Emergency care</li> <li>• Sexually transmitted infections</li> <li>• Substance abuse (most states)</li> <li>• Prenatal care (most states)</li> </ul>
Emancipated minor	<ul style="list-style-type: none"> <li>• Homeless</li> <li>• Parent</li> <li>• Married</li> <li>• Military</li> <li>• Financially independent</li> <li>• High school graduate</li> </ul>

16. Parents cannot withhold life- or limb-saving treatment from their children:

- If parents refuse permission to treat child: If immediate emergency → go ahead and treat.
- If parents refuse to consent to treatment of their child for a non-emergency but fatal medical condition → the physician should seek a court order mandating treatment.
- If not life- or limb-threatening (child needs minor stitches) → listen to the parents
- Note that the child cannot give permission. A child's refusal of treatment is irrelevant.

17. For the purposes of the USMLE, issues governed by laws that vary widely across states cannot be tested. This includes elective abortions (minor and spousal rights differ by locality) and legal age for drinking alcohol (vary by state).

18. Good Samaritan Laws limit liability in nonmedical settings:

- Not required to stop to help.
- If help offered, shielded from liability provided:
  - Actions are within physician's competence.
  - Only accepted procedures are performed.
  - Physician remains at scene after starting therapy until relieved by competent personnel.
  - No compensation changes hands.

19. Confidentiality is absolute:

- Physicians cannot tell anyone anything about their patient without the patient's permission.
- Physician must strive to ensure that others cannot access patient information.
- Confidential patient information should be disclosed only to fellow health care workers who are directly involved in the patient's care. Physicians should avoid discussing a patient's medical condition in public areas where comments might be overheard, inappropriate inquiries from colleagues curious about a patient's medical condition should be politely but firmly rebuffed.
- If you receive a court subpoena, show up in court but do not divulge information about your patient.
- General principles for exceptions to confidentiality:
  - Potential physical harm to others is serious and imminent.
  - Likelihood of harm to self is great.
  - No alternative means exist to warn or to protect those at risk.
  - Physicians can take steps to prevent harm.
- Patient confidentiality should not be maintained if it endangers the health and welfare of others. In cases of HIV, public health laws require reporting of the patient's positive test results to the local health department. The health department (and not the physician) typically makes contact with all of the

patient's sexual partners and informs them of being at risk for the disease, without giving any identifying information about the partner who placed them at risk.

- Examples of exceptions to patient confidentiality (many are state-specific) include the following (“The physician’s good judgment **SAVED** the day”):
  - **S**uicidal/homicidal patients.
  - **A**buse (children, elderly, and/or prisoners).
  - Duty to protect: State-specific laws that sometimes allow physician to inform or somehow protect potential **V**ictim from harm.
  - **E**pileptic patients and other impaired automobile drivers.
  - Reportable **D**iseases (STIs, hepatitis, food poisoning); physicians may have a duty to warn public officials, who will then notify people at risk. Dangerous communicable diseases, such as TB or Ebola, may require involuntary treatment.
- 20. Patients should be given the chance to state DNR (**Do Not Resuscitate**) orders, and physicians should follow them:
  - **DNR refers only to cardiopulmonary resuscitation.**
  - Continue with ongoing treatments.
  - DNR decisions are made by the patient or surrogate.
- 21. Detain patients to protect them or others: if they harm to self or to others.
- 22. Remove from patient contact health care professionals who pose risk to patients:
  - Types of risks:
    - Infectious disease (TB).
    - Substance-related disorders.
    - Depression (or other psychological issues).
    - Incompetence.
  - Actions:
    - Insist that they take time off.
    - Contact their supervisors if necessary.

## ❖ N.B:

1. As part of the admission process, patients should be asked whether they have advance directives and informed about options for creating them if they do not. Some physicians may be reluctant to discuss these issues, but studies have shown that most patients prefer to have end-of-life discussions with their caregivers.
  - Advance directives consist of 2 main components (a living will and a health care proxy):
    - A. A living will specify the patient's end-of-life wishes and often includes specific directives regarding intubation, cardiopulmonary resuscitation, enteral feeding, and other life-prolonging interventions. A living will communicate the patient's own wishes if he or she becomes incapacitated, and it overrules the wishes of the family.
    - B. A health care proxy document allows the patient to designate a specific individual to make health care decisions should the patient become incapacitated. The proxy decision maker must always make these decisions in accordance with the patient's wishes as outlined in the living will.
  - Advance directives take precedence over the wishes of family members, Physicians should respect patient autonomy and adhere to patients' wishes as outlined in advance directives.
2. When treating patients who have been referred for specialty care or a second opinion, it is imperative to not undermine the patient's relationship with the primary physician.
  - A physician should avoid making negative comments about the quality of care rendered by that practitioner unless practices are imminently dangerous or far outside acceptable standards of care.
3. Abortion is a legal medical procedure in the United States and is performed routinely in specialty clinics and doctors' offices. Although first-trimester abortions are unrestricted, states have different restrictions on second-trimester abortions, including mandatory waiting periods, parental consent for pregnant minors, and mandatory discussion of options.
  - Physicians are not required to provide medical services that are against their personal beliefs. In such cases, the physician should provide referral to providers who will perform the requested procedure.
4. When delivering bad news, a face-to-face visit in a comfortable private setting is preferred as it allows the physician to respond to nonverbal aspects of communication and provide empathy and emotional support as needed.
  - It is also important to assess the patient's understanding of the condition and how much the patient actually wants to know. Other steps include gaining an understanding of cultural/educational/religious issues, making medical information understandable to the patient, and formulating a collaborative treatment plan.
5. Hospice is a palliative, interdisciplinary model of care for patients with a prognosis of  $\leq 6$  months.
  - The focus is on symptom control; quality of life; and psychosocial, spiritual, and bereavement care.
6. The ethical dilemma of using newly deceased patients for training purposes involves weighing the conflicting considerations of respect for patient integrity with the need to train health care providers to perform lifesaving procedures.
  - According to ethical guidelines, permission must be obtained from the family (or from the patient prior to death) before procedures can be performed on a newly deceased patient for training purposes.

7. A pregnant woman who has capacity has the right to refuse treatment, even if it places her unborn child at risk.
  - In the United States, the mother is considered to have ultimate rights over her unborn child, assuming she has capacity. When a mother refuses a procedure or treatment that is in the best interest of the fetus, the physician should provide counseling and education as to why the procedure is necessary.
  - If the mother continues to refuse a procedure that would prevent irreversible harm to the fetus, the hospital ethics committee should be consulted, but the mother should not be coerced or otherwise forced into accepting any form of treatment she does not want.
8. The Health Insurance Portability and Accountability Act protects health information by requiring verbal or written authorization for release of information.
  - Hospitals and physicians' offices frequently have additional policies requiring written forms for release of information and procedures to verify the identity of phone callers.
  - It is important that health care providers be familiar with these rules and disclose only the minimum necessary information.
9. In general, a patient has the right to know a diagnosis.
  - If family members ask for information to be withheld, it is imperative for the physician to understand their reasoning.
  - Occasionally, it is in the patient's best interest to withhold especially distressing news (if a severely depressed patient might become suicidal). Therefore, it is best to clarify the situation with the concerned family members first before deciding how best to proceed.
10. It's important to maintain professional conduct when dealing with patients of all types, ranging from hostile to seductive. Several actions suggest that the patient could have boundary issues. These include:
  - A. Arrival at unscheduled times and/or at closing time (when others are less likely to be available).
  - B. Insistence on seeing the same physician for each visit (for mild conditions) and in private.
  - C. Frequent return visits for nonspecific complaints.
  - D. Health complaints that necessitate examination of private areas or undressing, despite recent normal findings.
  - Physicians should respond politely but firmly to inappropriate patient requests. Maintaining professional boundaries is an important component of the physician-patient relationship.
11. When dealing with an angry patient, the most appropriate response is to remain non-defensive, acknowledge that the patient is upset, and begin the discussion with an open-ended question.
12. Accepting gifts from Interested third parties can Influence a physician's practice in subtle or subconscious ways.
  - Only nonmonetary gifts that are of minimal value and that directly benefit the patient, such as unbiased educational material or drug samples, should be considered.
13. In the absence of an advance directive, a life-saving blood transfusion can be given to a Jehovah's Witness who lacks decision-making capacity.





**Ethical situations**

SITUATION	APPROPRIATE RESPONSE
Patient is not adherent.	Attempt to identify the reason for nonadherence and determine his/her willingness to change; do not coerce the patient into adhering and do not refer him/her to another physician.
Patient desires an unnecessary procedure.	Attempt to understand why the patient wants the procedure and address underlying concerns. Do not refuse to see the patient and do not refer him/her to another physician. Avoid performing unnecessary procedures.
Patient has difficulty taking medications.	Provide written instructions; attempt to simplify treatment regimens; use teach-back method (ask patient to repeat regimen back to physician) to ensure comprehension.
Family members ask for information about patient's prognosis.	Avoid discussing issues with relatives without the patient's permission.
A patient's family member asks you not to disclose the results of a test if the prognosis is poor because the patient will be "unable to handle it."	Attempt to identify why the family member believes such information would be detrimental to the patient's condition. Explain that as long as the patient has decision-making capacity and does not indicate otherwise, communication of information concerning his/her care will not be withheld. However, if you believe the patient might seriously harm himself/herself or others if informed, then you may invoke therapeutic privilege and withhold the information.
A 17-year-old girl is pregnant and requests an abortion.	Many states require parental notification or consent for minors for an abortion. Unless there are specific medical risks associated with pregnancy, a physician should not sway the patient's decision for, or against, an elective abortion (regardless of maternal age or fetal condition).
A 15-year-old girl is pregnant and wants to keep the child. Her parents want you to tell her to give the child up for adoption.	The patient retains the right to make decisions regarding her child, even if her parents disagree. Provide information to the teenager about the practical issues of caring for a baby. Discuss the options, if requested. Encourage discussion between the teenager and her parents to reach the best decision.
A terminally ill patient requests physician assistance in ending his/her own life.	Overwhelming majority of states refuse involvement in any form of physician-assisted death. Physicians may, however, prescribe medically appropriate analgesics even if they shorten the patient's life.
Patient is suicidal.	Assess the seriousness of the threat. If it is serious, suggest that the patient remain in the hospital voluntarily; patient can be hospitalized involuntarily if he/she refuses.
Patient states that he/she finds you attractive.	Ask direct, closed-ended questions and use a chaperone if necessary. Romantic relationships with patients are never appropriate. It may be necessary to transition care to another physician.
A woman who had a mastectomy says she now feels "ugly."	Find out why the patient feels this way. Do not offer falsely reassuring statements (eg, "You still look good").
Patient is angry about the long time he/she spent in the waiting room.	Acknowledge the patient's anger, but do not take a patient's anger personally. Apologize for any inconvenience. Stay away from efforts to explain the delay.
Patient is upset with the way he/she was treated by another doctor.	Suggest that the patient speak directly to that physician regarding his/her concerns. If the problem is with a member of the office staff, tell the patient you will speak to that person.
An invasive test is performed on the wrong patient.	Regardless of the outcome, a physician is ethically obligated to inform a patient that a mistake has been made.

**Ethical situations (continued)**

SITUATION	APPROPRIATE RESPONSE
A patient requires a treatment not covered by his/her insurance.	Never limit or deny care because of the expense in time or money. Discuss all treatment options with patients, even if some are not covered by their insurance companies.
A 7-year-old boy loses a sister to cancer and now feels responsible.	At ages 5–7, children begin to understand that death is permanent, that all life functions end completely at death, and that everything that is alive eventually dies. Provide a direct, concrete description of his sister's death. Avoid clichés and euphemisms. Reassure the boy that he is not responsible. Identify and normalize fears and feelings. Encourage play and healthy coping behaviors (eg, remembering her in his own way).
Patient is victim of intimate partner violence.	Ask if patient is safe and has an emergency plan. Do not necessarily pressure patient to leave his or her partner, or disclose the incident to the authorities (unless required by state law).
Patient wants to try alternative or holistic medicine.	Explore any underlying reasons with the patient in a supportive, nonjudgmental manner. Advise the patient of known benefits and risks of treatment, including adverse effects, contraindications, and medication interactions.
Physician colleague presents to work impaired.	If impaired or incompetent, colleague is a threat to patient safety. Report the situation to local supervisory personnel. Should the organization fail to take action, alert the state licensing board.
Patient is officially determined to suffer brain death. Patient's family insists on maintaining life support indefinitely because patient is still moving when touched.	Gently explain to family that there is no chance of recovery, and that brain death is equivalent to death. Movement is due to spinal arc reflex and is not voluntary. Bring case to appropriate ethics board regarding futility of care and withdrawal of life support.
A pharmaceutical company offers you a sponsorship in exchange for advertising its new drug.	Reject this offer. Generally, decline gifts and sponsorships to avoid any appearance of conflict of interest. The AMA Code of Ethics does make exceptions for gifts directly benefitting patients; gifts of minimal value; special funding for medical education of students, residents, fellows; grants whose recipients are chosen by independent institutional criteria; and funds that are distributed without attribution to sponsors.
Patient requests a nonemergent procedure that is against your personal or religious beliefs.	Provide accurate and unbiased information so patients can make an informed decision. Explain to the patient that you do not perform the procedure but offer to refer him/her to another physician.
Mother and 15-year-old daughter are unresponsive following a car accident and are bleeding internally. Father says do not transfuse because they are Jehovah's Witnesses.	Transfuse daughter, but do not transfuse mother. Emergent care can be refused by the healthcare proxy for an adult, particularly when patient preferences are known or reasonably inferred, but not for a minor based solely on faith.
A child presents with injuries inconsistent with parental story.	Contact child protective services and ensure child is in a safe location. Physicians are required by law to report any reasonable suspicion of child abuse or endangerment.