Behavioral Science
Epidemiology • Biostatistics

USMLE STEP 1

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USMLE Step 1

Behavioral Science

Epidemiology

Biostatistics

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Unit 1

Epidemiology

CHAPTER 1 Epidemiology

1 General Concepts

- Looks at the distribution of disease in a population.
- Focus is on groups, *not* individuals.
- Data is represented numerically in *ratios*.
- Ratio compares existing cases with possible cases.

$$\text{Ratio} = \frac{\text{Numerator}}{\text{Denominator}} = \frac{\text{Existing cases}}{\text{Possible cases}}$$

- Key part of ratio is *denominator*.

▲ **Figure 1–1.0A** Ratio

- Rates converted to ratio by adding multiplier. Most often "per 100,000." (This avoids decimals in the numerator.)
- However, not everything is per 100,000. Example: birth rate is per 1,000 live births.

USMLE® Key Concepts

For Step 1, you must be able to:

- Differentiate incidence versus prevalence.
- How prevalence related to screening test measures.
- Understand and interpret the consequences of changing a test cutoff score for screening tests.
- Recognize the differences between observational studies and clinical trials.
- Identify types of bias and how to avoid them.

Important Concept

- Everything in epidemiology is a ratio.
- Focus on denominator.

2 Types of Rates

2.1 Incidence Rate: *New* Cases

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

- Time period must be specified.
- Usually the focus for acute infections.
- **Attack rate:** Incidence rate where denominator is limited to people with a particular identified risk.
- **Primary prevention:** Stopping someone from getting the disease = preventing incidence.

Memory Aid

Incidence ⇒ Onset

Prevalence ⇒ ALL

2.2 Prevalence Rate: *All* Cases

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

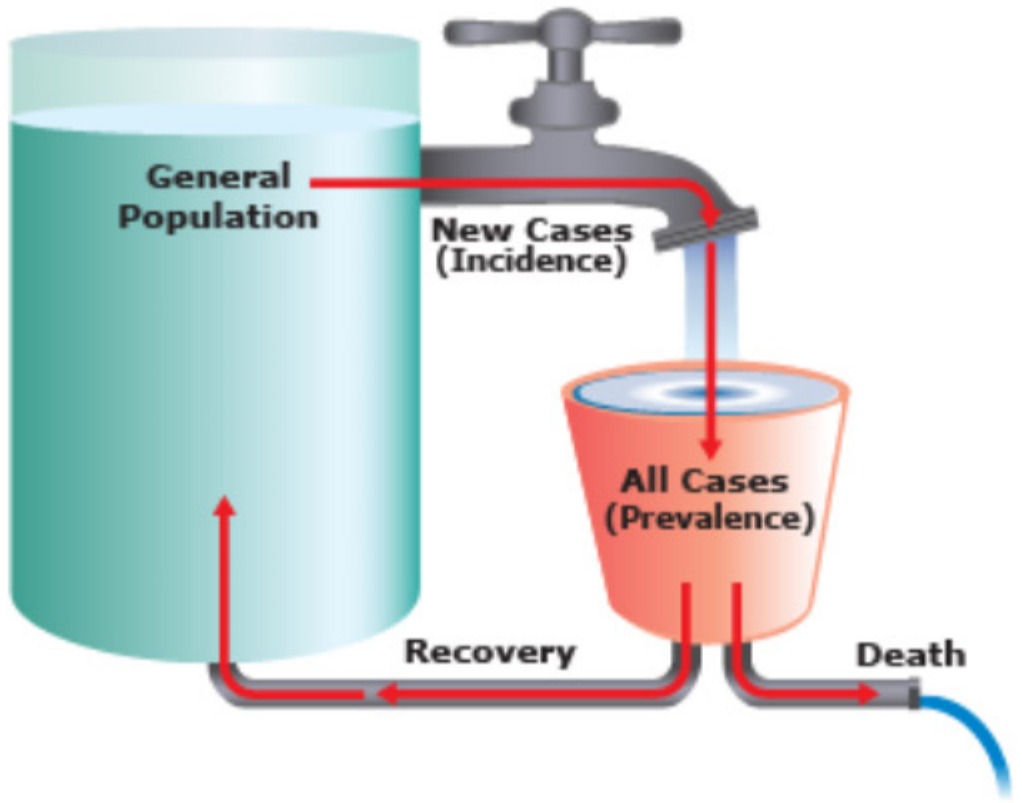
- Time period must be specified.
  - **Point prevalence:** at a particular "point in time."
  - **Period prevalence:** across a span of time.
- Usually the focus for chronic disease.
- **Secondary prevention:** Reducing the cases of the disease = preventing prevalence.

Note that within the same time period:
Prevalence = Incidence + Preexisting cases.

- **Tertiary prevention:** Decreasing negative effects of the disease. "Quality of life."

3 Incidence and Prevalence Together

I × D = P (Incidence × Duration = Prevalence)



▲ **Figure 1–3.0A** Incidence and Prevalence

Common questions: How do prevalence and incidence change if …

- … a cure is discovered?

  Answer: 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).

- … an effective prevention, such as a vaccine, is discovered?

  Answer: 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.

- … an effective therapy prolongs life, but does not cure?

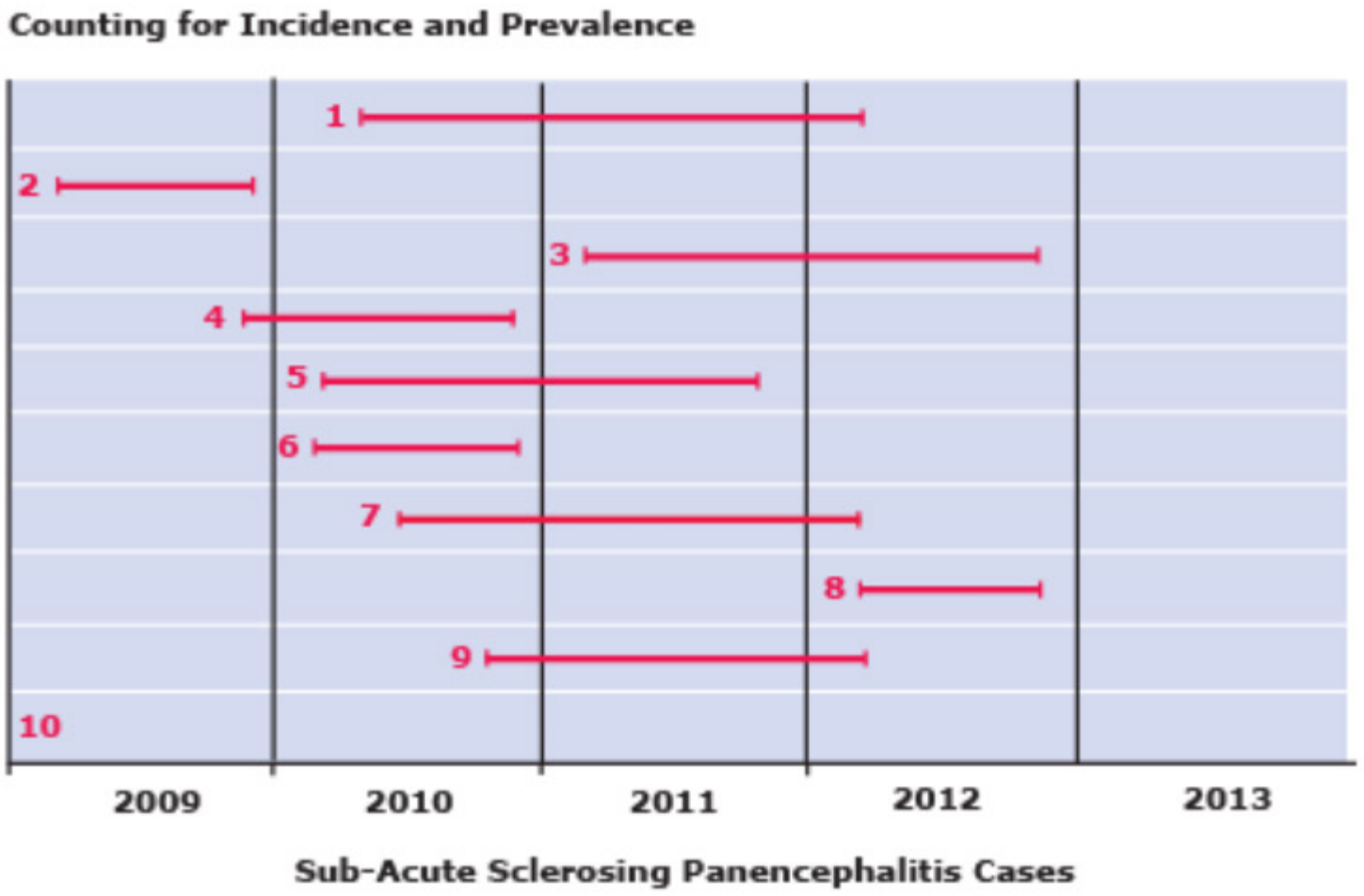
  Answer: Prevalence increases as more people are living longer with the disease.

- … person-to-person transmission is decreased?

  Answer: Incidence will go down, and over time, prevalence will follow.

Important Concept

Change prevalence by changing either incidence or duration.



▲ **Figure 1–3.0B** SSPE

4 Types of Rates: Basic Terms

▼Table 1–4.0A Types of Rates

Type of Rate	Description
Crude rate	Numerator/denominator for total population
Specific rate	Numerator/denominator for sub-groups within population
Standardized rate (adjusted rate)	Removing effects of demographic variables when comparing two or more populations
Case fatality rate	Death due to cause/# with that cause
Proportionate mortality rate	Death due to cause/ALL deaths

Important Concept

Not just who has disease, but out of how many.

Example:

▼Table 1–4.0B Disease Mortality for Two Cities

City One				City Two			
Ages	Disease A	Disease B	Total	Ages	Disease A	Disease B	Total
0 to 24	5,000	2,500	400,000	0 to 24	1,250	625	100,000
25 to 49	20,000	10,000	300,000	25 to 49	13,333	6,667	200,000
50 to 74	25,000	12,500	200,000	50 to 74	37,500	18,750	300,000
Over 74	50,000	25,000	100,000	Over 74	200,000	100,000	400,000
Total	100,000	50,000	1,000,000	**Total**	252,083	125,482	1,000,000

- In both City One and City Two, the age-specific rates for Disease A and B are the same.
- In both cities, the rate for Disease A is twice that of Disease B.
- The crude rates for both Disease A and Disease B are higher in City Two than City One.
  - This is because disease rates are related to age, and City Two has more older people than City One.
  - City Two is not "sicker," just older.
  - If the age distributions were the same, the rates of disease in both cities would be the same as well.

5 Interpreting Diagnostic and Screening Tests

Given a 2 x 2 table showing the data from a screening or diagnostic test, you are expected to calculate and interpret common test parameters.

		Actually Diseased: Yes	Actually Diseased: No
Test Results	Positive	750 TP	50 FP
	Negative	250 FN	950 TN

Important Concept

- Sensitivity = only diseased people.
- Specificity = only healthy people.

Memory Aid

"**T**rues on **T**op divide by everything."

5.1 For Selecting a Test: Computing Screening Test Values

5.1.1 Sensitivity (SEN)

Detecting disease:

- Everyone in the calculation is a diseased person.
- SEN = TP / (TP + FN)
- SEN = 750 / (750 + 250) = 750 / 1,000 = 75%
- *Note:* 1 − SEN = False Negative Rate

	Yes	No
Positive	750	50
Negative	250	950

5.1.2 Specificity (SPEC)

Identifying the healthy:

- Everyone in the calculation is a healthy person.
- SPEC = TN / (TN + FP)
- SPEC = 950 / (950 + 50) = 950 / 1,000 = 95%
- *Note:* 1 − SPEC = False Positive Rate

	Yes	No
Positive	750	50
Negative	250	950

5.2 For Interpreting Test Results

5.2.1 Positive Predictive Value (PPV)

How believable is a positive result?

- Everyone in the calculation got a positive on the test.
- PPV = TP / (TP + FP)
- PPV = 750 / (750 + 50) = 750 / 800 = 93.8%
- Must know this figure to talk to patient who got a positive test result.

	Yes	No
Positive	750	50
Negative	250	950

5.2.2 Negative Predictive Value (NPV)

How believable is a negative result?

- Everyone in the calculation got a negative on the test.
- NPV = TN / (TN + FN)
- NPV = 950 / (950 + 250) = 950 / 1,200 = 79.2%
- Must know this figure to talk to patient who got a negative test result.

	Yes	No
Positive	750	50
Negative	250	950

Important Concept

- Positive predictive value = only positives from test.
- Negative predictive value = only negatives from test.

5.2.3 Accuracy (ACC)

Overall correctness:

- 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%
- Offers single-number, global assessment of the test.

	Yes	No
Positive	750	50
Negative	250	950

Summary of computed values:

SEN = 75% PPV = 93.8%

SPEC = 95% NPV = 79.2%

ACC = 85%

Important Concept

Useful definitions

- **Likelihood ratio positive** (LR+) = SEN / (1− SPEC) = SEN / FP rate
- **Likelihood ratio negative** (LR−) = (1 − SEN) / (SPEC) = FN rate / SPEC

5.3 Putting Things Together

1. If number of new cases of disease increase, what happens to screening test values?

Answer: No change to any of them.

2. If total number of cases of disease increase, what happens to screening test results?

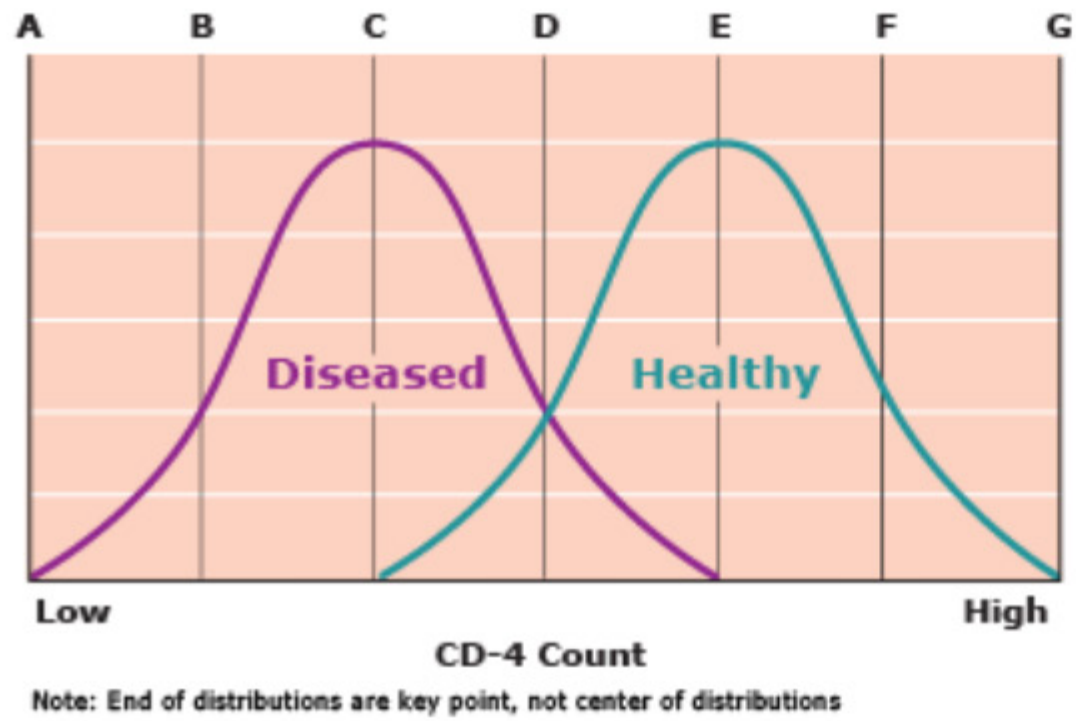
Answer: No change to SEN or SPEC, PPV increases, NPV decreases.

		Actually Diseased	
		Yes	No
Test Results	Positive	750	50
	Negative	250	950

Important Concept

Given a diagnostic or screening test dimension, you are expected to understand and interpret the consequences of changing a test cutoff score.

5.4 Selecting Screening Test Cutoff Values



as SEN ↑, SPEC ↓
as SEN ↑, PPV ↓
as SEN ↑, NPV ↑
as SPEC ↑, PPV ↑

▲ **Figure 1–5.4** Screening Test Cutoff Scores

In this diagram:

A = Lowest possible value

C = Point of optimum SPEC and optimum PPV

D = Point of highest ACC

E = Point of optimum SEN and optimum NPV

G = Highest possible value

The screening test cutoff score will be chosen between C and E, depending on what parameters we want to maximize.

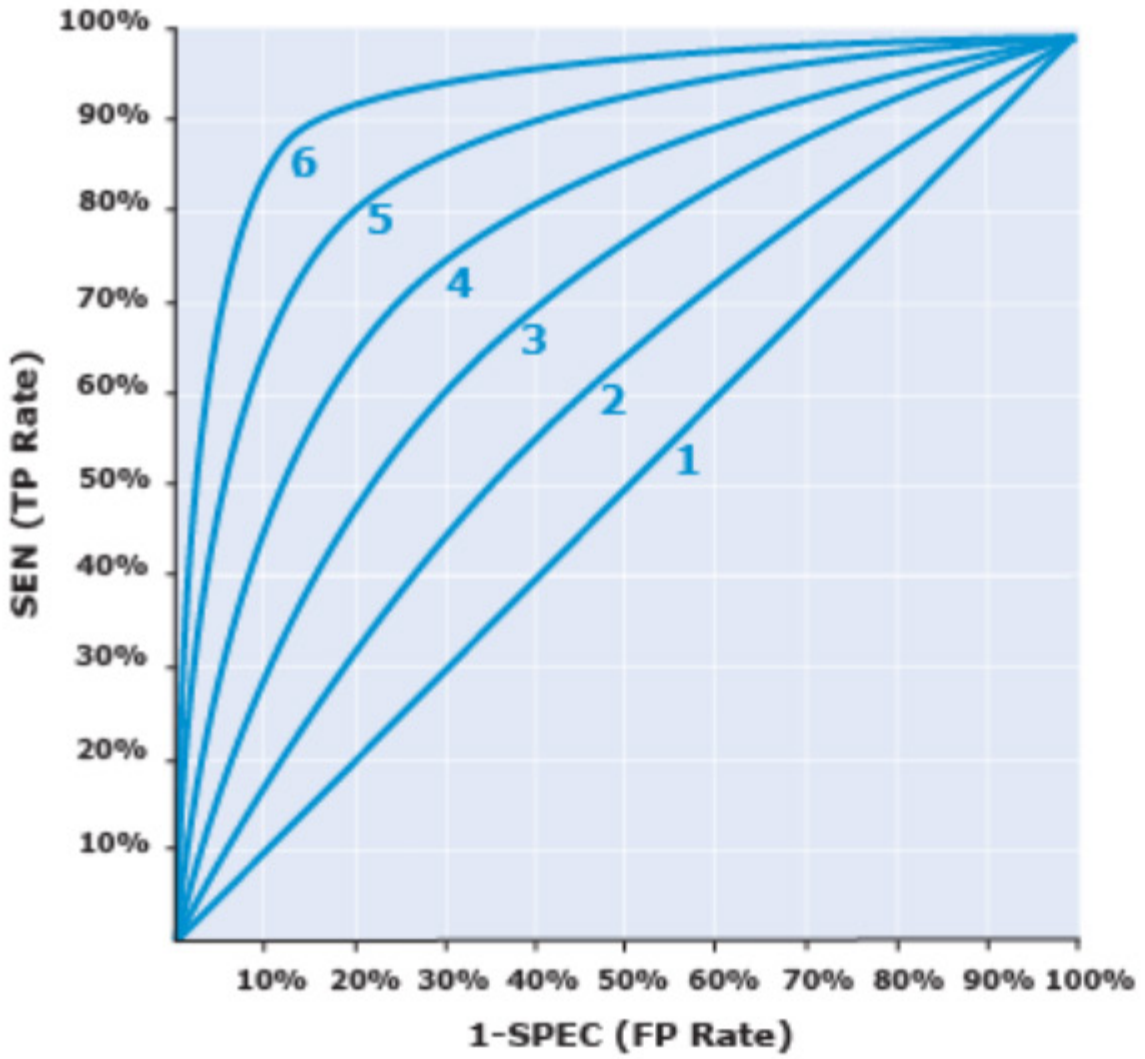
The key links are in the denominators

$$SEN = \frac{TP}{TP + FN} \qquad PPV = \frac{TP}{TP + FP}$$

$$SPEC = \frac{TN}{TN + FP} \qquad NPV = \frac{TN}{TN + FN}$$

5.5 Interpreting Receiver Operating Characteristic Curves: ROC Curves

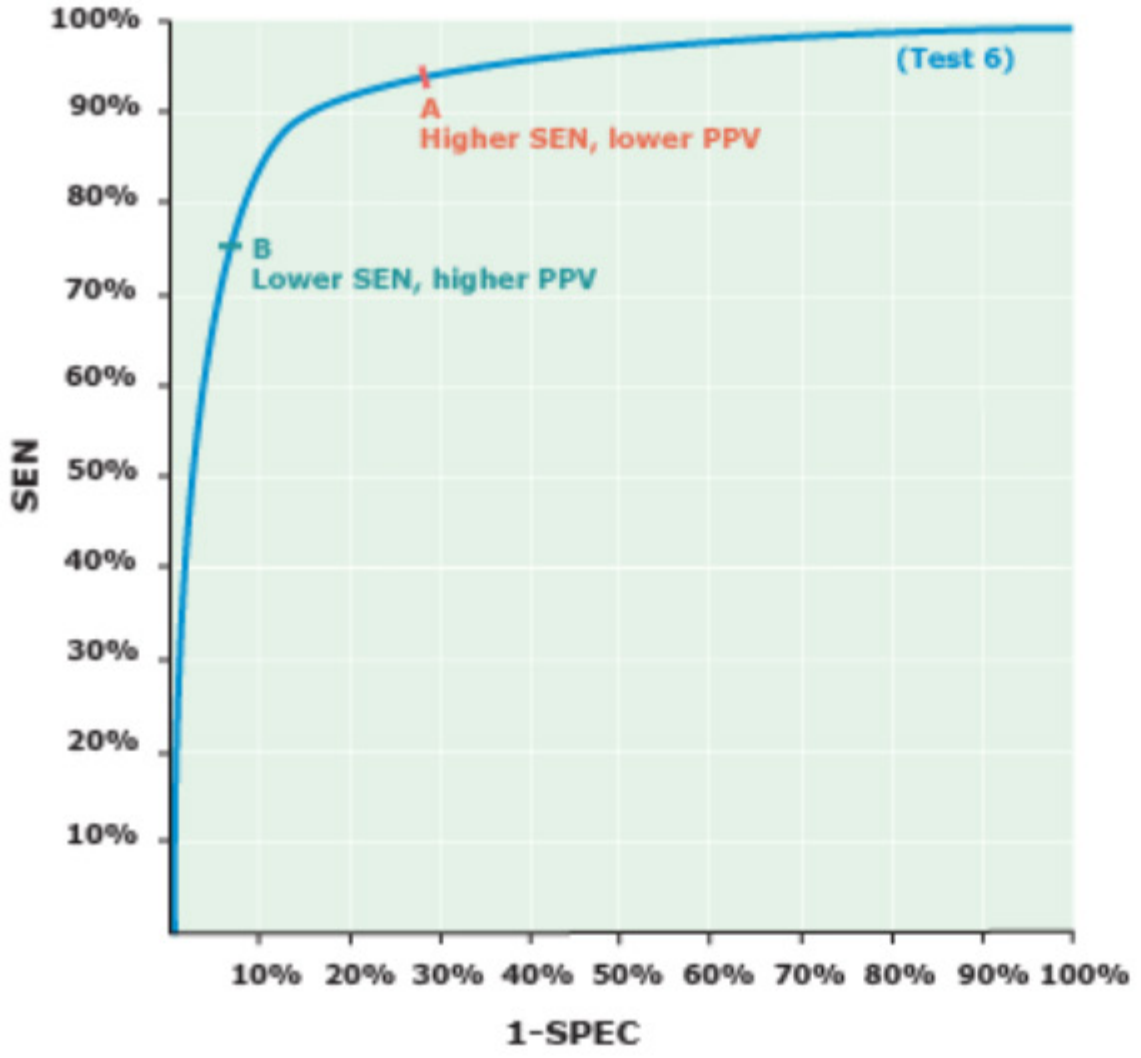
- Used to compare with available alternative test.
- Used to help to set test cutoff values.
- Rule of thumb: Any test where the curve bows the most to the upper left corner of the graph is a better test.
- In this example, test 6 is the best test.



▲ **Figure 1–5.5A** TP and FP Rates

Memory Aid

'N' with 'N' and 'P' with 'P'



▲ **Figure 1–5.5B** Test Comparisons

- Cutoff score will be selected from the area where the curve begins to become horizontal.
- Moving cutoff toward Point A yields better SEN, but worse PPV.
- Moving cutoff toward Point B yields better PPV, but worse SEN.

Important Concept

- Moving horizontal to the right increases FP.
- Moving vertically downward decreases FP.

6 Understanding Types of Research Studies

6.1 Research Studies Fall into Two Basic Classes

6.1.1 Observational Studies: Recording Without Intervention

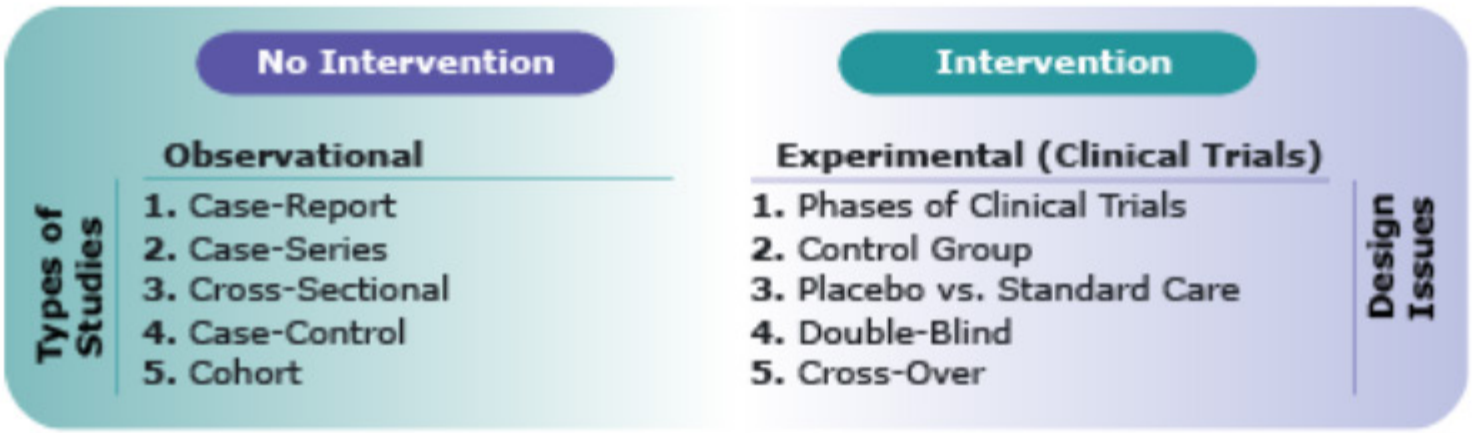
- First type of studies done.
- Looking at information available in the natural world.

6.1.2 Experimental Studies: (Clinical Trials) Assessing the Effects of an Intervention

- Done later in research process.
- Generates new information by assessing effects of intervention(s).

Important Concept

- Observational studies: no intervention
- Clinical trials: testing an intervention



▲ **Figure 1–6.1** Study Comparison

6.1.3 Types of Observational Studies

(Usually done in the order presented here.)

- **Case-report** Simplest form of descriptive study. Collecting and reporting information about a *single patient*. N = 1.
- **Case-series** Collecting and reporting information about *more than one patient* with the same disease. N > 1.
- **Cross-sectional study**

  Prevalence study:
  - 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.
  - Cannot provide incidence.
  - Usual statistical analysis is chi-square.

- **Case-Control Study**

  Identifies people with disease and a matching group of non-diseased people.

  - Key comparison: Diseased vs. non-diseased.
  - Looks backward in time for the presence or absence of risk factors.
  - Retrospective.
  - No assessment of prevalence or incidence.
  - Can give evidence for causality.
  - Analysis looks for risk factors in the history of the diseased group that are not found in the history of the non-diseased group.
  - Very useful for study of low-frequency conditions. Allows focus on persons with the disease, with non-disease only included for comparative purposes.

- **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.
  - Usually prospective, following people forward in time.
  - However, retrospective cohort studies use historical or archival data.
  - Gives assessment of incidence and causality.
  - No estimate of prevalence.
  - Analysis compares incidence rates in those who have and do not have risk factor.
  - Large sample sizes are required to provide a large enough group for incidence to emerge.
  - Expensive and time-consuming research to conduct.

Important Concept

- Case-control study compares disease vs. non-disease
- Cohort study compares risk factor vs. no risk factor

6.2 How We Analyze Cohort and Case-Control Studies

6.2.1 Cohort Studies

- **Relative Risk (Relative Risk Ratio) (RR)**
  - Compares incidence rates in groups with and without risk factor by division.

    Answers question: "How much more (or less) likely?"

Relative Risk Calculation

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

Memory Aid

Relative risk is a ratio of two incidence rates.

Attributable Risk (Absolute Risk Reduction) (AR)

- Compares incidence rates in groups with and without risk by subtraction.

  Answers question: "How many more cases?"

Attributable Risk Calculation

AR = Incidence rate in exposed − Incidence rate in unexposed

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

▲ **Figure 1–6.2A** Infant Mortality for City

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

▲ **Figure 1–6.2B** Computing RR and AR from 2 x 2 Table

Memory Aid

Attributable risk compares two incidence rates by subtraction.

Important Concept

Whichever incidence rate is on top of the ratio, relative risk conveys the same information but in different words.

Attributable Risk Percent (AR%)

- Percent of cases due to exposure.
- Used to assess proportion of cases due to risk factor.
- Calculation uses RR.

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

If RR = 4.0

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

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 AR.
- Called *Number Needed to Harm* (NNH) when examining something that increases risk.

$$NNT = \frac{1}{I_H - I_L} = \frac{1}{AR}$$

$$\text{If } I_H = \frac{50}{1{,}000} = \text{ and } I_L = \frac{10}{1{,}000}$$

$$NNT = \frac{1}{5\% - 1\%} = \frac{1}{4\%} = \frac{1}{.04} = 25$$

where I_H = highest incidence rate
I_L = lower incidence rate

Important Concept

NNT and NNH are computed the same way.

6.2.2 Case-Control Studies

Odds Ratio

- A ratio of odds.
- Estimates increased odds of having risk factors when comparing diseased and non-diseased groups.
- *Not* a prediction of disease, but an estimate of the strength of risk factors.

Computing an Odds Ratio

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

	Autism	No Autism
Pesticide Use	104 **A**	77 **B**
No Pesticide Use	56 **C**	103 **D**

'A' cell = disease + risk factor

'D' cell = diagonal to the 'A' cell

$$OR = \frac{AD}{BC} = \frac{104 \times 103}{56 \times 77} = 2.48$$

Patients with autism are almost 2.5 times more likely to have been exposed to pesticides while in utero than people without autism.

▲ **Figure 1–6.2C** Case-Control Study Example

Important Concept

- RR for cohort study
- OR for case-control studies

Risk \ Disease	Yes	No
Yes	**A**	**B**
No	**C**	**D**

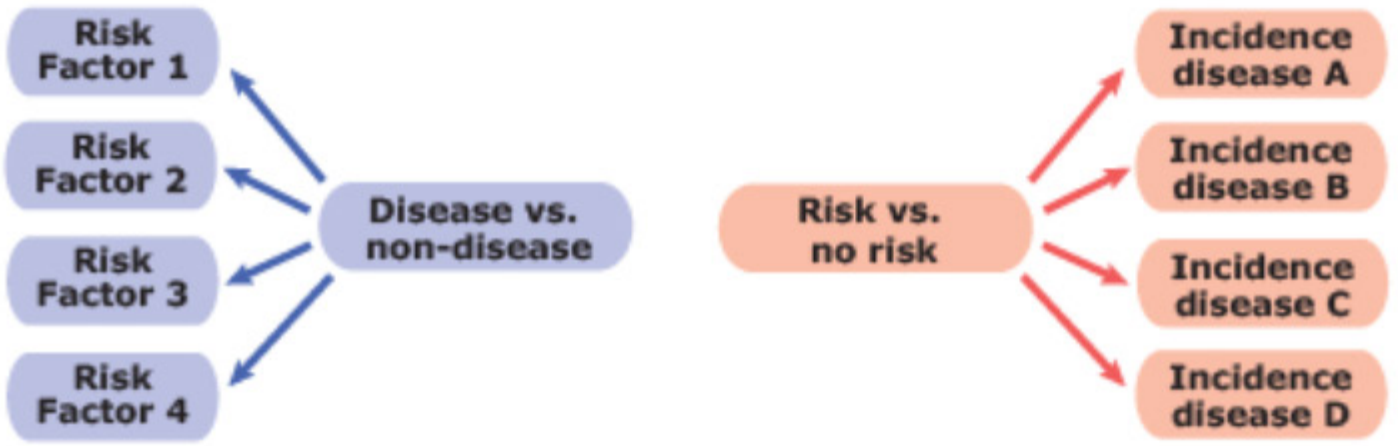
6.2.3 Comparison of Case-Control and Cohort Studies

Case-Control

- Disease vs. non-disease
- Retrospective
- Odds ratio
- Evidence for causality
- Choice for rarer diseases
- Quicker, cheaper study

Cohort

- Risk vs. no risk
- Usually prospective
- Relative risk & attributable risk
- Assesses incidence & causality
- Choice for better data
- More costly & time-consuming



▲ **Figure 1–6.2D** Study Comparison

7 Experimental Studies (Clinical Trials): Intervention Studies

7.1 Phases of Clinical Trials

7.1.1 Phase 1: Safety Trial

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

7.1.2 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.

7.1.3 Phase 3: Main Event

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

7.1.4 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.
- Phase 4 continues for as long as the compound is in use.

Important Concept

For every 100 drugs tested in the phases of clinical trials only 2 will make it to FDA approval.

7.2 Features of Randomized Controlled Clinical Trials

7.2.1 Baseline for Comparison Is Control Group

- **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?"

Important Concept

Most research designs require comparison of 2 or more groups.

- **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?"

7.2.2 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."

Important Concept

Individually we are all different. Collectively we are all alike.

7.2.3 Double-Blind Design

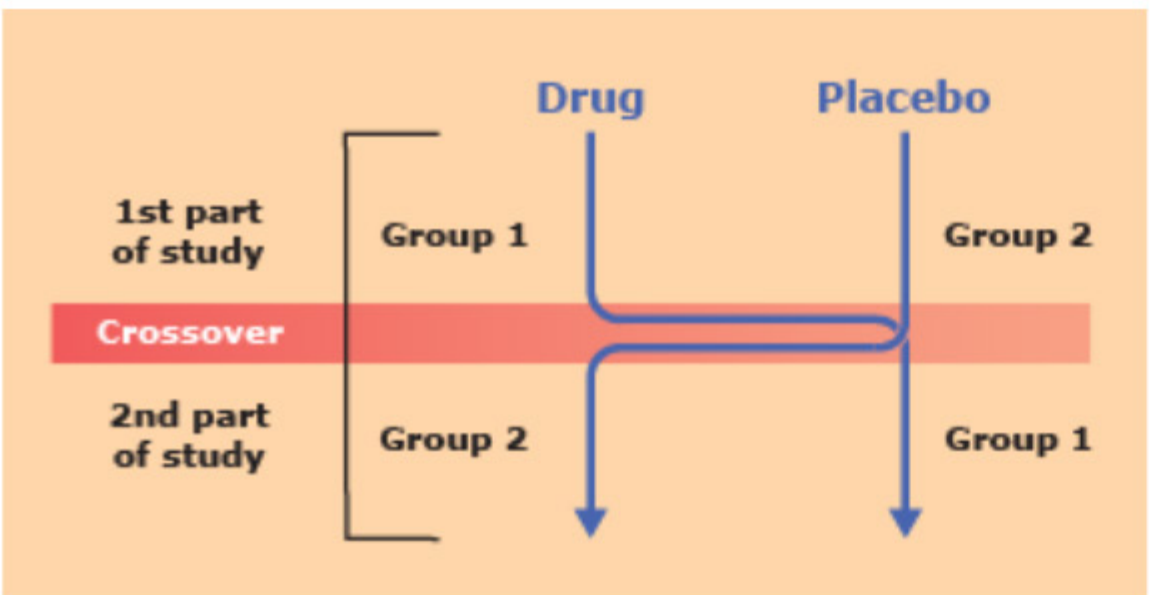
- Neither research subjects nor researchers who interact with them know if subjects are in treatment or control group.
- Of course, someone has to know—usually a research assistant who does not evaluate or interact with subjects.
- Knowledge of group membership cannot affect either subjects' reactions or researchers' behavior toward subjects.
- Exam issue: Do not break the double-blind code unless shutting down the study.

7.2.4 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.

Important Concept

Crossover design balances the demands of research methodology and research ethics.



▲ **Figure 1–7.2** Crossover Study

8 Ways Research Can be Misleading: Understanding the Bias

8.1 Bias Occurs When Research Generates a Distorted Picture of Reality

- **Random Error**
  - Average still gives reality
  - Threat to reliability (consistency)
  - Think shots centered around a target
- **Systematic Error**
  - Average diverges from reality
  - Threat to validity (accuracy)
  - Think shots off to one side of a target

8.2 Sampling Bias

Problem: People in a study are not a good representation of external reality.

- 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."
  - Sample does not reflect the population.
- **Non-respondent bias** (volunteer effect):
  - Decision to be in a study is a choice. *All* subjects must volunteer.
  - People who say "yes" are different from those who say "no."
  - Research includes only those who say yes. Does this really tell us about the whole population?
- **Ascertainment bias:**
  - People with severe cases *more* likely to come to medical attention.
  - Sample biased toward sicker cases.
  - Consider: A study of alcoholics based on those who are hospitalized for treatment.
- **Late-look bias:**
  - People with severe disease *less* likely to be included in research study.
  - Harder to access or maybe already dead.
  - Sample biased to less sick cases.
  - Consider: A study of cancer treatment experience by interviewing cancer survivors.
- Solution to sampling biases:
  - Representative (random) sample.
  - Weigh the data for analysis so sample matches population.

8.3 Selection Bias (Design Bias)

Problem: Different types of people in the treatment and control groups.

- Comparing apples and oranges.
- The groups compared should start out the same.
- Solution to selection bias:
  - Random assignment. (*Note:* alternating assignment is not random assignment.)
  - Those in treatment or control groups determined by random, impersonal selection process.

8.4 Measurement Bias

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

- **Leading questions:** Suggesting in word choice, nonverbal behavior, or tone, what answer is preferred.
- **Hawthorne effect:**
  - The fact of being observed (or being in a study) changes behavior from what it otherwise would have been.
  - Keeping food diaries often results in patients changing what and when they eat.
- **Recall bias:**
  - People do not remember clearly what happened in the past.
  - Sometimes, they simply make things up.
  - Sometimes, they distort the past based on the perspective of the present.
  - A depressed patient will very likely tell you that life has always been sad.
- **Observer bias:**
  - Person making assessment perceives things in a certain way based on prior knowledge or experience.
  - A psychiatrist perceives mental illness in everyone. All physicians are more likely to assume that patient has an illness.
- Solution to measurement bias:
  - Make measurement as undemanding as possible.
  - Use a control group.
  - Measurement is a constant between the two groups, so even if measurement bias exists, it will be the same for both groups and will not contaminate the comparison between them.

8.5 Expectancy Bias

Problem: Researcher unintentionally acts in ways to influence behavior of subject and change research results.

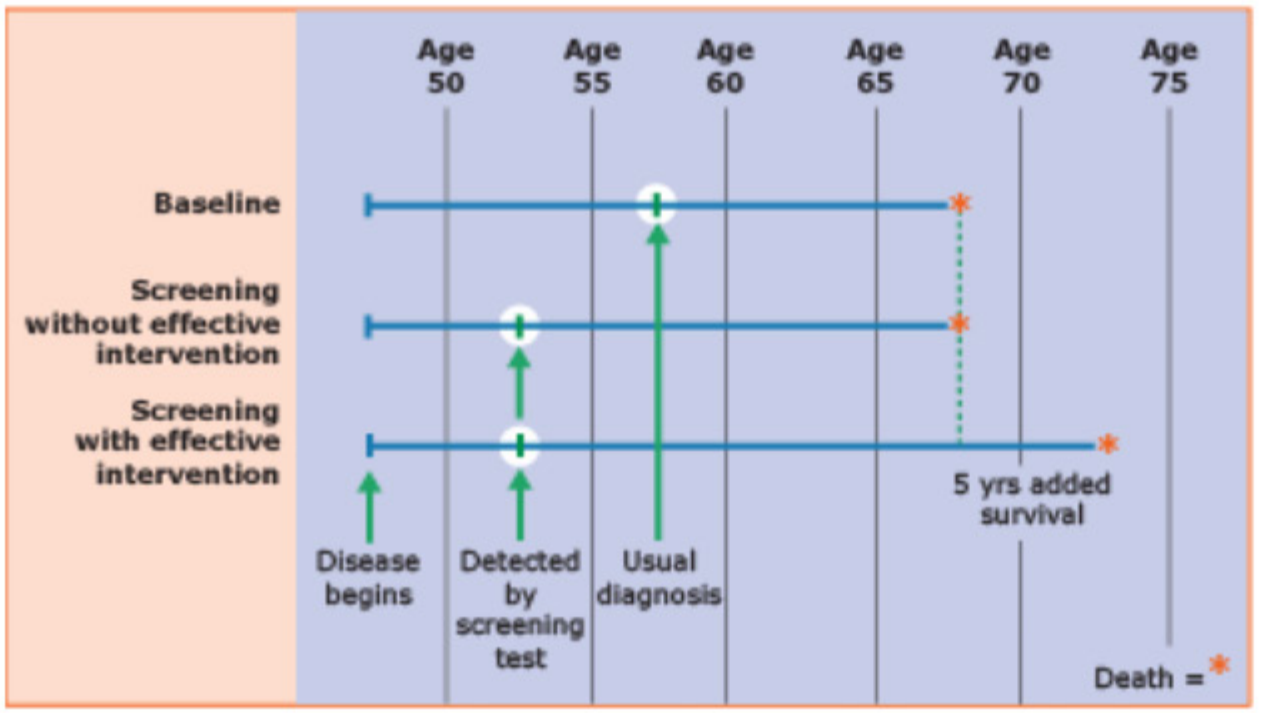
- Demand characteristics:
  - Subtle clues that guide subjects in how to act or respond.
  - Smiling at certain answers while frowning at others.
- Pygmalion effect:
  - Treating subjects so as to induce a result.
  - Telling students they are "not good in math" reduces scores on a test.

- Solution to expectancy bias:
  - Double-blind design.
  - If the researchers do not have the knowledge, it cannot influence how they deal with research subjects.

8.6 Lead-Time Bias

Problem: False estimate of the benefits of an intervention.

- Early detection is confused with living longer.
- Extending how long patient lives after diagnosis can occur from finding out sooner, rather than from having patient live longer.
- Solution to lead-time bias:
  - Use life-expectancy, not time since diagnosis.



▲ **Figure 1–8.6** Lead-Time Bias

8.7 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.
- A new curriculum produces better results than the old one because the top teachers are the ones trained in the new curriculum.
- Solution to proficiency bias:
  - Be sure that treatment providers are selected at random.

8.8 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.
- Outcomes at a large university hospital are worse than those at a local community hospital. Confounding issue: University hospital treats more severe or more complex cases.
- 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:
  - Thoughtful research design
  - Do multiple studies (meta-analysis).

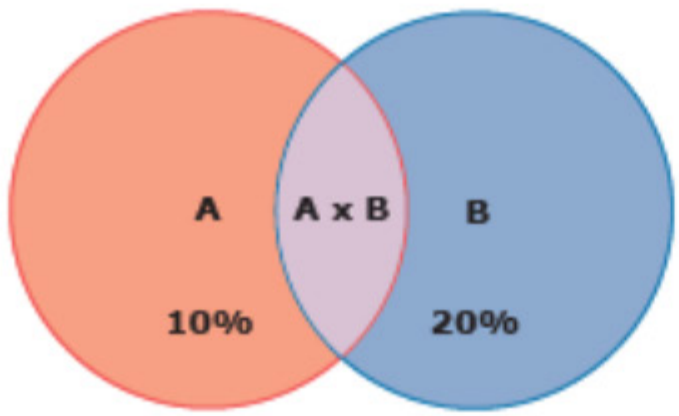
Unit 2

Biostatistics

1 Answering Probability Questions

1.1 Combining Independent Events

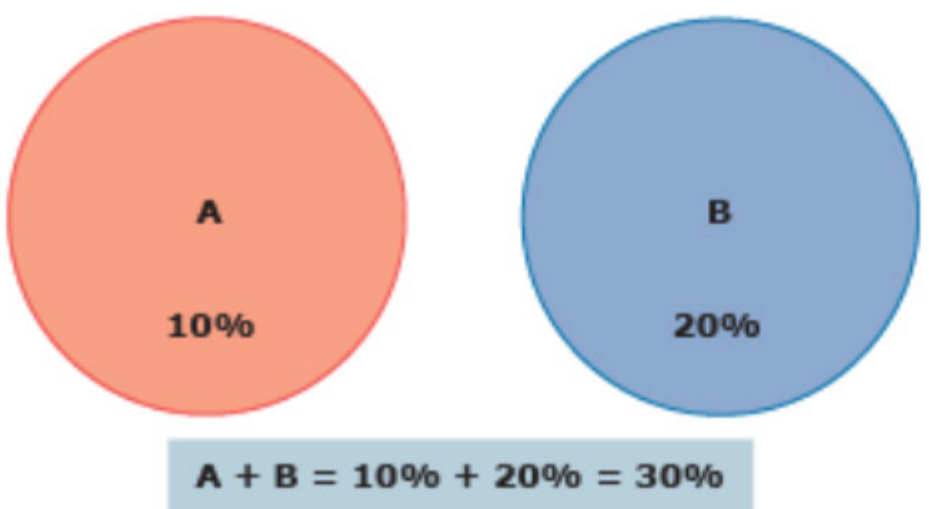
- Key idea: Multiply probabilities (A × B)
- *Independent* means that knowing one probability tells you nothing about another.
- Think: multiple coin tosses.
- Intersection of two sets.
- For non-independent events, still multiply, but use changing probabilities.



▲ **Figure 2–1.1** Independent Events

1.2 Combining Mutually Exclusive Events

- Key idea: Add probabilities together = (A + B).
- *Mutually exclusive* means events *cannot* occur at the same time.
- Think: heads or tails for a coin toss.
- Union of two sets.



▲ **Figure 2–1.2** Mutually Exclusive Events

USMLE® Key Concepts

For Step 1, you must be able to:

- Understand the probabilities of independent events.
- Make inferences from patient data.
- Interpret data and statistics.
- Demonstrate use and purpose of four types of scales.

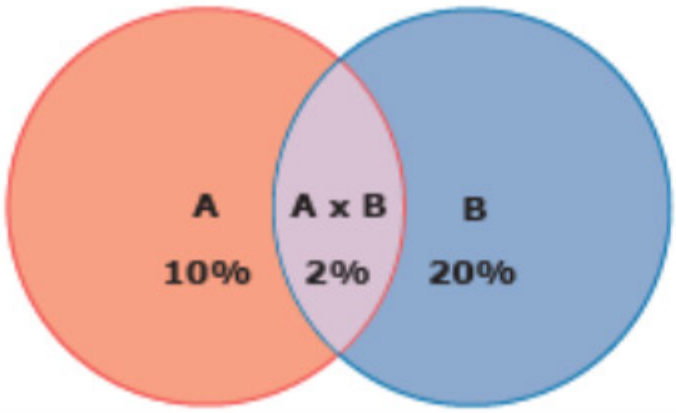
Important Concept

For independent events ⇒ Multiply

For mutually exclusive events ⇒ Add

1.3 Non-mutually Exclusive Events = (A + B) − (AB)

- Key idea: add probabilities together, then subtract the overlap.
- *Non-mutually exclusive* means events *can* occur at the same time.
- Overlap may be given, or if not, then estimate it by assuming independence and multiply.



(A + B) − (AB) = 10% + 20% − 2% = 28%

▲ **Figure 2–1.3** Non-mutually Exclusive Events

Important Concept

For non-mutually exclusive events ⇒ add, multiply, subtract.

1.4 Conditional Probability = Change A/B to A/C

- *Conditional probability* means that the occurrence of one event (condition) affects the probability of another event.
- "Number where you stop, on top; number where you start, on the bottom."

Important Concept

For conditional probabilities, change the denominator.

If patient lives 2 years after diagnosis, what is the chance he will still be alive after 3 years?

N	After 1 year	After 2 years	After 3 years	After 4 years
234	90%	80%	60%	30%

Of 234 patients who were diagnosed with prostate cancer, chart shows percentage still alive at specified interval.

Solution: Recode data to people and get rid of percent

N	Y1	Y2	Y3	Y4
100	90	80	60	30

Answer: $\frac{60}{100}$ = chance of making it to 3 years at diagnosis

$\frac{60}{80}$ = chance of making it to 3 years if still alive after 2 years

2 Descriptive Statistics

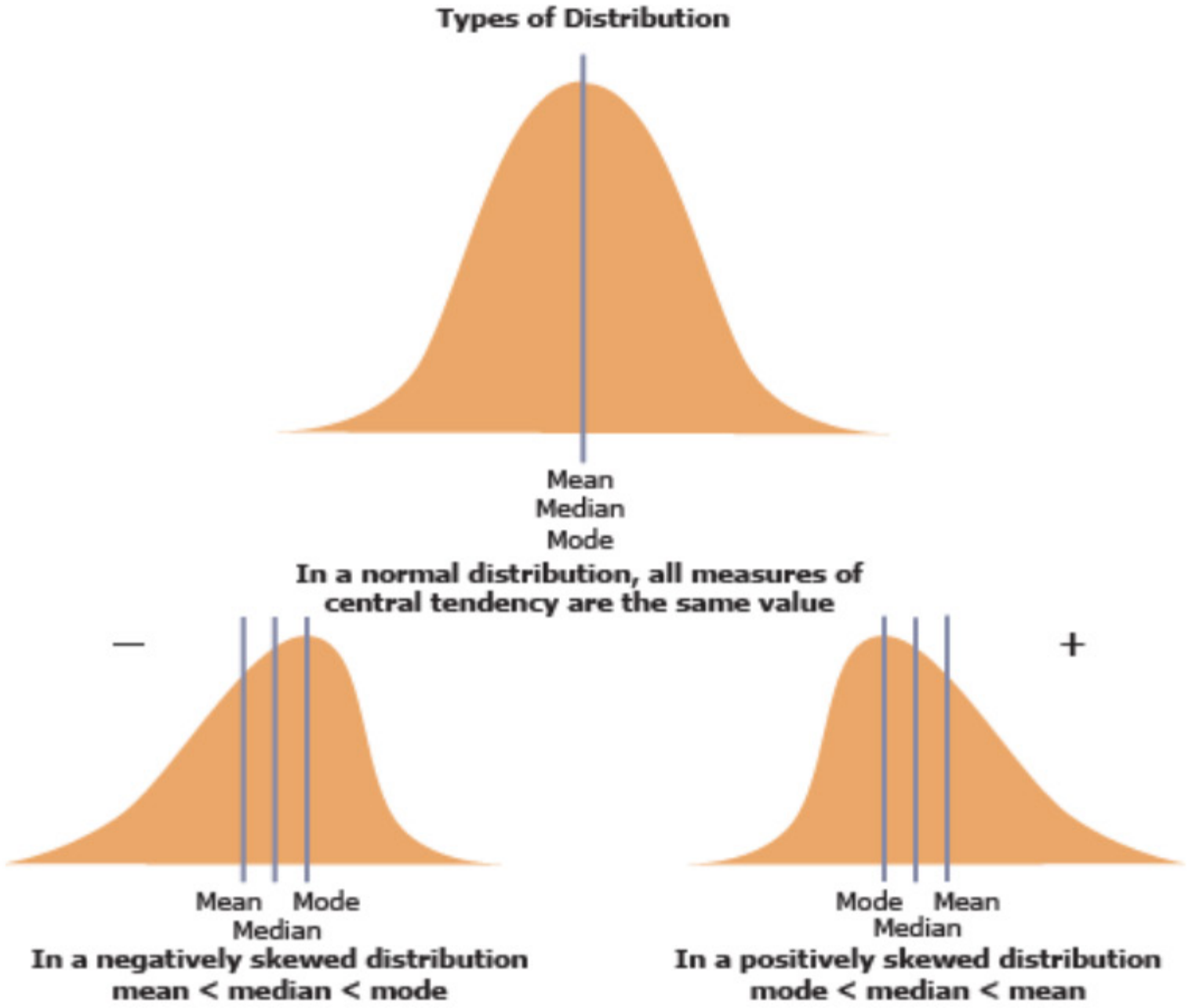
- Summarizing the data you have to make it understandable and easier to manage.
- Creating an "abstract of the data."
- Representing the world as a *distribution*.
- Central tendency.
  - Mean
    - Mathematical average.
    - Add together all values and divide by number of observations.
  - Median
  - 50th percentile, middle number.
  - If even number of observations; add middle 2 numbers and divide by 2.
  - Mode
    - Highest frequency
    - Most common value

Important Concept

Statistics is understanding the world as distributions.

Important Concept

Description statistics describe what you have and make no generalizations beyond that.



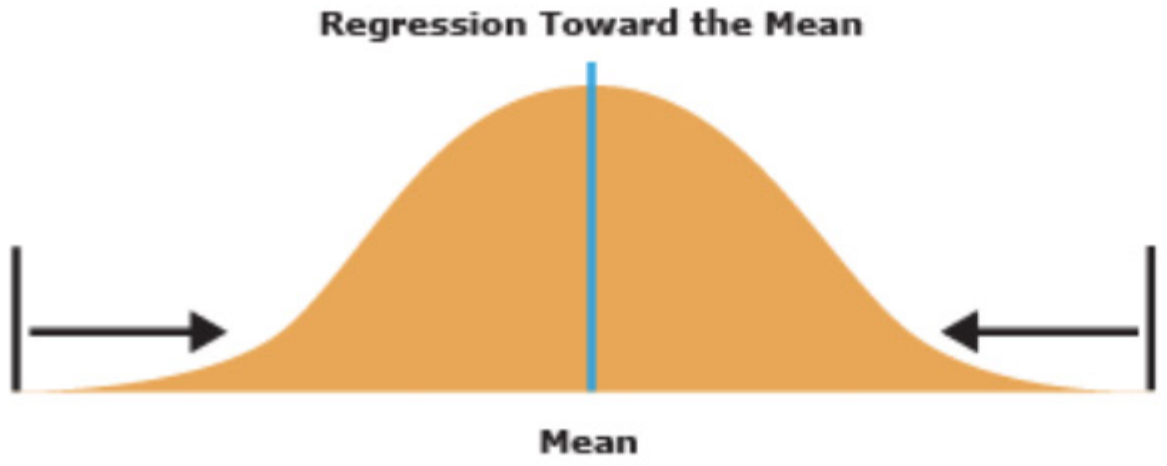
▲ **Figure 2–2.0** Types of Distribution

2.1 Measures of Variation

- Range
  - Difference between the highest and lowest value
  - Not very stable

Important Concept

Every measurement is reality + error.



"Extreme values are likely to be less extreme when remeasured."

This is not always the case, but on a probability basis, tends to be true.

▲ **Figure 2–2.1** Regression Toward the Mean

2.2 Standard Deviation

- Assessing spread around the mean.
- Think about it as the "average deviation."
- Concept, not calculation is what is needed for the exam.

Important Concept

Fat distribution = Large S

Thin distribution = Small S

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

s = standard deviation (s^2 = variance)
x = each observation
$\bar{x}$ = mean
n = sample size

▲ **Figure 2–2.2** Standard Deviation

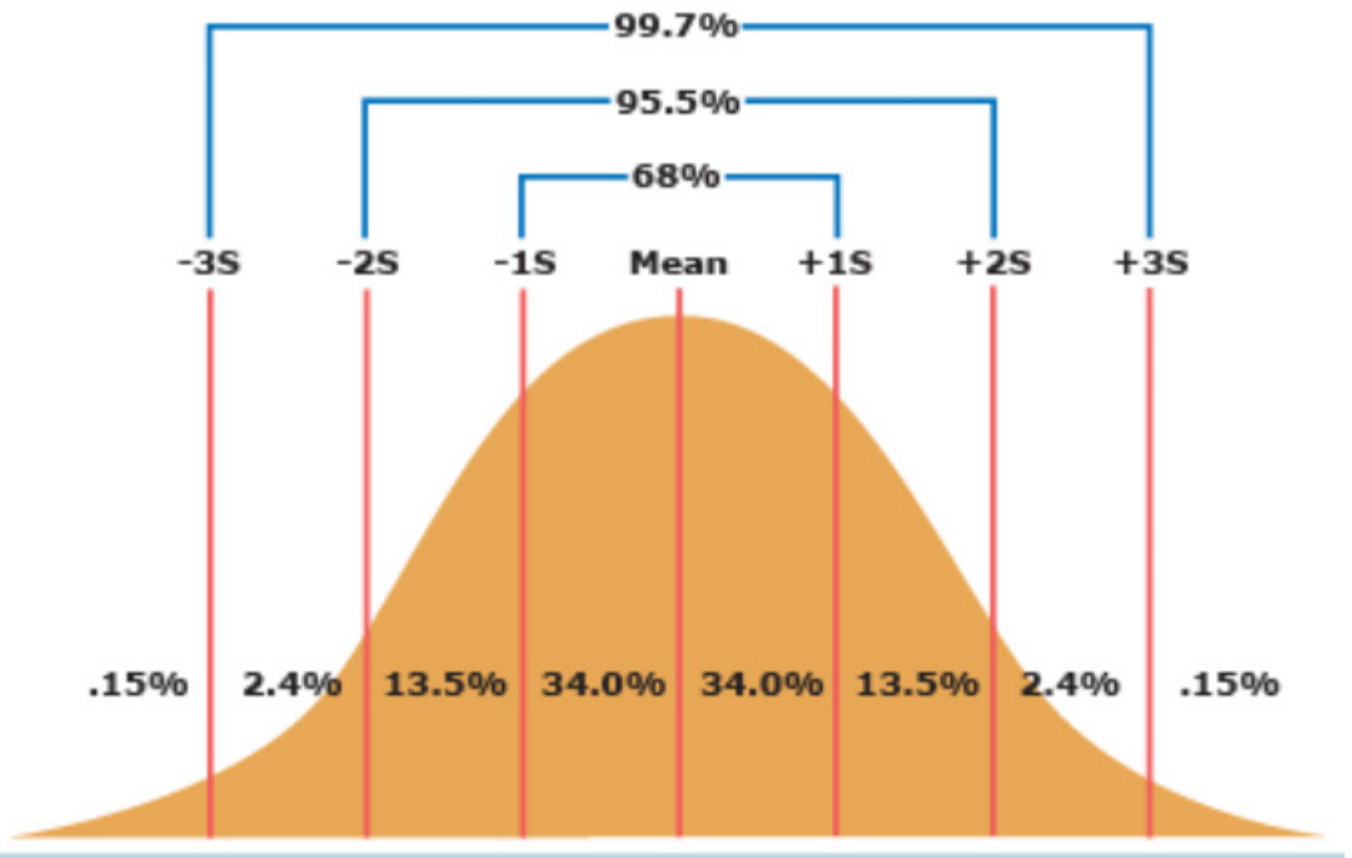
2.3 Standard Deviation and the Normal Curve

- Two sets of values

1. **Symmetric:** "around the mean"
2. **Asymmetric:** "above or below the mean"

Important Concept

These values must be memorized!



IQ $\bar{x}$ = 100 s = 15	55	70	85	100	115	130	145
USMLE $\bar{x}$ = 220 s = 20	160	180	200	220	240	260	280

▲ **Figure 2–2.3** Standard Deviation and the Normal Curve

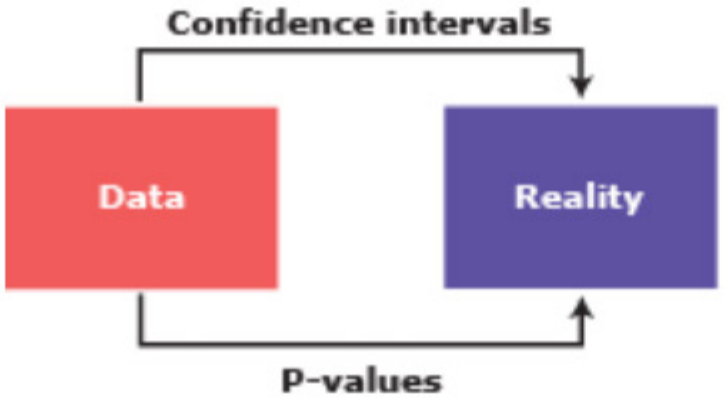
Important Concept

Be able to say percent of cases relative to standard deviation issues.

3 Inferential Statistics

- Not just describing what you have.
- Making an inference from the:
  - Sample to the population; or
  - Data to reality.
- Two types of inferential statistics

1. Confidence intervals
2. P-values



▲ **Figure 2–3.0** Inferential Statistics

3.1 Confidence Intervals (CI)

- Measured value is understood as an approximation.
- Reality is seen as very likely "around" that measured value.
- Confidence intervals can be computed for any measured parameter, but the one most likely on the exam is the *confidence interval of the mean*.

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

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

Important Concept

Inferential statistics are used to generalize beyond the data you have.

Important Concept

z = 1.96 for 95% confidence

z = 2.58 for 99% confidence

Computing Confidence Interval of The Mean

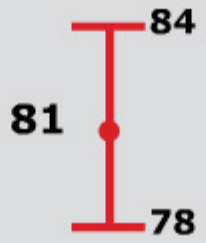
If on a test:

Mean = 81% $\quad \bar{x} \pm Z\left(S/\sqrt{n}\right)$

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

N = 36 $\quad 81 \pm 3$

Compute 95% CI.

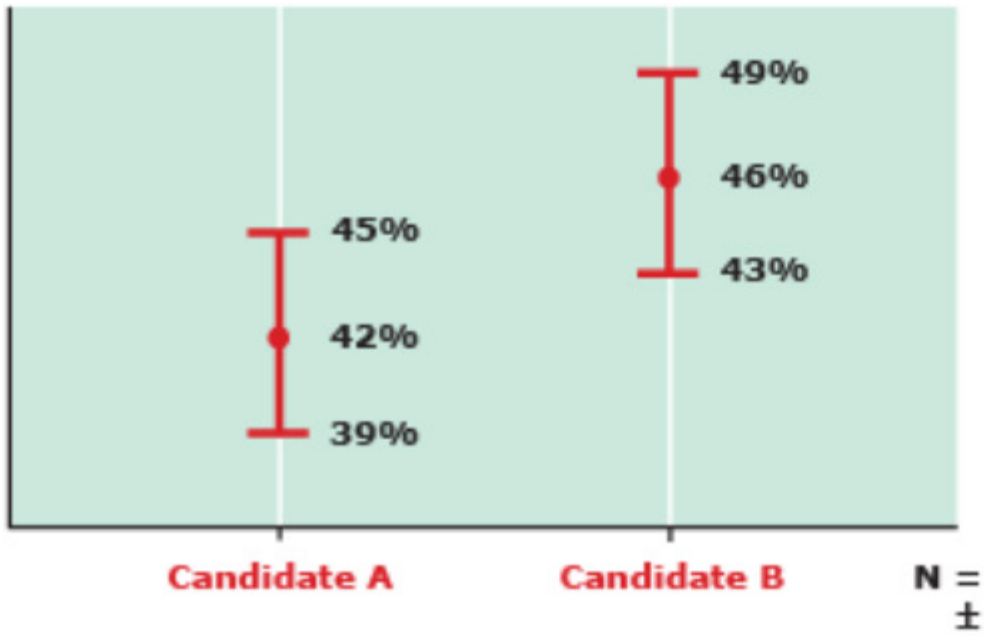


Conclusion: The *real mean* likely falls somewhere between 78 and 84

Note: CI does NOT mean:

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

3.2 Interpreting Confidence Interval of the Mean

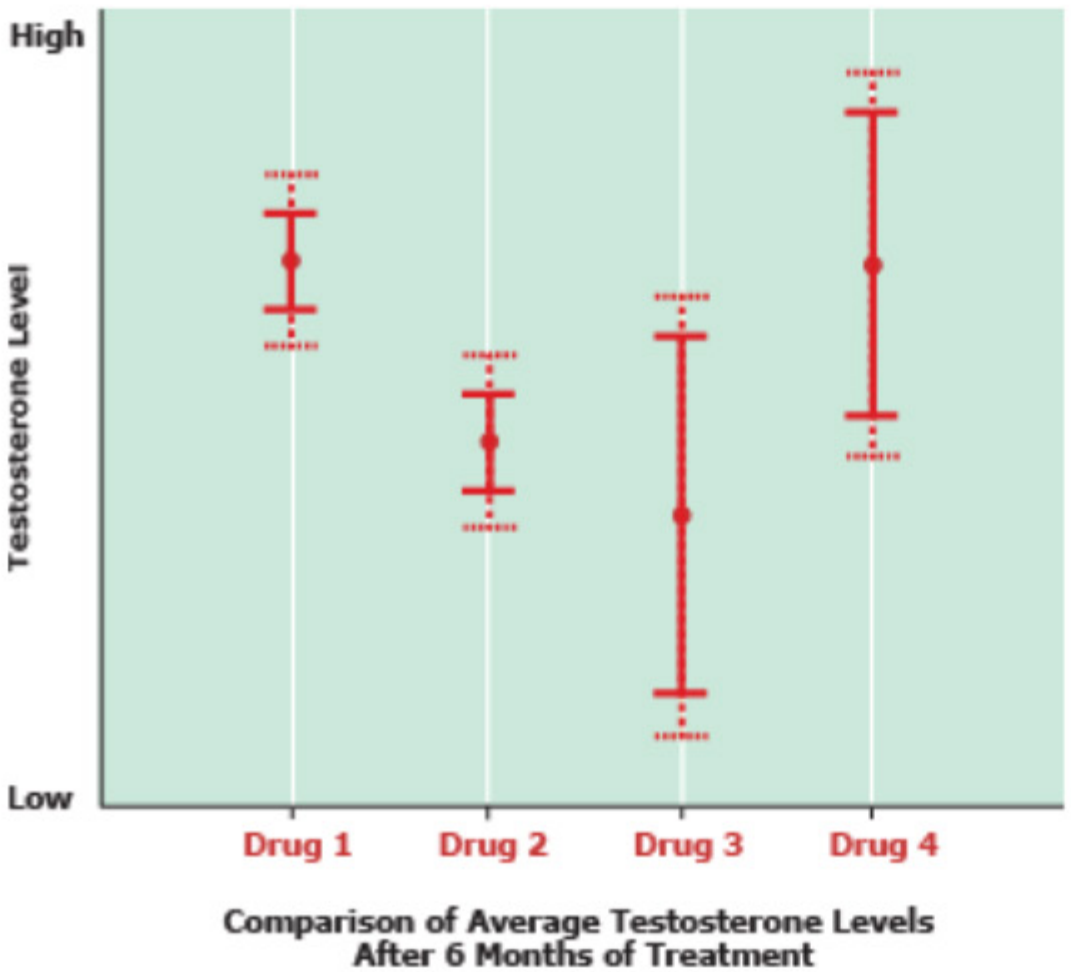


Q: Is Candidate B leading?
A: No, they are tied. (Difference is within the margin of error.)

▲ **Figure 2–3.2A** Comparing 2 Candidates

Important Concept

Measured data is a sample, *not* reality. CIs help us guess what reality is.



▲ **Figure 2–3.2B** Comparing Treatments

Important Concept

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

Formula for confidence interval of the mean.

Important Concept

Narrower interval means either:

- Larger sample size
- Smaller standard deviation

(or both)

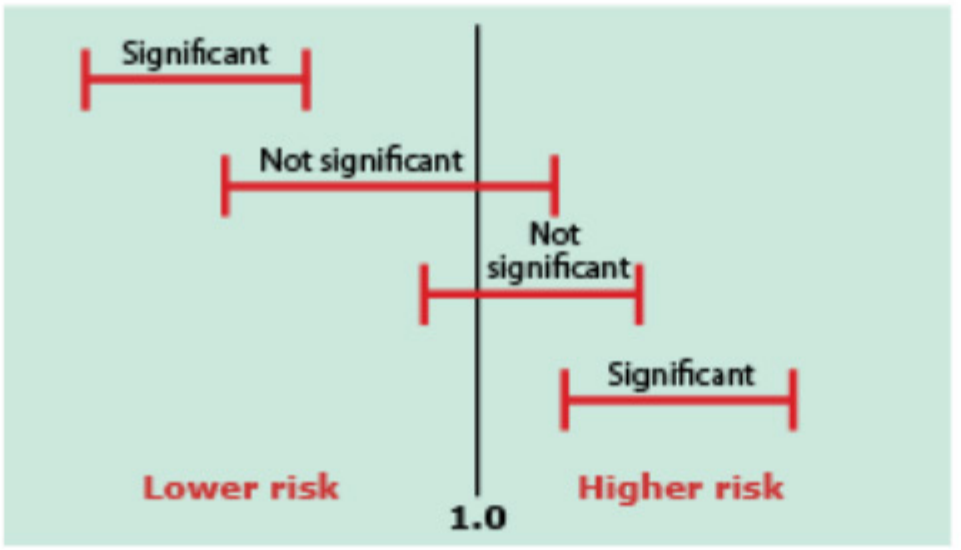
3.3 Interpreting Confidence Intervals for Relative Risks and Odds Ratios

Use the rule for interpreting relative risks (from cohort studies) or odds ratios (from case-control studies).

▼Table 2–3.3 Comparing Risks

	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

- Comparison A shows a 134% increase in risk.
- Comparison D shows a 27% decrease in risk (1 − .73).
- Note 100% increase = 50% decrease if numbers are inverted.



▲Figure 2–3.3 Graphic Presentation of Confidence Intervals

Important Concept

Key Rule:

- If 1.0 falls inside the presented interval, the difference is *not* significant.
- If 1.0 falls outside the interval (either above or below), the difference *is* significant.

Important Concept

CI for relative risk and odds ratios are interpreted the same way.

3.4 P-Values and Hypothesis Testing

3.4.1 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.
- We never "accept" the null hypothesis. Options are to reject or not to reject.

3.4.2 One- vs. Two-Tailed Null Hypotheses

- **One-tailed:**
  - Only one way to disprove (either just higher, or just lower).
  - One direction.
  - "Drug A does not lower blood pressure more than Drug B." Here we reject the null hypothesis *only* if Drug A *does* lower blood pressure more than Drug B.
- **Two-tailed:**
  - Two ways to disprove (any difference, either higher or lower disproves).
  - Two directions.
  - "The effects of Drug A on blood pressure are no different than Drug B." Here we reject the null hypothesis if Drug A *either* raises *or* lowers blood pressure more than Drug B.

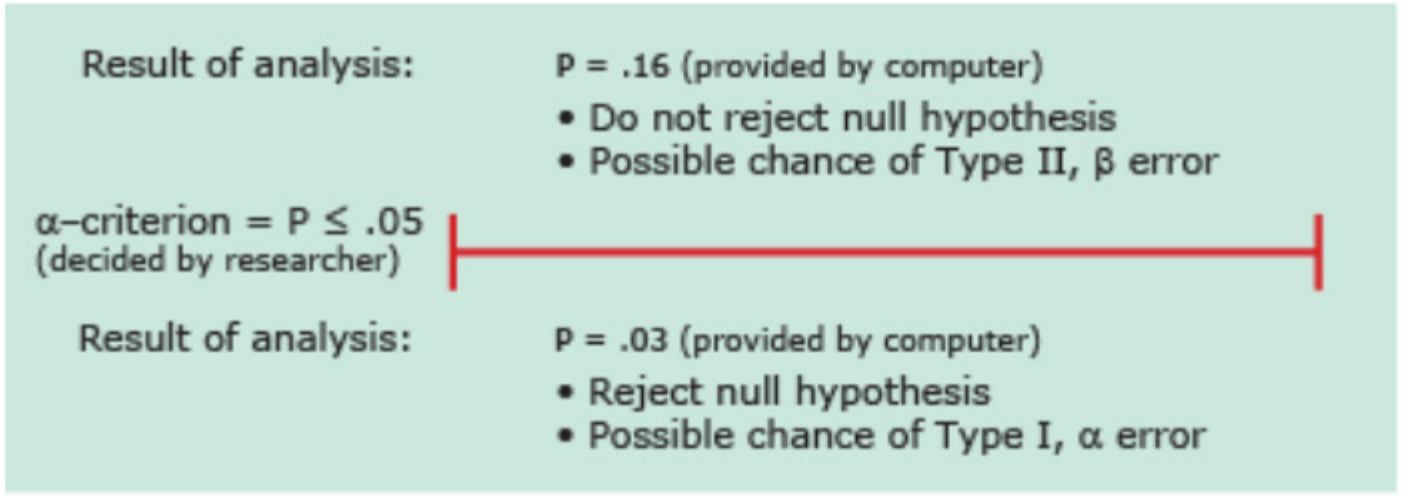
Important Concept

For statistical tests we don't prove something, we disprove its opposite. Think "double negative."

Memory Aid

One-tailed = 1 way to disprove

Two-tailed = 2 ways to disprove



▲ **Figure 2–3.4** How We Make Statistical Decisions

3.5 Types of Errors in Statistical Decision Making

3.5.1 Type I (alpha error)

- Reject the null hypothesis when it is really true.
- Decide the drug works when it does not.
- Computed p-value estimates chance of Type I error.
- Sin of commission.

3.5.2 Type II (beta error)

- Not reject the null hypothesis when it is really false.
- Decide the drug does not work when it really does.
- P-value will not tell you the chance of Type II error.
- Sin of omission.

3.5.3 Other Key Points

- Type I error is generally considered worse (first do no harm).
- Type II error can be derived from statistical power (see below).

Important Concept

Errors occur when data does not match reality.

Type I = Data says "yes," reality says "no."

Type II = Data says "no," reality is yes."

3.6 Statistical Significance vs. Clinical Significance

3.6.1 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.
- Decide that there is a difference.

3.6.2 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*.

Important Concept

P-value ⇒ There is a difference.

Clinical significance ⇒ This difference matters.

3.6.3 Sometimes a Very Low P-value Can Occur With a Very Small Actual Difference

- Statistical significance: *Yes*; Clinical significance: *No.*
- Common reason for this outcome is very large sample size (N).
- Note that you cannot have clinical significance unless you first have statistical significance.

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

3.7 Statistical Power

- Definition: capacity to detect a difference (if there is one).
- 1-Power = Type II error.
- Three things increase power:
  1. Larger sample size (more information).
  2. Larger effect size (looking for something bigger).
  3. Weaker alpha-criteria (accepting greater chance of Type I error).
     - Alpha criteria: p =.05 (This has *less* power)
     - Alpha criteria: p =.10 (This has *more* power)
- If you reject the null hypothesis, you must have had enough power. You were able to make a decision.
- We worry about power when:
  - We do not reject the null hypothesis.
  - We are trying to decide how many subjects to enroll in our study.

Important Concept

Power is not about being right, but about the ability to make a decision.

4 Choosing the Right Statistical Test

Important Concept

Focus on nominal and interval variables for the exam.

4.1 Four Types of Scales

The best statistical test to use depends on the information we have with which to work. We convert the world to be numbers by a process called *scaling*. Traditionally, we think about four types of scales.

4.1.1 Nominal

- Things sorted into groups or categories
- To what group does this belong? (e.g., gender, state of residence)

4.1.2 Ordinal

- Things ordered into a sequence
- Think "rank ordered"
- Class rank, taller to shorter

4.1.3 Interval

- Measuring an exact amount using a dimension graded in equal increments
- Here we can say what is the numerical value of something
- Temperature measured in Celsius

4.1.4 Ratio

- Interval scale with a true zero point
- A value relative to a baseline of zero
- Temperature measured in Kelvin

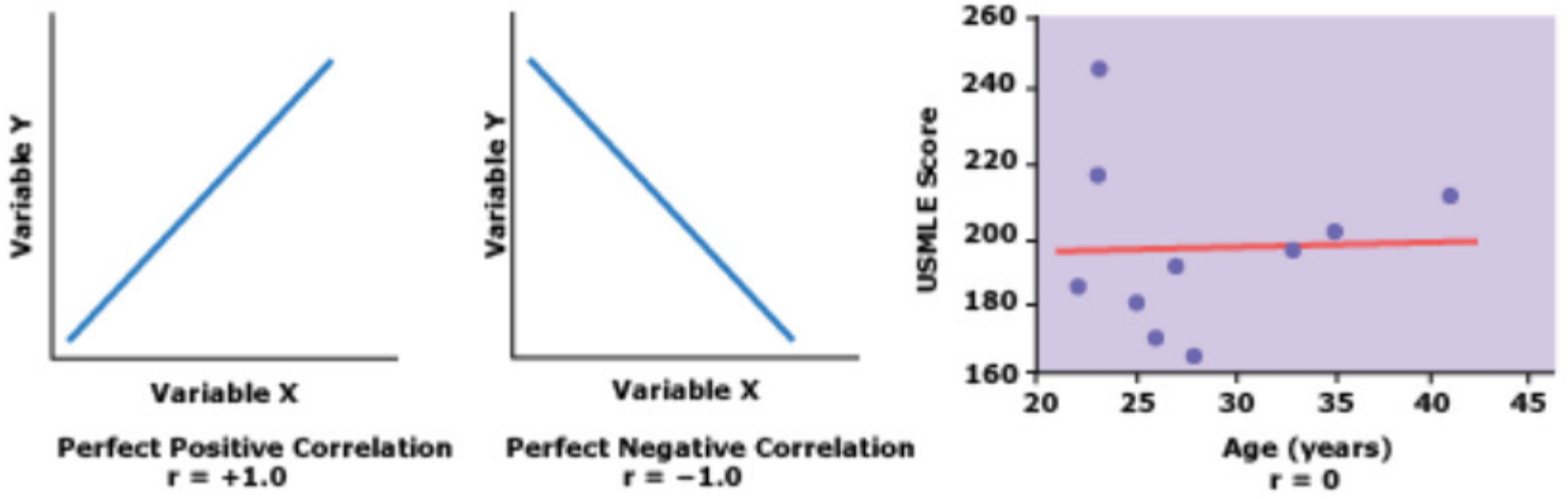
4.2 Variables

4.2.1 Pearson Correlation

- For two interval variables, use Pearson correlation (r)
  - Ranges from −1.0 to +1.0
    - — Positive number = proportional relationship
    - — Negative number = inverse relationship
  - Number further from zero, either positive or negative means stronger relationship.
  - Looks for linear relationship only.
  - Correlations, even a strong one, by itself, does not mean causation.

Important Concept

If two interval variables, use Pearson correlation.



▲ **Figure 2–4.2A** Scores vs. Age

4.2.2 Chi-Square

- If two nominal variables, use chi-square (χ^2):
  - Can be used to compare any number of groups (2 x 2, 2 x 3, 4 x 5, etc.).
  - Assesses whether two variables are independent.
  - You do not need to know how to calculate a chi-square for the exam.

Important Concept

If two nominal variables, use Chi-square

	Male	Female	Totals
Passing Grade	87	71	158
Failing Grade	43	19	62
Totals	130	90	220 = N

2 × 2 Table would be analysed using χ^2

▲ **Figure 2–4.2B** Comparing Grades by Gender

4.2.3 T-Test and ANOVA

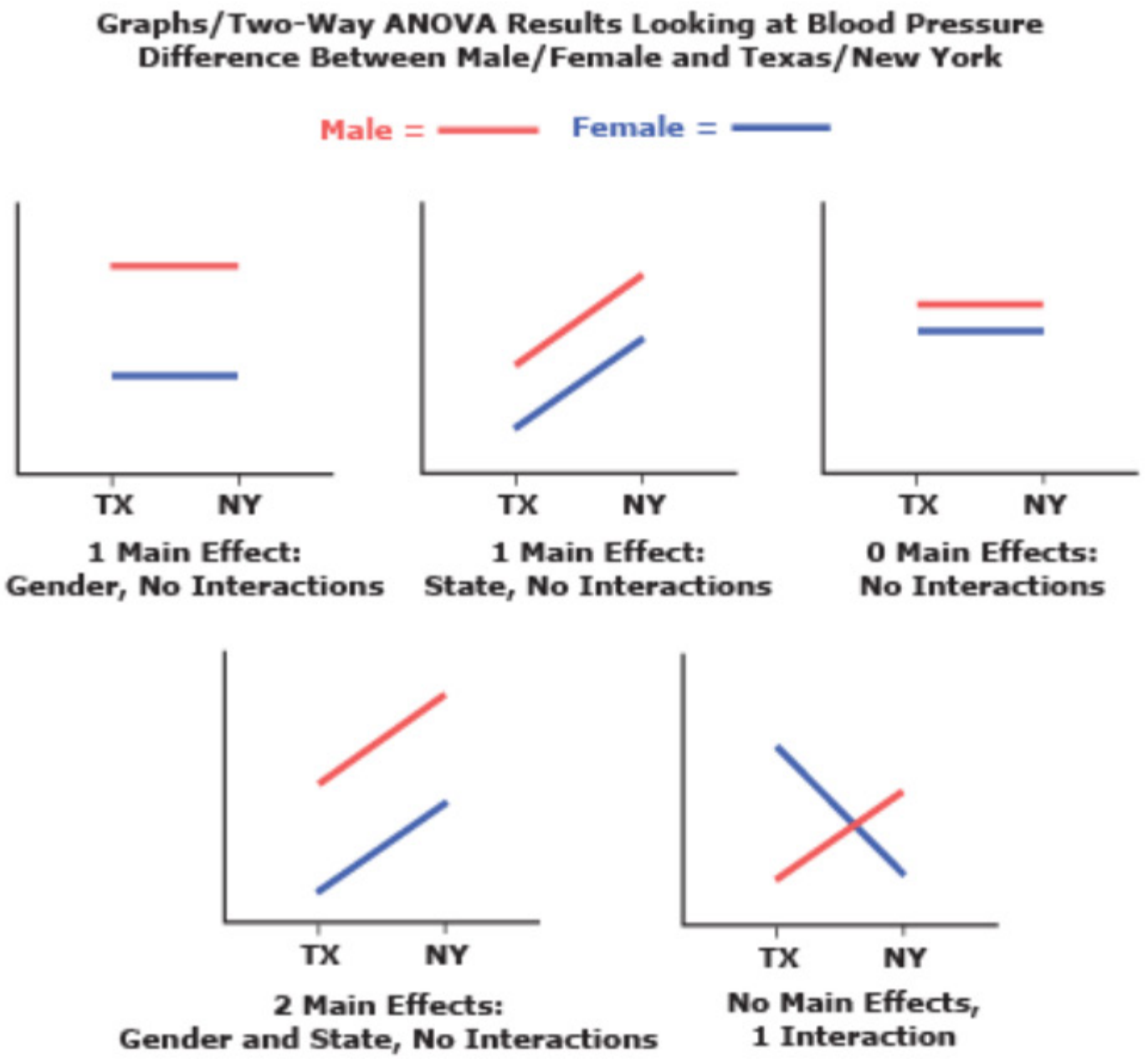
- If one nominal and one interval variable, use t-test (t) or analysis of variance (ANOVA) (F).
  - t-test (also called *Student's t-test* or *pooled t-test*)
  - Compares the means and standard deviations of two groups.
  - Limited to comparing only *two groups.*
- If more than two groups in the nominal variable, use analysis of variance (ANOVA).
  - Compares means and standard deviations of more than two groups:
    - If one interval and one nominal variable: One-way ANOVA.
    - If one interval and two nominal variables: Two-way ANOVA.
      - Generates three P-values.
      - Two main effects (one for each nominal variable) and one interaction term (how the nominal variables do or do not work together).

Important Concept

If nominal and interval variables combined use t-test or ANOVA.

Memory Aid

'T' for Two: T-test compares 2 groups.



▲ **Figure 2–4.2C** Possible ANOVA Test Results

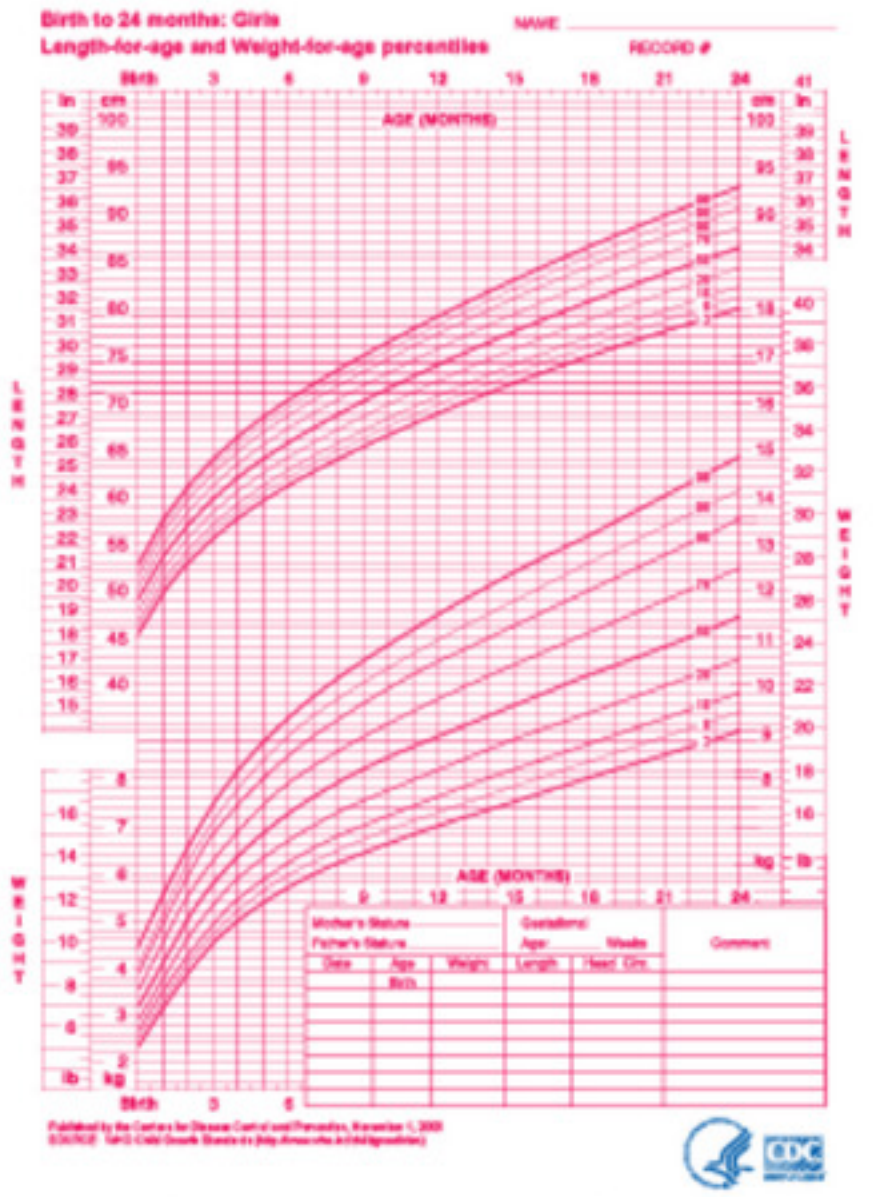
Unit 3

Behavioral Science

1 Early Development

1.1 What Is Normal?

- Key theme: 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).
  - However, there are wide variations regarding those milestones.
  - The current trend is to look at *developmental charts*.
  - "Normal" is defined more in terms of:
    - —The progression of the person's development.
    - —Comparisons with peers.



▲ **Figure 3–1.1A** Height and Weight Percentiles: Girls

USMLE® Key Concepts

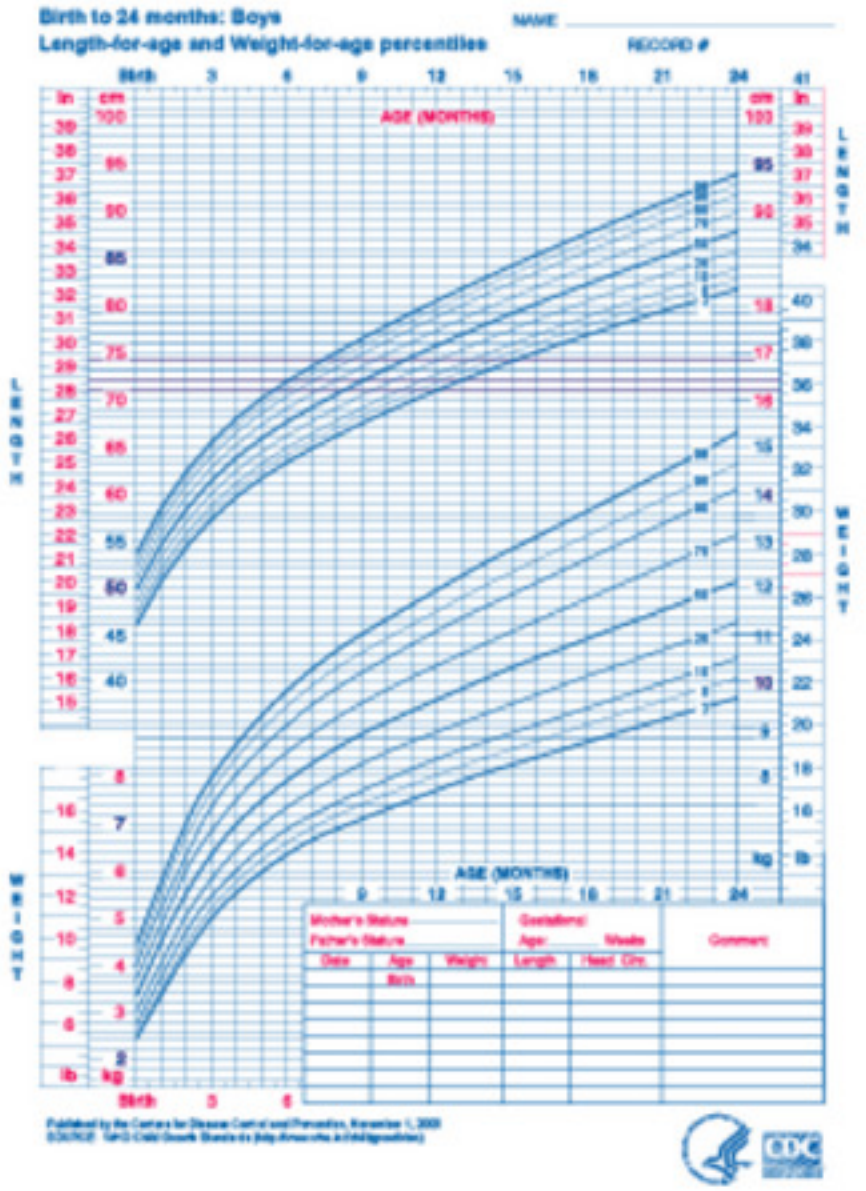
For Step 1, you must be able to:

- Recognize developmental milestones.
- Understand how to communicate with children in a developmentally appropriate manner.
- Know what to do in cases of illness and abuse.

Important Concept

Normal for children has two meanings:

- Continuation of a trend
- Comparison to peers



▲ **Figure 3–1.1B** Height and Weight Percentiles: Boys

1.2 Birth Issues

1.2.1 Preterm (Premature)

- Fewer than 37 weeks gestation. Those fewer than 32 weeks gestation are associated with significantly increased disability (very preterm).
- *Preterm* birth is associated with increased risk of infant mortality, and emotional, behavioral, and learning problems.

1.2.2 At-Birth Assessment

APGAR: Rapidly assesses the health of the newborn and the likelihood of survival. Scored 0, 1 or 2 for each:

- A—appearance (color)
- P—pulse (heartbeat)
- G—grimace (reflex irritability)
- A—activity (muscle tone)
- R—(respiration)

1.2.3 Presence of Father

In delivery room for both vaginal and cesarean section births, presence of the father is encouraged.

Important Concept

APGAR scores

7–10 = normal
4–7 = might require resuscitation
< 3 = immediate resuscitation

1.3 Newborns

Infants are not "blank slates," but are born with certain capacities and preferences.

1.3.1 Capacities Present at Birth Include:

- Crying and clinging
- Reaching and grasping
- Imitate facial expressions
- *Entrainment* (moving limbs in rhythm matching speech of other people)

1.3.2 Given a Choice, Newborns Prefer:

- Complex designs
- Curves (versus straight lines)
- Objects in motion
- Bright objects
- Contrasting colors

1.3.3 Newborns Pay Special Attention to:

- **Language**
  - Infants do not learn language, but learn to use the innate language skills in ways that match people around them.
  - Language learned before age 10 goes into the Broca and Wernicke areas. After age 10, language goes into contiguous brain regions.

1.3.4 Facial Stimuli

- Strong preference for faces vs. other stimuli
- Preference stronger in females.

1.3.5 Maternal-Child Bonding

- No attachment without bonding.
- Lack of bonding can result in "failure to thrive."
  - *Reactive attachment disorder*:
    - —Inhibited type: Withdrawn and unresponsive.
    - —Disinhibited type: Indiscriminate interaction; will bond with anyone available.

Innate capacities interact with environment and experiences to form the child.

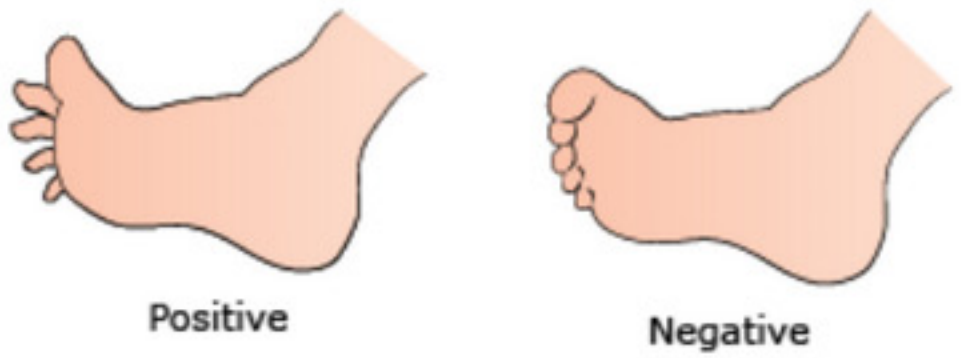
Development is about interaction not mere progression.

2 Developmental Indicators

2.1 Reflexes

▼ **Table 3–2.1** Developmental Indicators

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



▲ **Figure 3–2.1** Babinski Reflex

2.2 Smiling Development

- Ability present — At birth
- Response to others — 2 months
- Recognition/social smile — 3 to 4 months

Important Concept

USMLE issue:

Focus on when reflexes disappear.

Memory Aid

Order of reflex disappearance:

See
My
Reflexes
Pull
Back

2.3 Motor Patterns

- Grasp before release.
- Palm up before palm down.
- Gross motors first, fine-grain distal movements later.
- Ulnar to radial progression.
- **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 8 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.
- **Imprinting:** Attachment behavior for geese, ducks, quail (*not* for people).

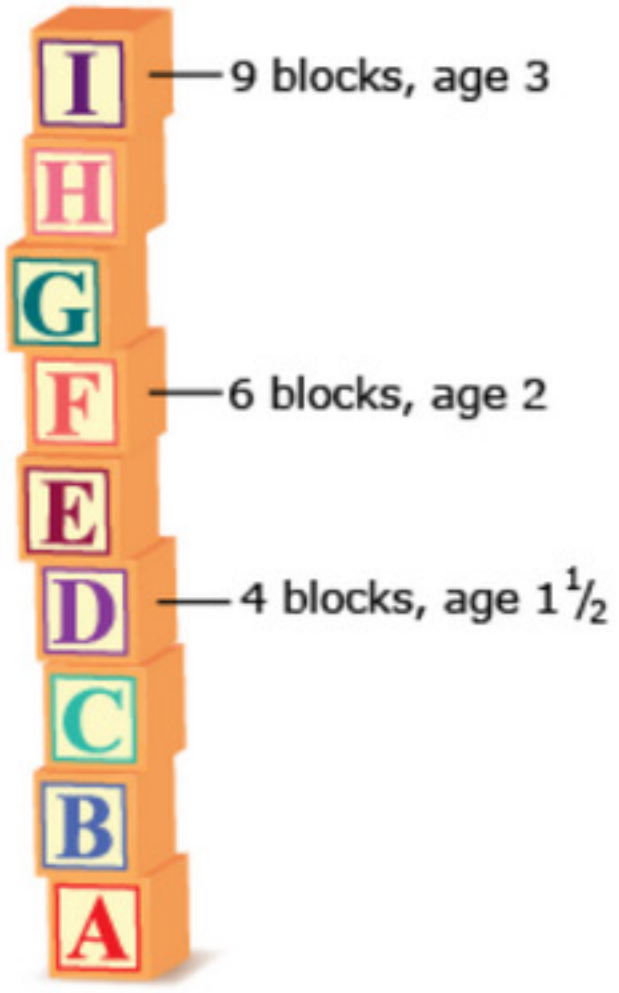
Important Concept

Motor development follows a predictable sequence.

Memory Aid

Age (in years) x 3 = number of cubes

Block Tower Clues to Age



▲ **Figure 3–2.3** Cube Stacking

3 Milestones for First Year of Life

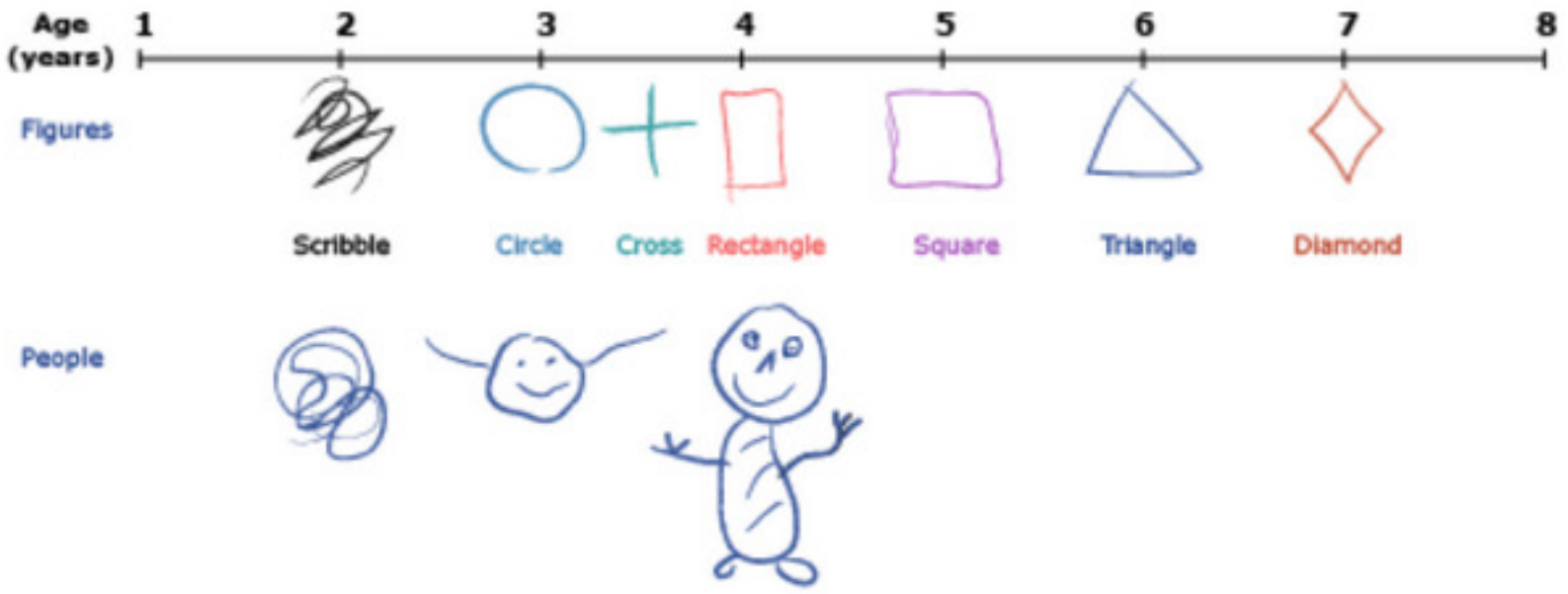
		At Birth	2 months	4 months	6 months	9 months	12 months
Physical	Reflexes		• Sucks on hand • holds head up • pushes up when on stomach	• One-hand reach for toy • shakes toy • holds head with no support • rolls over tummy to back • pushes up on elbows • sits with support	• Tries to get things out of reach • passes toy from hand to hand • rolls over in both directions • puts feet in mouth • sits without support • bounces on legs • crawls backward before moving ahead	• Points with finger • plays peek-a-boo • puts things in mouth • has pincer grip • stands holding on • pulls to stand • crawls	• Puts out arm to help with dressing • plays peek-a-boo and patty-cake • shakes head "no" • waves "bye" • says "mama" and "dada" • shakes, bangs, and throws toys • puts things in and out of container
Cognitive	Imitates faces; entrainment		• Turns toward sound • makes gurgling sounds	• Babbles • copies sounds • different cries for hunger, pain, tiredness	• Responds to own name • makes sounds in response to sounds • babbles sounds *m* and *b*	• Has favorite toy • understands "no," "mamamama," and "babababa"	• Hands form a book to hear a story • responds to spoken requests • tries to repeat words others say • finds hidden things (object permanence) • follows simple directions, such as "Pick up the toy"
Social	Clings and cries; fussy when bored		• Smiles at others • recognizes people	• Smiles in recognition of person • likes to play with others • laughs aloud • responds to affection	• Likes to play with parents • likes to see self in mirror	• Stranger anxiety	• Shy with strangers • separation anxiety

▲ **Figure 3–3.0** First Year of Life

4 Developmental Behaviors After the First Year of Life

	Age 1	Age 2	Age 3	Age 4	Age 5	Ages 6-12	Over age 12
Physical	• Walking • climbing stairs (at 1½) • shows hand preference	• Very active; can open doors • stands on tiptoes • can aim and throw a ball	• Alternates feet going up • rides tricycle • toilet training • catches ball with arms • unbuttons buttons • uses scissors	• Alternates feet going down • hops on one foot • grooms self	• Dresses and undresses self • two-hand catch	• Switches to bicycle • loses first tooth (age 6) • permanent teeth in (age 11) • general coordination increases • onset of sexual maturity (ages 11–12)	• Adolescence: sexual characteristics develop
Cognitive	• Recognizes self in mirror • uses 10 words	• "No" is common word • only parents understand pronunciation • uses two-word (telegraphic) sentences • uses pronouns • points to body parts	• Fixed-gender identity • uses complete sentences • pronunciation clearer • recognizes objects in pictures • can answer simple questions	• Tells stories • uses plurals, prepositions, compound sentences	• Asks the meaning of words • shows clothing preferences	• Vocabulary greatly expands (60,000 words by age 12)	• Speech patterns express identity
Social	Separation anxiety continues; onlooker play	• Imitates adult actions • is selfish • parallel play	• Gender-specific play • begins to "take turns"	• Imitates adult roles • curious about sex • may have nightmares (monster in the closet) and/or imaginary friends	• Expresses romantic feelings (Oedipal phase) • notices and conforms to peers	• Key point to be competent • focus on "rules of the game" • team sports; sexual feelings not expressed • separation of genders	• Identity is a key issue • fights with parents about symbolic issues • conformity most extreme (age 11–12) • boy/girl separation erodes • organized sports decline for many • communication becomes activity in its own right

▲ **Figure 3–4.0A** Milestones After 1 Year



▲ **Figure 3–4.0B** Drawing Developmental Benchmarks After 1 Year

5 Tanner Stages for Pubic Hair

	Approx. Ages
1. No hair (preadolescent).	< 10
2. Hair sparse, long, downy, light pigmentation.	10 to 11
3. Increased pigmentation, more curly.	11 to 13
4. Adult-like, but less, and not distributed.	13 to 14
5. Adult distribution, spread to thigh.	> 14

▲ **Figure 3–5.0** Tanner Stages and Approximate Ages

6 Highlighted Topics

6.1 Enuresis (and Encopresis)

- Not generally diagnosed until child is age 5.
- Occurs during Delta sleep.
- Look for life stressors (new baby sibling) as triggers.
- Treatment: Medications (short-term only).
  - **Desmopressin**
    — Acts on kidneys.
    — Reduces urine produced at night.
  - **Imipramine**
    — Reduced Delta sleep.
  - **Oxybutynin**
    — Reduces bladder contractions.
    — Delays urge to urinate.
    — Especially useful if both day and night wetting.

6.2 Gender Identity

- By age 3, locked by age 4.
- Once set, not changeable.
- Not determined by self-observation but by "parental assignment and culture."
- A vocalized exploration for many children.
- *Gender Identity Disorder*
  - Person sees gender identity as opposite of physical self.
  - "Girl trapped in a boy's body" or "Boy trapped in a girl's body."
  - "God made a mistake."
  - Intervention: Sex change procedures or operation.

6.3 Imaginary Friends

- Common, over one half of all children have them.
- May occur up to age 10.
- May be pure imagination or embodied in something such as a stuffed animal.
- Children with imaginary friends:
  - Are social.
  - Have real friends, too.

7 Piaget: Cognitive Development

- The ability to represent experience to self and to understand that the world changes in predictable ways with age.
- Being aware of this tells the physician how to communicate clearly with children of different ages.

7.1 Key Ideas

- Schema: Patterns by which we understand
- Assimilation and accommodation

7.2 Stage 1: Sensorimotor

Sensations matched with movements.

- Age: 0–2 years
- No *object permanency*
  - Until just before age 1
  - Out of sight is "out of existence"

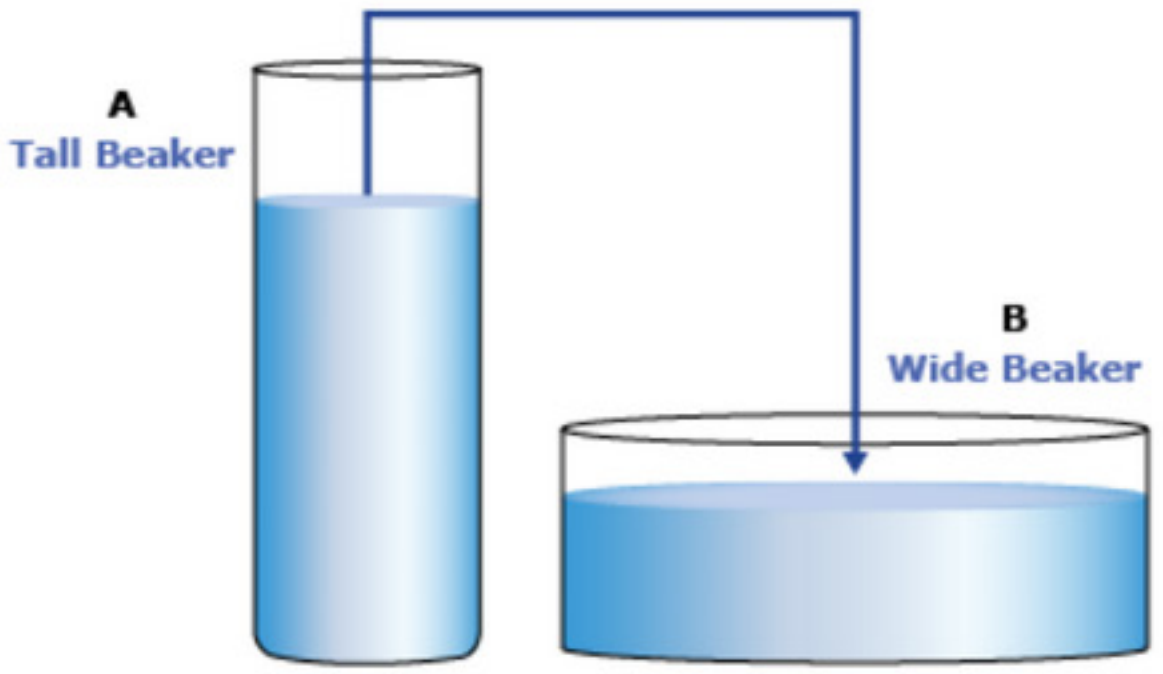
7.3 Stage 2: Preoperational Thought

Objects make up the world.

- Age: 2–6 years
- Language changes child's interactions (name = object)
- Use of objects is concrete
- Egocentric thinking; magical thinking
- Moral thought is based on being bad or good

7.3.1 Testing the Law of Conservation

Which Beaker Holds More Water?



▲ **Figure 3–7.3** Beaker Measure

- They are the same.
- But child under age 5 will usually say, "Beaker A."

Important Concept

We do not take in the world passively but actively represent the world to ourselves.

Important Concept

- Assimilation: matching to existing schemas
- Accommodation: changing schemas to deal with new experiences

7.4 Stage 3: Concrete Operational

Abstract from objects.

- Age: 7–11 years
- Law of conservation achieved
- Ability to understand other's point of view
- Seriation
- Mnemonics
- No hypotheticals

7.5 Stage 4: Formal Operational

Abstract from abstractions.

- Age: 12+ years (if ever)
- Problem-solving strategies
- Hypotheticals
- Past, present, future

8 Special Topics

8.1 Children's Views of Illness and Death

8.1.1 Before Age 5: No Real Concept of What Death Means

- They think the person left them, is angry at them, does not care about them.
- May "try to be good" to bring the dead person back.

8.1.2 When Hospitalized at Early Age

Children are much more likely to:

- Fear separation from parents.
- Think they are being punished.
- Worry about mutilation.

8.1.3 Young Children are Egocentric

When ill, they are very likely to think:

- They are being punished.
- They made this happen to themselves.
- Parents or others do not like them.
- Treatment for illness may also be seen as punishment.

8.2 Ages 5 to 8: Understand Death as a Fact

- May think death can be "fixed."
- May try magical actions.
- May see or "feel" dead people as present.
- By age 8, children have learned that death is permanent.

8.3 Vulnerable Child Syndrome

- Child who has a "close call" with death is thereafter perceived by parents as vulnerable to serious injury or accidents.
  - Parents: Overprotect the child, are unable to set age-appropriate limits, and display excessive concerns in medical settings about their child's health.
  - Child: Exaggerated separation anxiety, out-of-control behavior, school underachievement, and distorted perceptions of their own health.

Important Concept

Understanding of life, death, and illness change with age.

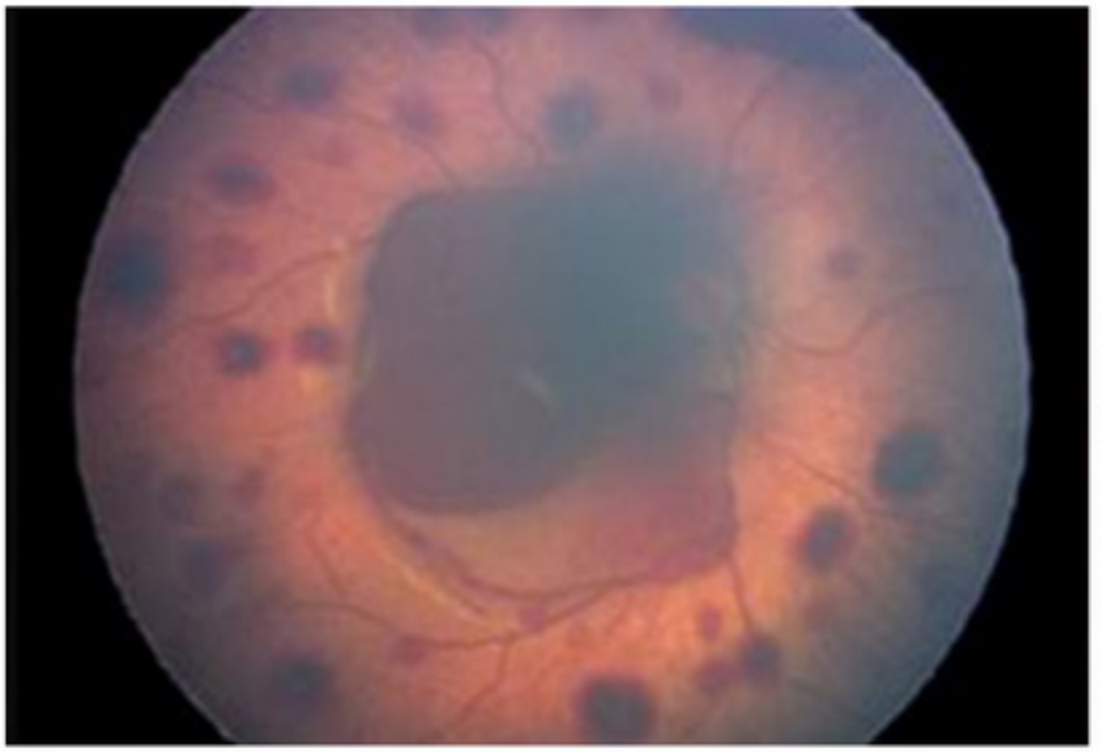
9 Types of Abuse

9.1 Child Abuse

- Mandatory reportable offense up to and including age 17.
- Physicians must first protect child.
  - First, separate child from adult.
  - Then, report to a child welfare agency.
- Physicians over-report child abuse by a 2-to-1 ratio in the real world.
  - This is how we want it. Be oversensitive.
  - *On the exam, if you think an example may be abuse, but you are not sure, act as if you are sure.*
  - You are a screening mechanism. Others will make the definitive evaluation.
- Child abuse can be: Physical, neglect (nutritional/hygiene), mental cruelty, sexual.
- Abuse is a crime of opportunity: Suspect the caregiver first.
- Risk factors for abuse:
  - < 1 year
  - Stepchild
  - Premature
  - Hyperactive
  - Sick
  - Developmentally delayed
- Signs of physical abuse:
  - Belt marks
  - Fractures at various stages of healing
  - Fractures in patients < 1 year
  - Spiral fractures
  - Bruises in unusual areas (back, inner thigh, buttocks)
  - Burns
    —Highest risk of mortality
    —Smaller burns: More likely abuse (cigarettes)
    —If arm, but not hand = abuse
- Most child-abuse injuries are soft tissue.
- Abused children tend to be more aggressive, poorly adjusted in school (socially and academically), abuse substances, and often become abusers themselves.
- *Shaken baby syndrome*
  - Caused by vigorous shaking of an infant resulting in brain damage leading to MR, hearing loss, speech and learning disabilities, paralysis, seizures, and death.
  - Presentation: Retinal hemorrhages, floppy baby, subdural hematoma, increased head size indicating excessive accumulation of fluid in the tissues of the brain.

Important Concept

Child abuse *must* be reported after making sure that child is safe.



Courtesy from the American Association for Pediatric Ophthalmology and Strabismus (AAPOS)

▲ **Figure 3–9.1** Retinal Hemorrhage

9.2 Suspect Child Sexual Abuse When You See:

- Unusual sexual knowledge.
- STDs in young children.
- Recurrent urinary tract infections.
- Vaginal or anal trauma.
- Excessive dependency on caregiver.

9.2.1 Beyond the Physical: Psychological Trauma

- Comes from shame, guilt, and fear of retribution or loss of affection from perpetrator.
- Most likely perpetrator: Uncles, older siblings, stepfathers.
- Males are most likely the source.

9.2.2 Prevention

- Teach child about inappropriate touching (good touches/bad touches).
- Inform child of right to say *no*.
- Tell children to whom they can turn.
- Help child feel comfortable in discussing abuse.

9.3 Elder Abuse

- Mandatory reportable offense, age 65 and over.
- Prevalence 5% to 10%.
- Includes: Physical, psychological, financial, neglect (most common).
- Caregiver is most frequent abuser, then spouse.
- Often, abuser will accompany patient to see the physician.

Important Concept

Most likely source for physical abuse: female

For sexual abuse: male

Important Concept

Elder abuse is as serious as child abuse and must be reported in the same way.

9.4 Domestic Violence

- *Not* a mandatory reportable offense in most states.
- Five million women are physically abused each year and nearly 1,500 women are killed by abusers.
- 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:
  - No support system in place.
  - Financial dependence on abuser.
  - Fear of abuser retaliation.
  - No plan of escape.
- Pregnancy and abuse:
  - Frequently struck in abdomen or chest.
  - Most likely in last trimester.
- Physician should:
  - Ensure the safety of the abused person.
  - Document the abuse.
  - Help the abused person develop an emergency escape plan.
  - Encourage the abused person to report to law enforcement officials.
  - Refer the abused person to an appropriate shelter or program.

Important Concept

You can urge the victim of domestic abuse to make a report but cannot force him or her to do so.

9.5 Rape/Sexual Assault

- *Any* sexual contact without consent is *sexual assault*.
- Any form of penetration constitutes rape (male or female).
- *Statutory rape*: Sex with a minor or someone who is not mentally competent and unable to consent.
- Date rape drugs: Flunitrazepam (Rohypnol), gamma hydroxybutyric acid (GHB), ketamine.
- Rapists tend to be under 25, known to victim, same race as victim, and substance abuse is usually involved.
- Victims tend to be 16–24, raped in their own homes.
- Do *not* need to actively resist to prove rape.

9.5.1 Physician's Role

- Be supportive.
- Detailed physical exam in presence of chaperone:
  - Rape kit.
  - Patient may be sensitive about gender of physician.
- Consult rape crisis counselor.
- Antibiotics for treatable STDs.
- Emergency contraceptive.
- Encourage victim to notify police and report the crime.

10 Disorders Usually Diagnosed in Childhood

10.1 Intelligence and Mental Retardation

10.1.1 Intelligence Quotient (IQ)

- Estimate of the person's functional capacity.
- By analogy: The bottle, not the water.
- Mean = 100, standard deviation = 15
- Recalibrated every 10 to 15 years.
- Two methods for generating score from IQ test results:
  - **Mental Age Method**: Compares across ages
    - —Used only for children under age 16
    - —MA/CA x 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.

Important Concept

1. IQ is a comparative *not* an absolute score.
2. IQ assesses potential not actual success.

10.2 Key IQ Numbers

- 130 and above = Superior intelligence
- 90 to 110 = Average (50% of population)
- 69 and below = Mentally retarded
- Mental retardation (MR) diagnosis requires IQ < 70 *and* objective functional impairment.

▼ Table 3–10.2 Mental Retardation

Retardation Level	IQ	Details
Mild	69–50	Supports self with some guidance from others. 85% of mentally retarded, 2x males, diagnosis during first year of school.
Moderate	49–35	Benefits from vocational training with supervision. Works in sheltered workshop, Goodwill Industries.
Severe	34–20	Train for self-care habits, minimal speech.
Profound	< 20	Constant supervision, nursing care.

11 Developmental Disorders

11.1 Fetal Alcohol Syndrome

- The most common known cause of mental retardation.
- Results from alcohol consumption during pregnancy.
- Look for:
  - Small head
  - Flat midface
  - Small eye openings
  - Skin folds at corner of eyes
  - Short nose
  - Thin upper lip
  - Smooth philtrum

Andy Levin/Science Source

▲ **Figure 3–11.1A** Fetal Alcohol Syndrome

11.2 Down Syndrome (Trisomy 21)

- 1/700 births, moderate to severe MR.
- Low muscle tone, hyperreflexia, typical facies.
- Simian crease: Single line across hand.
- Cardiac and GI problems common.
- High rate of Alzheimer disease in older Down syndrome patients.

Lauren Shear/Science Source

▲ **Figure 3–11.2A**
Down Syndrome

Dr. Ken Greer/Visuals Unlimited, Inc.

▲ **Figure 3–11.2B**
Down Syndrome: Simian Crease

11.3 Williams Syndrome

- Chromosome 7 deletion
- 1/20,000 births
- Moderate to Severe MR
- Elfin-like face
- Starburst iris
- Hypertension, aortic stenosis

11.4 Fragile X Syndrome

- 1/1,000 male births
- Long arm of chromosome X (Xq27)
- Long face, prominent ears
- Flat feet
- Macroorchidism
- Low muscle tone, hyperextensible finger/thumb joints
- Excessive shyness
- Perseveration
- 80% develop ADHD

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▲ **Figure 3–11.4** Fragile X Syndrome

11.5 Prader-Willi Syndrome

- Deletion of chromosome 15
- Paternal imprinting
- Short, obese
- Failure to thrive
- Strabismus (crossed eyes)
- Hypoorchidism
- Hyperphagia
- Obesity may lead to type 2 diabetes

Wellcome Imagey/Custom Medical Stock Photo

▲ **Figure 3–11.5** Prader-Willi Syndrome

11.6 Angelman Syndrome (Rare)

- Deletion of chromosome 15
- "Happy puppet" syndrome (old term)
- Developmental delays, absence of speech, happy disposition
- Hand flapping; jerky, stiff-legged gait; ataxia

Maria Platt-Evans/Science Source/Custom Medical Stock Photo

▲ **Figure 3–11.6** Angelman Syndrome

12 Pervasive Developmental Disorders

12.1 Autism Disorder

- Diagnosis usually not made before age 2.
- Delayed in all three of the following prior to age 3:
  1. *Impaired social interaction.*
     - Lack of reciprocal gaze.
     - Lack of social or emotional reciprocity.
  2. *Impaired communication.*
     - Delay or absence of language development.
     - Stereotyped, repetitive use of language; idiosyncratic language.
  3. Restricted, *repetitive behavior*, interests, activities.
     - Preoccupied with specific interest, parts of objects.
     - Inflexible adherence to specific nonfunctional routines, rituals.
     - Repetitive motor mannerisms.
- Male:Female = 4:1
- 80% have IQ < 70
- Some have deficits in chromosome 11 or 15
- Higher rates with:
  - Prenatal injury.
  - Maternal rubella in first trimester.
  - Mother had asthma, allergies, or psoriasis while pregnant.
  - Father older than 40.
- Likely mechanisms
  - Exposure to environmental toxins (mercury, pesticides).
- Failure of apoptosis.
- Neurological findings
  - Brains at age 3 are 15% larger than peers'.
  - Lack of *mirror neurons*.
- Treatments
  - Behavioral techniques: Shaping.
  - Risperidone to reduce agitation and aggression.

12.2 Asperger Syndrome

- Similar to autism, *but:*
- No delays in language or cognitive development.

12.3 Rett Disorder

- Similar to autism, *but:*
- Normal development until 6 months of age.
- Head growth normal, then decelerates after 6 months.
- *Only* in girls.

Important Concept

One in 88 live births may lead to a PPD.

Important Concept

If you can't get rid of old, unused neuronal connections, you do not have the ability to make new connections.

Important Concept

Mirror neurons: one person's brain shows activity to mirror neuronal activity of another person they are watching.

12.4 Childhood Disintegrative Disorder

- Similar to autism, *but:*
- Normal development for the first two years.
- Language, behavior, bowel/bladder control, play, and motor skills already achieved are lost.

12.5 Attention Deficit Hyperactivity Disorder (ADHD)

12.5.1 Criteria

- **Inattention** (six months of six or more symptoms).
  - Careless, cannot follow instructions or finish work, difficulty organizing, loses things, easily distracted, forgetful.
- **Hyperactivity** (six months of six or more symptoms).
  - Fidgets, cannot be quiet or still, always in motion, talks excessively, blurts answers, cannot wait for turn, interrupts others.
- Impairs functioning and relationships with others.
- Symptoms must present prior to age 7.

12.5.2 Clinical Issues

- Prevalence in about 5% of males.
- 10x more in males.
- Lower dopamine levels.
- >70% children with ADHD also have sleep disorders.
- 10× higher rate of depression in adolescents.
- Some have developmental delays in frontal lobes and anterior cingulate gyrus.

12.5.3 Likely Overdiagnosed

Must differentiate from:

- Obsessive-compulsive anxiety disorder.
- Tourette syndrome.
- "High-energy" child.
- Response to pharmacology helps confirm diagnosis.

12.5.4 Hypothesis

Excessive behavior helps to maintain waking state.

12.5.5 Treatments

- *All* pharmacology must be accompanied by behavioral therapy.
- First line: Methylphenidate, dextroamphetamine.
- Second line: Atomoxetine, modafinil.

Important Concept

Adults with ADHD usually have inattention, but not hyperactivity symptoms.

Important Concept

Think about an ADHD person as in danger of falling asleep.

CHAPTER 4 Human Sexuality

1 Gender

The *default gender* for sexual development in humans is female.

1.1 Wolffian and Müllerian Ducts are Found in Male and Female Fetuses

1.1.1 In Males

- *Wolffian duct* develops into male internal and external genitalia under the influence of androgens and TDF. (Seminal vesicles, vas deferens, epididymis, penis, and scrotum.)
- *Gonads*: Y chromosome directs differentiation of primitive gonads to be male.
- *Testis-determining factor* (TDF) gene.
  - Found only in fetuses with Y chromosomes.
  - The indifferent testes begin to secrete androgenic hormones and müllerian-inhibiting substance (MIS).

1.1.2 In Females

- *Müllerian duct* develops into the fallopian tubes, uterus, and top third of the vagina, in the absence of androgens and TDF.

1.2 Androgen Insensitivity Syndrome (AIS)

Occurs when an XY fetus' testes produce testosterone, but hormone *receptor insensitivity* results in female external genitalia.

- Patients have female external genitalia and a blind vaginal pouch.
- *Note: Often not identified until puberty.*
  - Patients have normal breast development (due to conversion of testosterone to estradiol).
  - Normal presentation is due to failure of menarche.
- Occasionally testes "drop" and appear in the inguinal region or labia.
- Most frequently, patients with AIS are oriented as female in terms of gender.
- Usually heterosexual (seek male partners).

USMLE® Key Concepts

For Step 1, you must be able to:

- Understand sexual development across the lifespan.
- Identify paraphilias.
- Diagnose and know treatments for sexual disorders.
- Know the impact of common pharmacology on sexual functioning.

1.3 Congenital Adrenal Hyperplasia

- XX fetus exposed to excessive androgens from adrenal glands.
- Increased androgen production results in *ambiguous genitalia in newborn girls.*
  - Large phalluses, fused labia.
  - External genitalia become masculinized.
  - Most commonly due to 21-hydroxylase [21-OH] deficiency (90% of cases).
- In adulthood, two thirds of patients have a female gender identity.
- One third of patients have homosexual (lesbian) identities.
  - Suggesting early exposure to androgens may affect sexual orientation.
- Traditionally, sexual reassignment surgery is done in infancy, most frequently assigning female gender (easier surgery).
  - *Current recommendation*: Wait for development of gender identity (age 3).

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▲ **Figure 4–1.3** Ambiguous Genitalia

2 Sex Across the Life Span

▼ **Table 4–2.0** Early Sexual Development

Age	Sexual Issue
3	Gender identity established.
4–5	Expect questions about sexuality and mechanics of sex.
6–11	Latency: Separation of genders, talk of sexuality fades.

2.1 Childhood

- Children are naturally curious about everything, including sex.
  - *Encourage the child to talk* and ask questions.
  - Maintain a calm and noncritical atmosphere for discussions.
  - Use words that are understandable and comfortable.
  - Listen to the child to determine his or her level of knowledge and understanding.
- *Self-exploration,* physically touching genitalia, and masturbation *are expected and normal.*
- *Question*: If child touches self in front of parents, and parents are uncomfortable?
  - *Answer*: "Please don't do that while I'm sitting here. That's private."

Important Concept

Questions abuot sex and self-exploration are part of normal curiosity in children.

2.2 Adolescence

- Questions about sexuality reemerge.
- Masturbation three to four times per week is well within normal range.
- Experimentation with opposite and same-sex partners is common.
- Up to 35% of adults report at least one homosexual encounter, usually during adolescence.
- Ten percent of teenage girls become pregnant.
  - Fifty percent of these give birth.
  - Can produce social isolation.
  - Leading cause of school dropout incidences.
- Now able to talk about sex in terms of relationship context.
- May be anxious, uncertain about intensity of sexual feelings.
- Often questions about masturbation, menstruation, contraception, STDs.
- May struggle with sexual issues in the context of family or religious values.
- Physician should remove barriers to communication about sexual issues by:
  - Speaking to teens without their parents.
  - Inquiring if adolescents have questions.
  - Making clear physician's availability to help as issues arise.
- Can prescribe birth control or treat STD without parental involvement in most states.

2.3 Adult Years

2.3.1 Males

- Testosterone responsible for "masculinity" and sexual drive.
- Hormone production decreases with age, but normally remains sufficient for activity.

2.3.2 Females

- Estrogen responsible for "femininity," but not sexual drive.
- Testosterone responsible for sexual drive and is secreted from adrenal glands and ovaries.

2.3.3 Physician

- Physician should ask about sexual activity as part of routine examination.
- Put patient at ease. If physician is comfortable, the patient will be comfortable.
  - If the patient never asks about sex, then *physician* must make the patient feel comfortable.
- Anticipate how medical conditions or treatment might affect sexual functioning.

2.4 Older Adults (65+)

- Continuing to have sex maintains functioning. ("Use it or lose it.")
- Remain interested in sex. ("Spirit stays willing, but flesh may weaken.")
  - Men take longer to achieve erection; ejaculation may be delayed or accelerated; refractory period prolonged.
  - Women may have vaginal dryness and thinning.
- Single best predictor of person 65 or older having sex:
  - Availability of a partner.
- As health issues/pharmacology increase, chances of interference with sexual activity also increase.
  - Educate patients on how (erectile dysfunction) ED drugs may interact with treatments.
- Rates of STD in adults 65 and older are rising.

3 Phases of Sexual Response Cycle

- **Desire**
  - Interest and sexual fantasies
- **Excitement**
  - Genital vasocongestion and enlargement, nipple erection
  - Males: Erection; elevation and enlargement of testes
  - Females: Vaginal lubrication and elongation; uterus ascends
- **Plateau**
  - Sustained excitement prior to orgasm
- **Orgasm**
  - Males: Ejaculation
  - Females: Contractions of labia minora, lower one third of vagina, uterus
- **Resolution**
  - Return to baseline
- **Refractory Period**
  - Time in which orgasm cannot be achieved
  - Only in males

4 Homosexuality

- A label, not a diagnosis or pathology.
- Determined by "partner preference," not gender identity.
- Estimated prevalence:
  - 4% to 10% male
  - 1% to 3% female
- Ego-syntonic: requires no intervention.
- Ego-dystonic: intervention is to make person more comfortable with his or her orientation.
- Heritability index: 47%.
- May be married, 50% have children.
- *Preference* usually established by adolescence and *precedes first sexual experience.*
- "Very feminine boys" are more likely to grow up to be homosexual.
  - But, many homosexual men were *not* feminine boys.
  - More masculine girls are only slightly more likely to be homosexual.
- *Note: Treat homosexual patients like all other patients.*
  - Homosexual patients may be reluctant to talk about sexual orientation.
  - Approach the topic by asking about behavior, not self-label.
- For either homosexuals or heterosexuals:
  - Multiple sexual partners increase risks of STD.
  - Anal intercourse in sexual practice most likely to increase spread of HIV.

Important Concept

For homosexuality: Focus on patients' behaviors and risk issues, not self-label.

5 Sexual Disorders

5.1 Desire Disorder

5.1.1 Hypoactive Sexual Desire

- Decreased desire in sexual activity.
- Lack of fantasies or thoughts about sex.
- Twenty percent of the population.
- More common in females.
- Reasons:
  - Depression
  - Marital discord
  - CNS depressants
  - Postsurgical/ post-MI (myocardial infarction)

4.0.2 Sexual Aversion

- Recoiling from the thought of sex.
- Avoidance of all sexual contact.
- Disruptive to relationships.

5.2 Arousal Disorders

5.2.1 Female Sexual Arousal Disorder

- Inability to maintain sufficient arousal and lubrication.
- 33% lifetime prevalence.
- Antihistamine or anticholinergic medications may produce symptom.

5.2.2 Male Erectile Dysfunction

- **Primary ED:** Male has never been able to achieve erection.
- **Secondary ED:** Male who was previously able to achieve erection now cannot.
- ED is most common sexual disorder in males; 20% lifetime prevalence.
- Incidence increases with age.
- Screen for:
  - Depression
  - Marital conflict
  - Diabetes
  - Low testosterone

5.2.3 Physiological or Psychological Problem?

- Ask about morning erections (REM sleep).
- Postage-stamp test or snap gauge.

5.2.4 Treatment

- Address underlying condition.
- Pharmacology: Sildenafil, Tadalafil, Vardenafil.

Important Concept

Four classes of disorders:

- Desire
- Arousal
- Orgasm
- Pain

5.3 Orgasm Disorders

5.3.1 Anorgasmia (Inhibited Female Orgasm)

- Primary: 5% of married women >35 have never achieved orgasm.
  - Likelihood of orgasm increases with age.
- Acquired: Prior history of normal orgasms (prevalence 30%).
  - Screen for depression or anxiety disorders.

5.3.2 Retarded Ejaculation (Inhibited Male Orgasm)

- Inability to orgasm with vaginal intercourse.
- May have no problem having orgasm by other means.
- Distinguish from "retrograde ejaculation."

5.3.3 Premature Ejaculation

- Regular ejaculation before or soon after vaginal penetration.
- Interferes with pleasure of sexual act.
- More common if early sexual experiences were in situations where orgasm was rapid (non-private settings, prostitute, masturbation for stress relief).
- Treatment use
  - Behavioral conditioning techniques.
    - — Stop and go
    - — Squeeze technique
- Effects of SSRIs and opiates.

Important Concept

Retarded ejaculation: lack of orgasm

Retrograde ejaculation: orgasm occurs, but ejaculant is sent backwards into bladder

5.4 Sexual Pain Disorders

The two pain disorders below have considerable overlap.

5.4.1 Dyspareunia

- Persistent, recurrent pain before, during, or after intercourse.
- More likely in women.
- Common post-surgery of genital area, after childbirth.

5.4.2 Vaginismus

- Involuntary muscle constriction of outer one third of vagina.
- Prevents penetration.
- Treatments: Relaxation training, Hegar dilators.

Important Concept

- If dyspareunia occurs, vaginismus may develop as protective measure.
- If vaginismus and intercourse is forced, dyspareunia can be the consequence.

5.5 Substance-Induced Sexual Dysfunction

5.5.1 Alcohol, Marijuana, Other Drugs

- Increase sexuality acutely but, in the long term, cause sexual dysfunction.
- Marijuana reduces testosterone levels.
- Liver disease is secondary to alcohol in leading to altered estradiol and sexual dysfunction.
  - Stimulants increase sexuality by increasing dopamine levels.
  - Heroin decreases libido and inhibits ejaculation.

Important Concept

Always explore substance use with patients reporting sexual dysfunction.

5.5.2 Prescription Drugs

- SSRIs decrease libido and delay orgasm.
- Antipsychotics:
  - Block dopamine receptors in the infundibulum.
  - Interfere with erection and orgasm.
- Antihypertensives, such as beta and alpha blockers, cause ED.

5.6 Summary

▼ **Table 4–5.6A** Frequent Reported Sexual Side Effects of Common Medications

Sexual Side-Effect	Medication Type	Affected Neurotransmitter
Decreased interest (Reduced libido)	SSRIs α-and β- lockers Methyldopa	Increase serotonin Decrease NE Increase NE in CNS
Increased interest	Androgens L-dopa (Parkinson)	Increase dopamine
Erectile dysfunction	α-Blockers Methyldopa SSRIs Antipsychotics	Decrease ND Increase NE in CNS Increase serotonin Decrease dopamine
Priapism	Trazodone	Increase serotonin
Vaginal dryness	Antihistamine Anticholinergic	Decreases histamine Decreases acetylcholine
Delayed/inhibited Orgasm	SSRIs	Increase serotonin
Inhibited Ejaculation	SSRIs Antipsychotics	Increase serotonin Decrease dopamine

5.6.1 Medical Conditions That May Interfere With Sexual Functioning

- **Heart Disease**
  - CV meds may decrease libido or cause ED.
  - Post-MI fear that having sex will cause another MI.
- **Diabetes**
  - Vascular changes and neuropathy cause ED and decreased sensory response.
  - Poor glycemic control worsens symptoms. PDE inhibitors are effective.
- **Prostate Surgery**
  - Transurethral resection of the prostate (TURP) can cause neurologic ED and retrograde ejaculation.
- **Spinal Cord Injury**
  - Males: ED, loss of sensation, orgasmic dysfunction, and decreased fertility.
  - Females: Decreased vaginal lubrication, but maintained fertility.

5.7 Paraphilias

- Sexual aberrations: patterns of sexual arousal/behavior that are:
  - — Outside of the cultural norms.
  - — Typically occur for > six months.
  - — Cause distress or dysfunction in some aspect of life.
- **Treatment options**:
  - — Psychotherapy (best choice)
  - — Aversive conditioning (limited success)
  - — Medications: Anti-androgens and SSRIs

▼Table 4–5.6B Paraphilias

Name	Sexual Arousal and Gratification Induced by
Exhibitionism	Exposing genitals to unsuspecting strangers.
Voyeurism	Observing unsuspecting person bathing, grooming, having sex.
Fetishism	Nonliving objects are sexually arousing. Shoes, special material, special lighting, or focus on parts of anatomy only.
Transvestite fetishism	Man dresses fully or in part in women's clothing.
Frotteurism	Rubbing against a usually fully clothed, non-consenting stranger. Common: Buses and subways during rush hour.
Sadism	Inflicting pain, suffering, or humiliation on another person.
Masochism	Involve self being humiliated, beaten, bound, or causing pain.
Pedophilia	Sexual urges toward children. Most common type of sexual assault.
Zoophilia	Having or fantasizing about sex with animals.
Necrophilia	Sex with dead people. Or may give drugs to make partner inert.
Hypoxyphilia	Enjoyment of hypoxia during orgasm. Choking by partner, amyl nitrate, poppers. Common: Autoerotic asphyxiation (man hangs self while masturbating).
Coprophilia	Sexual activities or fantasies with defecation.
Urophilia	Sexual activities or fantasies with urination.

▼Table 4–5.6C Commonly Confused Terms About Sexuality

Distinguishing Some Commonly Confused Terms			
Name	Biological Gender	Gender Identity	Preferred Partner
Heterosexual	Male	Male	Female
Homosexual	Male	Male	Male
Transvestite fetishism	Male	Male	Female
Gender identity disorder	Male	Female	Male

Important Concept

Only gender identity disorder is treated by sex-change operations.

1 Parts of the Freudian Psyche

1.2 Human Behavior as a Combination of Impulse and Control

1.2.1 Id

- Instinctive (biological) urges/drives.
- Sex and aggression; desires.
- Can lead to overindulgence and disregard for needs of others.
- "I want."

1.2.2 Ego

- Logical and language-based.
- Problem solving in context of reality.
- "I think."

1.2.3 Superego

- Moral conscience based on ideals and values of society.
- Directs appropriate behavior based on social ideals.
- Can lead to deprivation, so needs are not met.
- "I should."

1.2.4 Defenses

Ways the ego tries to solve the twin problems of:

- Mediating conflict between desires of the id and restrictions of the superego.
- Keeping person connected to reality at the same time.
  - Important:
    - —All defenses are unconscious (below the level of awareness).
    - —Defenses change with changing circumstances.
    - —Defenses can be both good (coping) and bad (pathological).
    - —Pathology is determined by intensity and extent.

USMLE® Key Concepts

For Step 1, you must be able to:

- Recognize the existence of defense mechanisms in self and others.
- Understand how to differentiate between defense mechanisms, not just to memorize definitions.
- Understand how to respond appropriately.

Important Concept

ID: Impulses from self

Ego: Problem-solving

Super-Ego: Values from others

2 Specific Defense Mechanisms

2.1 Primitive Defense Mechanisms

2.1.1 Projection

Seeing what is within self as part of the outside world, either the general environment or a particular person.

- What is in self is projected onto others the way a movie projector puts the movie on the screen.
- "Self, seen in others."
- Produces paranoia, delusions.
- Examples:
  - Man accuses his wife of having an affair, when he is attracted to his new work colleague.
  - A soldier says, "I wasn't scared, but everyone else was."

Important Concept

Projection: Seeing self in others

2.1.2 Denial

Refusal to accept some feature of objective reality.

- Expected first response to bad medical news.
- 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!"

Important Concept

Denial: Refusal to accept reality

2.1.3 Splitting

The world seen in terms of extremes.

- Things seen as "all good" or "all bad." Can rapidly shift from one to the other.
- Key symptom for *borderline personality disorder*.
- Any extreme evaluation is likely the result of this defense.
- Examples:
  - "You are the best doctor in the world. My old doctor was a malpractice nightmare."
  - "That man is pure evil and must be destroyed."

Important Concept

Splitting: black and white without shades of gray

2.2 Basic Defense Mechanisms

2.2.1 Blocking

A momentary gap in thinking.

- Disruptive; usually followed by an embarrassed reaction.
- Content will come to mind again, but after the moment has passed.
- Examples:
  - A moment after a student walks out of an exam she suddenly remembers the answer to the one question that stumped her.
  - The doctor cannot recall the name of the disease when trying to tell the patient the diagnosis.
  - Someone talking about a sensitive subject goes blank and forgets the subject. "I'm sorry, what were you saying?"

Important Concept

Blocking: Gap in thinking process

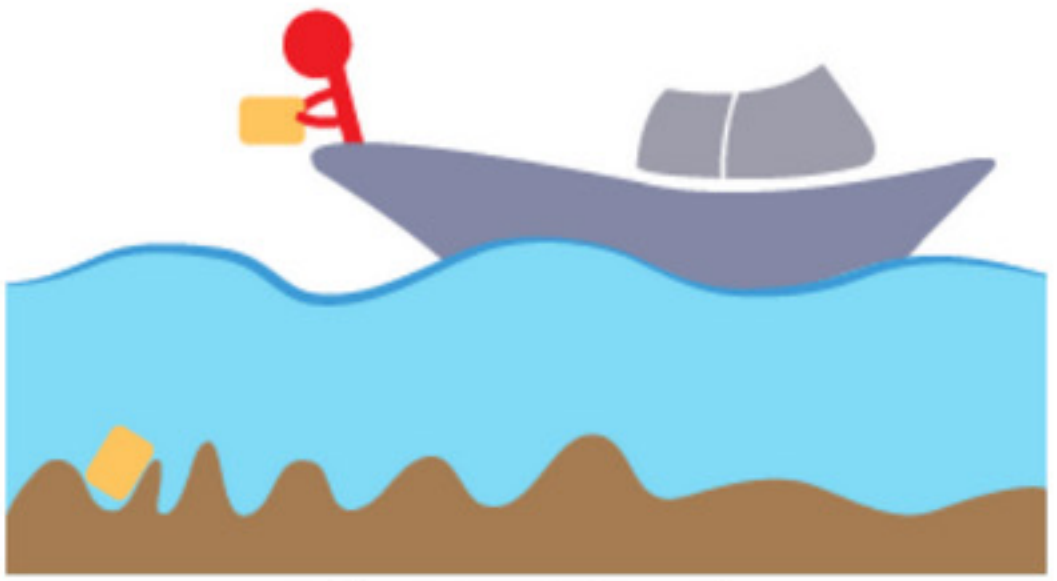
2.2.2 Repression

An idea or feeling is deleted from conscious thought.

- An unwanted idea is pushed and held outside of the conscious mind.
- Involves "unconscious" forgetting, with retrieval essentially impossible.
  - 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* and *denial*.

Important Concept

Repression: What was conscious is permanently pushed from awareness



▲ **Figure 5–2.2A** Repression

2.2.3 Displacement

Redirecting emotion or behavior to a different target.

- The person who has the emotion or reaction stays the same, but the target shifts (contrast with *projection*).
- Usually impulses are redirected to a less threatening, lower status target.

Important Concept

Displacement: Redirection to a different target

- Can be redirected in inanimate objects: After husband walks out, wife throws a plate at the wall.
- Person is not aware of doing this (unconscious).
- Examples:
  - I'm angry at you, but I yell at him.
  - A person who is angry at the boss yells at the spouse instead.

2.2.4 Regression

Returning to an earlier level of functioning.

- 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 acts like a child.
  - A previously toilet-trained child develops enuresis after his baby brother is born.
  - "Baby talk" between sweethearts.
  - A patient breaks down crying hysterically when told bad news.
  - A man, tired at the end of the day, grunts and points at something he wants rather than asking for it verbally.

Important Concept

Regression: Return to earlier functioning

2.2.5 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.
  - Baseball player reports that his hands shake just before he steps up to bat.
- At the extreme, produces the *somatoform disorders*.

Important Concept

Somatization: Psychological action produces physical symptoms

2.2.6 Introjection (Identification)

Taking in behaviors and emotions observed in others, and making them part of self.

- Reverse process of *projection*.
- Psychotherapy can be seen as getting rid of bad parts of self and replacing them with better ones, often introjected from a therapist.
- Examples:
  - An abused child becomes an abusive parent (identification with the aggressor).
  - A medical student develops a bedside manner that is very similar to her mentor's.
  - Being a sports fan ("Be like Mike!").
- When conscious, we call *this imitation*.

Important Concept

Introjection: Parts of the outside brought in to make a self

2.2.7 Isolation of Affect

Cognitive aspects of experience are retained while emotion is discarded.

- Facts retained, feelings disposed.
- *La belle indifference* found with *conversion disorder*.
- Examples:
  - Woman who was raped discusses the events without any emotion.
  - A surgeon tells a patient about negative results without empathy or sensitivity.

Important Concept

Isolation of affect: Cognitive facts retained, emotion pushed aside

2.2.8 Intellectualization

Emotion expunged and replaced by excess cognition.

- Intellect accentuated to push out feelings.
- Not conveying useful information, but keeping up the flow of cognition as a way to avoid underlying emotion.
- Examples:
  - Academic discussions, philosophical musings, focusing on numerical data while talking with patient.
  - Physician speaking to patient who has a gunshot injury uses Latin anatomic terms and describes the physics of bullet velocity.

Important Concept

Intellectualization: Emotion pushed aside and replaced with excess cognition

2.2.9 Acting Out

Filling self with alternative feelings and sensations to push away actual underlying feelings.

- The stronger the feeling to be covered, the more dramatic the covering sensations need to be.
- **Key:** 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.
- **In milder form:** Humming a tune as you go in to see a patient for the first time.
- Often seen in adolescents, *post-traumatic stress disorder (PTSD)*, and *borderline personality disorder.*
- Differentiate from *displacement*.

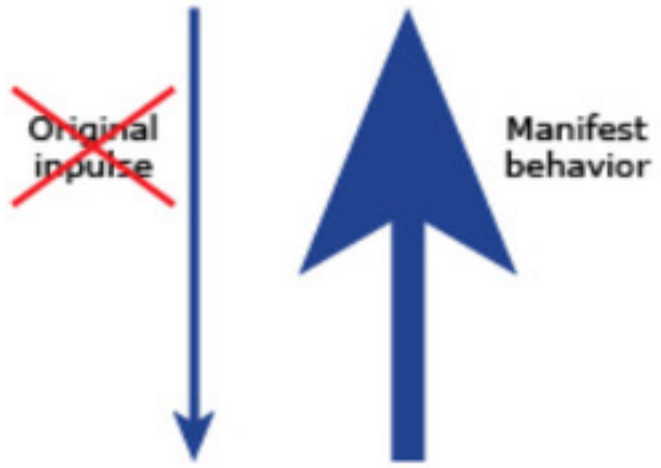
Important Concept

Acting out: Emotion pushed aside and replaced with excessive sensation-producing behaviors

2.2.10 Reaction Formation

Transforming unacceptable or unattainable emotion into its exact opposite.

- An exact attitude reversal: Love → hate, joy → despair
- Look for *overreaction* ("She protests too much, methinks.")
- Examples:
  - From a fable: Fox cannot get the grapes, so he says, "They are sour anyway."
  - Person who does not like children becomes a pediatrician.
  - Young boys show they like girls by hitting them and calling them names.
  - A mother who does not want her new baby is very solicitous and overprotective.



▲ **Figure 5–2.2B** Reaction Formation

Important Concept

Reaction formation: Expression of the opposite of what is felt

2.2.11 Undoing

An action that reverses or fixes the unacceptable or intolerable.

- Focal and behavioral.
- Sense of making things right again; fixing or atoning.
- Compulsive behaviors as seen in *obsessive compulsive anxiety disorder*; repeated vomiting for *bulimia nervosa*.
- Examples:
  - Superstitions: "Knocking on wood"; salt thrown over shoulder after it is spilled.
  - A man makes the sign of the cross as the airplane takes off.
  - Checking and checking again to make sure the doors to the house are locked.
- Contrast with *reaction formation*.

Important Concept

Undoing: Action to fix or repair the unacceptable

2.2.12 Rationalization

Inventing a reason why the normally unacceptable is OK.

- Unconscious justification.
- Not reasoning about what to do, but giving reasons why something is done, or deciding it is acceptable.
- Looks for a list of reasons, usually not just one reason.
- Examples:
  - "Yes, we killed women and children, but we were at war."
  - "If the room were not so darn noisy, I would have done better on the exam."
  - "Of course I took the bribe. Everybody does it."
- Differentiate from *intellectualization* and *reaction formation*.

Important Concept

Rationalization: Reasons why this is OK

2.2.13 Passive Aggressive

Expression of hostility by delaying action or not acting at all.

- Expectation of action followed by inaction.
- Examples:
  - A woman makes a date to meet someone at a restaurant but does not show up.
  - Patients who do not keep appointments, do not follow instructions, or show up late are being passive aggressive. (When this happens, figure out why they are angry, fix it, and the behavior should fade.)
  - A professor ignores questions from a particular student after class but answers questions for others.

Important Concept

Passive aggressive: Hostility expressed by inaction

2.2.14 Dissociation

Separating oneself from difficult or unbearable experiences.

- Person is having an experience, but is shielded from feeling the full emotional weight of events.
- "Third-person experience" of events affecting you.
- Feeling as if in a dream-like state, floating, feeling that things are in slow motion.
- 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*).
  - In extreme form, it produces *dissociative disorders*. Also seen in substance abuse and in PTSD.
- Differentiate from *repression*.

Important Concept

Dissociation: Self separated from experience

3 Mature Defense Mechanisms

3.1 Humor

Venting of unpleasant feelings by laughter.

- Not just a covering, but a release of feelings. You feel better after a good laugh.
- A way to recognize and cope with an unpleasant reality without being overwhelmed by it.
- Examples:
  - "When you said I needed a shot, I thought it would be tequila."
  - "Every time you say carcinoma, I just keep thinking of little gnomes driving cars around a track."

Important Concept

Humor: The unpleasant becomes laughter

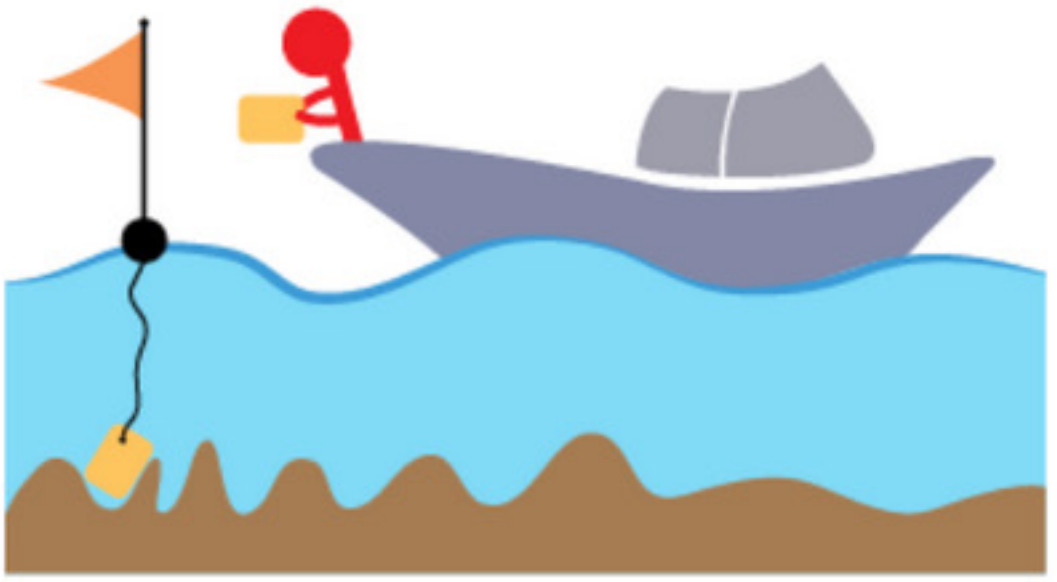
3.2 Suppression

Conscious decision to push something out of consciousness.

- Content can be recovered from the unconscious by the right cue or stimulus.
- 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.
  - As the music began to play, the woman suddenly recalled a boy she dated in high school.
- Different from *repression* in that content can be recalled.

Important Concept

Suppression: Conscious decision to push things into unconscious



▲ **Figure 5–3.2** Suppression

3.3 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.
  - A ruthless business man donates to and takes great interest in the local orphanage.
  - A wealthy woman volunteers weekly at a soup kitchen for the poor.

Important Concept

Altruism: Doing good to feel good

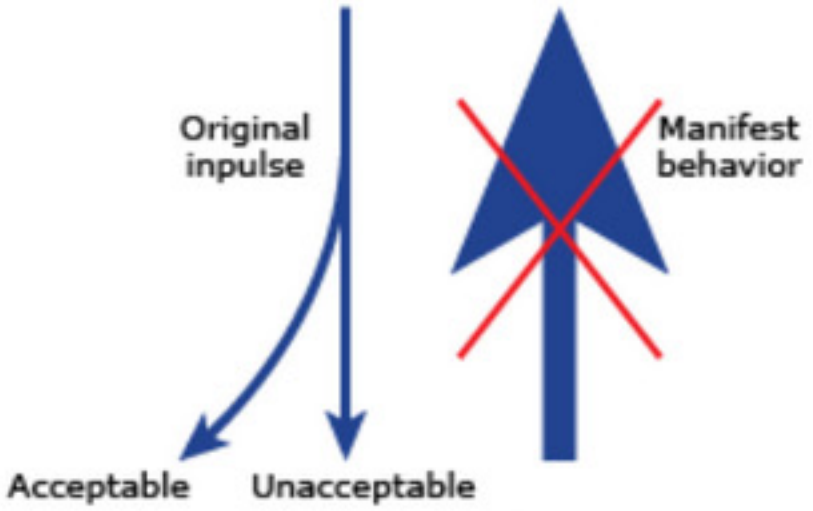
3.4 Sublimation

Gratification is achieved by *altering* a socially unacceptable desire into one that is acceptable.

- Much of art and music comes from this.
- Examples:
  - Professor becomes a helpful mentor for a female student to whom he is attracted.
  - Becoming a nutritionist to overcome personal obesity.
  - A kleptomaniac becomes a security guard.

Important Concept

Sublimation: Acceptable means to gratify unacceptable impulse



▲ **Figure 5–3.4** Sublimation

3.5 Transference

In transference, emotions and reactions to someone in the past are unconsciously carried forward and applied to someone in the present.

- Unconscious process, but *not a defense*.
- Can be positive or negative.
- Example:
  - You meet someone for the first time and like them at once (positive transference).
  - You hate them on sight (negative transference).
- For displacement, you give the reaction to one person *instead of* giving it to another. For transference, you had a reaction to someone in the past and then *in addition* have the same reaction to someone in the present.
- For behaviorists, this is *stimulus generalization*.
- Patient toward doctor = transference.
- Doctor to patient = countertransference.

Important Concept

People have defense mechanisms because they need them. In psychotherapy, doctors do not try to strip away defense mechanisms, but to remove the underlying need. As an analogy, therapists do not strip off patients' coats on a cold day, but make it warmer so patients take off the coat themselves.

1 Physician-Patient Relationship

The patient, not the physician, is the focus.

Consider the patient's convenience and safety.

- Provide late or early office hours when necessary.
- Travel to see patients.
- In the room with a patient and family or friends, the focus and interactions should be directly with the patient.
- The key point is to maximize the chances for successful patient outcomes.

1.1 Success Begins by Setting the Scene

1.1.1 Remove Barriers to Communication

- In the examining room, remove tables, computers, or desks between physician and patient.
- Evaluate the merit of having family or friends in the room.
  - Patients may be reluctant to share certain information with an audience.
  - If patient wants family or friends present, then keep the *focus* on, and interaction with, the patient. Ask others not to answer a question for the patient.
  - Suggest that parents wait outside when talking to children as young as age 7. Parents or caregivers may choose not to leave, but the standard will be set well before adolescence. Create an atmosphere in which children feel free to share.
  - Use a local expert, rather than a family member, to translate when necessary. If a local translator is not available, work with one over speakerphone.

1.1.2 Face-to-Face Communication

- *Face-to-face* is better than phone.
  - Face-to-face fosters a sense of intimacy and, therefore, honest sharing of information.
  - Nonverbal information enhances communication.
  - Communicate with patients at eye level.
    - —Sit with the patient if the person is in a chair.
    - —Stand in front of your patient if the person is sitting on the exam table.

USMLE® Key Concepts

For Step 1, you must be able to:

- Identify the *best* possible behavior on the part of the physician.
- Recognize how to have a successful physician-patient relationship.
- Understand the value of complete and direct communication between patient and physician.

1.1.3 Explain Reasons for Touch

- Tell the patient what you are going to do before you do it. ("I'm going to place the stethoscope on your chest to listen to your heart.")
- Placing a hand on a patient's arm as a gesture of comfort is OK.
- Maintain a pleasant and professional demeanor.

1.2 Things Should Happen in the Proper Sequence

The typical clinical encounter proceeds through a set of stages. Be clear what stage you are in when answering a USMLE question.

The best answer will change based on where you are in the sequence. Before answering, decide where you are in the sequence.

1.3 The ADOPT-R Model

- **A**ssess
- **D**ifferential
- **O**ptions
- **P**lan
- **T**reatment
- **R**elationship

1.3.1 Assess: Gather Information

- Subjective report by patient and objective signs and symptoms noted by physician.
- Begin with *open-ended* questions.
  - "What brings you to see me today?"
  - Opens space for the patient to fill with personal perspective.
  - Provides a sense of what is on the patient's mind.
  - Lets the explanation come from the patient's own words.
- Reflect back to summarize what the patient says to be sure you understand.
- Ask for clarification of terms patient uses.
- *Be an information sponge:*
  - Seek clarity.
  - After patient presents, ask, "Is there anything else I should know?"
- *Common error:* Talking and not listening.
  - Physician talks 25% of the time; patient speaks 75%.
  - Probe for more details: "Tell me more about that."

Important Concept

Types of Questions:

Open-ended question: Allows broad range for answer; usually more than one sentence needed to answer.

Closed-ended question: Limits answer, usually *yes* or *no* will serve as answer.

Leading question: Directly or indirectly suggests a preferred answer.

Confrontation: Making patient aware of some aspect of appearance, demeanor, or behavior.

Facilitation: Gets the patient to continue a thought, talk more, "Tell me more about ... ."

Redirection: Puts question back to the patient.

Direct question: Seeks specific information directly.

Important Concept

The right answer will be the one that has a response consistant with the presented stage of the physician-patient encounter.

1.3.2 Differential Diagnosis: Sort Out the Information

- Move to *closed-ended* questions to gather details for differential:
  - "Are you in pain now?"
  - Guide the conversation to the information you need.
  - Time spent talking should be about 50/50.
- When telling a patient the diagnosis:
  - Name it—patients like having a name for what is wrong.
  - Next, ask what they know about it.
  - Then, explain in detail in language the patient understands.
    - —Use metaphors: "The plaque clogs your artery like a ball of hair in a bathtub drain."
    - —After explanation, ask if the patient has any questions.
    - —Mention technical terms, but have the talk about the disease and processes in everyday language.
- If diagnosis is not yet clear:
  - Discuss possible likely options.
  - Talk about next steps to clarify what is wrong.
- *Common error:* Premature closure on diagnosis.
  - After deciding on diagnosis, ask yourself, "What else could it be and how would I know?"
  - Think about prevalence, not just symptoms, when deciding.

Important Concept

When deciding diagnosis
'Horses before zebras'

1.3.3 Options for Treatment: Sorting Through What Can Be Done

- You lay out options; patients select from options.
- For example, imagine you are a waiter or waitress who presents a menu and the patient selects from the menu.
- Patients *do not* get to select inappropriate treatments. If something is not on the menu, it should not be an option.
  - This issue is increasingly common as drug companies advertise, and compete for business.
  - Patients may have done Internet searches to decide what is best.
  - Remember, patients can always refuse treatment.
    - —If they do, try to find out why because they may have false beliefs or incorrect information.
- Discuss refusal; do not simply accept it.
- *Common error:* Pushing a favored treatment.
  - All options must be presented.
    - —*Informed consent* requires this.
    - —Best medical practice requires complete review.
  - Patient makes final decision, not physician.

Important Concept

You present, patient decides.

1.3.4 Plan: Prescription and Agreement on Action

- Negotiate treatment; do not order patient what to do.
  - If patient says he or she cannot do what is needed, find out what can be done. ("If you think stopping smoking is too much, do you think you can reduce how much you smoke?")
  - Ask if the patient wants to have family members or friends involved.
  - Try to avoid expressing frustration when a patient will not do what you think is best.
- Anticipate barriers and discuss ways to overcome them.
  - Ask the patient to think about what might get in the way.
    - —Discuss life situation, daily routine, job, and family issues.
    - —Troubleshoot how to deal with things that interfere.
  - Get patient what he or she needs.
    - —Seek best treatment. Cost should not be the determinant.
    - —Arrange for pharmacology or surgery even if the patient cannot pay.
- *Common error:* Insisting on what should be done.
  - Patient must want to do the recommended behavior. A patient cannot be forced.
  - Some change is better than no change. Ask, "What do you think you can do?"

Important Concept

Get as much behavior change as you can.

Some change is better than none.

1.3.5 Treatment: Executing the Plan

- Verbal instructions are better understood; written instructions are perceived as more important.
- Provide what is needed.
  - Talk with patients about dietary and nutrition issues, or social problems.
  - Do not refer the patient to another expert.
- Contact is the key to *adherence*.
  - Regular follow-up appointments should be scheduled.
  - Consider reminder phone calls, postcards, and e-mails to increase adherence.
  - Assume that this will be an evolving process.
  - Treat nonadherence as part of a learning process, not a failing on the part of the patient.
- *Common error:* Expecting adherence without providing support.
  - Eighty-five percent of conditions you will treat are chronic where adherence is *key*.
  - Success is measured by getting a better outcome, not simply by getting the diagnosis right and dictating the correct treatment.

Important Concept

Agreement leads to adherence.

1.3.6 Relationship: Context and Leverage

- Having a good, long-term relationship is the key to successful medical practice. It helps to:
  - Take a moment to chat.
  - Ask about patient's life beyond medical issues. ("So how have things been going lately?")
  - Make it clear that you are available.
  - Patients do not listen to you because you are right, but because they like you.
- Every encounter with the patient is a chance to do two things:
  - Improve the person's health.
  - Form a better relationship.
- *Common error*: Focusing on disease; neglecting the person.

Important Concept

They listen beause they like you.

1.4 Fundamental Attributional Error (FAE)

1.4.1 How We Attribute Cause

- Ways to *attribute cause* (why people do what they do) depends on what one is looking at:
  - "I tend to attribute my behavior to the environment. It's what I'm looking at as I am taking action."
  - "I tend to attribute others' behavior to character. I am looking at them as they do something."

Important Concept

- "I act because of the world I'm in."
- "You act because of your character."

1.4.2 The Patient Is Late for an Appointment

- The physician says, "The patient is lazy and does not care about personal health or others' inconvenience."
- The patient says, "Given my family and work obligations, it's a wonder that I was even able to squeeze in time to see the physician. Being a little late is just part of my life."

1.4.3 Part of Empathy Is a Reversal of FAE

- When we see someone as part of a group to which we belong ("us"), we are better able to understand an environmental reason for a behavior.
- When we see someone as a part of a different group ("them"), the attribution of character gets stronger ("those kind of people … ").
- This is why seeing patients as fellow humans ("us"), rather than as just patients ("them"), is so important.

1.5 The Patient Makes the Decisions

- Patients must be fully informed or they cannot make decisions and medical intervention cannot proceed.
- The patient should know what you know, as soon as you know it.
- The "norm of reciprocity":
  - If you tell patients everything, you set the standard that *they should tell you* everything.
    - —They have important information, but do not know what matters.
    - —You know what matters but do not have all the information.
  - Medical problems are best resolved by the freest possible exchange of information.
- If a patient says, "I do not want to know":
  - Try to find out why.
  - *Consent requires that they know.*
  - Do not force bad news on a patient, but work on informing the person as soon as you can.
- If telling a patient information might cause harm:
  - Find a way to tell your patient that avoids the harm.
  - Withhold information only in extreme cases.
- If the family says do not tell the patient:
  - How did the family find out before the patient was told?
  - Information flows from patient to family, not from family to patient.
  - Patient may turn to family to help make decisions, but the decision still resides with the patient.
- If a patient asks you to make the decision for him or her:
  - Thank the person for having confidence in you.
  - Suggest that the decision is the individual's and review the options again.
- If *you* do not know everything:
  - Tell the patient what you *do* know.
  - If you do not know something, say so.

Important Concept

You tell patients things so patients will tell you things.

1.6 Work Within the Patient's Beliefs

- Accept the patient's health beliefs and deal with your patient according to those beliefs.
  - Find out how the person understands the disease and explain things in those terms.
    - —If patient feels bad because of an "evil spirit," talk about how the treatment will help get rid of the evil spirit.
    - —If patient views health as a balance of forces, talk about how the treatment can help restore balance.
  - Use the patient's words for the disease when explaining things.
  - Check what self-treatment the person has done before coming to you. (Most people have done something.)
- Accept and work within the patient's religious beliefs.
  - When physicians participate in religious issues with patients, the patients recover faster, have lower infection rates, and get out of the hospital sooner.
  - Consider praying or participating in religious rituals with your patient, even if not your religion.
    - —The rituals may mean little to you, but will have meaning and value to the patient.
    - —Even if practicing rituals may have only a placebo effect, placebo effects can be very powerful.
  - Do not assume that because someone is a member of a certain religious group that the person accepts or follows all the tenets of that religion.
    - —Ask about religious beliefs if you are not sure.
    - —Seek to understand their belief; withhold personal judgment.
  - Do not be the one to bring up the topic of God or religion.
    - —The patient's religious beliefs matter; yours do not.
    - —If you have strong personal beliefs, do not impose your beliefs on the patient.
    - —It is fine to talk about your personal beliefs if the patient asks you.
  - Do not do anything to endanger the patient's health, even if that patient directs you to do so for religious reasons.
    - —Find a way to satisfy a request in a way that does not put the patient at risk.
    - —If the patient insists and you see unacceptable risks, explain to the person why you cannot do it.
  - You will not be expected to take any action against your personal religious beliefs (as defined for you by the question).
  - Remember that patients can always refuse treatment for religious or any other reason.

Important Concept

Work to see things as the patient does. Don't force patients to grasp the technical issues which may be important to you.

1.7 When Things Change, You Change

- Even though a plan is in place, change it if you get new information.
  - The presenting problem is only the real issue about half the time.
  - Be prepared for "doorknob questions," for example, "Oh doctor, just one more thing," as you are walking out the door.
    - —Even though you think you are finished, you are not.
    - —Return to sit with the patient and continue to talk.
    - —Focus on patient needs, not your appointment schedule.
- Watch for "momentum questions."
  - You have taken in information and thought about how to respond.
  - Then new information is given in the question, which changes everything.
  - For example, you are thinking about how to give difficult news to a patient when suddenly you are confronted with a question by a member of the patient's family.
- These questions test *your mental flexibility.*

Important Concept

Answer the test question based on where it ends, not how it began.

1.8 Take On and Solve the Problem Presented

- Do not leave the room.
- Accept personal risk to resolve presented issues.
- Do not refer (with a very few exceptions: abortion, ophthalmic problems).

1.9 Do *All* That Is Needed

- Patients often have multiple issues.
- Best exam answers deal with the range of issues presented, not just one.
- For example, address both a physical health problem *and* a life situation issue.
- If you are given the option to only deal with one of a set of presenting problems, deal with the most immediate threat first.

1.10 Deal With Hostility by Expressing Empathy, Then Giving Control

- "I'm so sorry about this; what would you like to do about it?"
- When attacked, seek to understand, not defend.
- Ask how the patient thinks a problem can be solved.

Important Concept

Express empathy, giving control is a great way to handle angry patients and family.

1.11 Do Not Lie—Ever

- Not to patients, their families, colleagues, or insurance companies.
- Do not lie to protect a colleague.
- There is no such thing as a "white lie," only a bad exam answer.

1.12 Admit When You Make a Mistake

- The patient has the right to know everything.
- What goes right is the result of the medical team. Whatever goes wrong, whoever causes it, is your fault and should be presented that way.
  - The physician has "captain of the ship" responsibility for all aspects of medical care.
  - If a medical student makes a mistake, *you* are responsible, not the student.
    - —If you make a mistake, fix it.
    - —Early and open discussions with patients about mistakes reduce malpractice law suits.

Success is the result of all.
Failure is your responsibility.

2 Special Topics

2.1 Breaking Bad News: Bruckman's Steps

2.1.1 Issues to Remember

- If the patient starts crying, wait for the crying to stop.
- You may want to offer tissues.
- Do not assume that you know why your patient is crying.
- Denial is common.
- The patient may not absorb all the information you offer.
- Do not be surprised if the patient questions other people or asks you to repeat information at a later time.

▼Table 6–2.1 Bruckman's Steps

Step	Example
1. Getting started	Private setting; begin with "How are you feeling right now?"
2. What does the patient know?	"What have you already been told?"
3. What does the patient want to know?	"Some patients want a lot of technical details; others want more of the big picture. What would you prefer?"
4. Sharing information	Focus on one or, at most, two topics; for example, diagnosis and the next steps.
5. Respond to patient feelings	"Could you tell me a bit about what you are feeling about all this?"
6. Planning and going forward	Review concrete next steps consistent with patient's reaction. Say when your next contact will be. Give contact information and invite patients to use it for questions or if something happens.

Important Concept

Do the right thing in the right sequence.

2.2 Stages of Behavioral Change

- What the physician can do to help a patient depends on where the patient is in these stages.
- Identifying the patient's stage helps to tell the physician what the best answer is in the scenario presented.
- Success usually requires many passes though these stages.
- Once *relapse* occurs, the process begins again.
- Use the "stages" to help with any behavioral change: Changing diet for a diabetic patient; getting a patient to do more exercise, stop smoking, or address problems with substance abuse; or dealing with an abusive spouse.

Important Concept

If you are not sure what to say, stay silent and wait.

▼ Table 6–2.2 Stages of Behavioral Change

Name of Stage	Issues	Physician's Task
Pre-contemplation	No awareness of problem.	Point out objective consequences of patient behavior.
Contemplation	Aware of problem but ambivalent about action.	Make patient aware that effective interventions exist.
Preparation	First steps to change; small, symbolic action is taken.	Suggest simple action with likely success.
Action	Actively seeking a solution; trial-and-error process.	Present series of options until one works.
Maintenance	Effective behaviors continued; focus on relapse prevention.	Encourage efforts, monitor activity.
Relapse	Efforts to change abandoned.	Work to start the process again.

Important Concept

The correct resonse to a patient depends on where they are in the stages of change.

2.3 Reminders About Fostering Adherence

2.3.1 Patients Are *Less Adherent When*

- Limited information has been exchanged.
- They are dissatisfied with the encounter or do not like physician.
- *Most common patient complaint*: Not enough medical information was given.
- The physician makes few positive statements.
- *Physicians generally cannot tell which of their patients do and do not adhere.*
  - They assume that more of their patients are adhering than actually are.
  - They think those who get better were adhering and those who do not get better were not adhering.
  - *But,* some patients who do *nothing* to adhere will get better, and some who do everything in your plan will not improve.

2.3.2 To *Increase Adherence:*

- Do not give too much information all at once. Patients may need time to accept diagnosis before treatment discussions can occur.
- Take into account the effects on the patient.
- Explain why, not just what.
- The less you ask of a patient, the more likely the patient will be to do it.
- Hardest adherence is that which requires a lifestyle change.
- Consider what motivates the patient.
- Involve family (with patient's permission) but do not make them responsible for adherence.

2.3.3 If the Patient is Non-adherent, Check for These Problems:

- Patient dissatisfaction with the physician.
- Misunderstanding of instructions.
- Interference by lifestyle or the family.
- Insurance issues.

Important Concept

Relationship is the key to adherence.

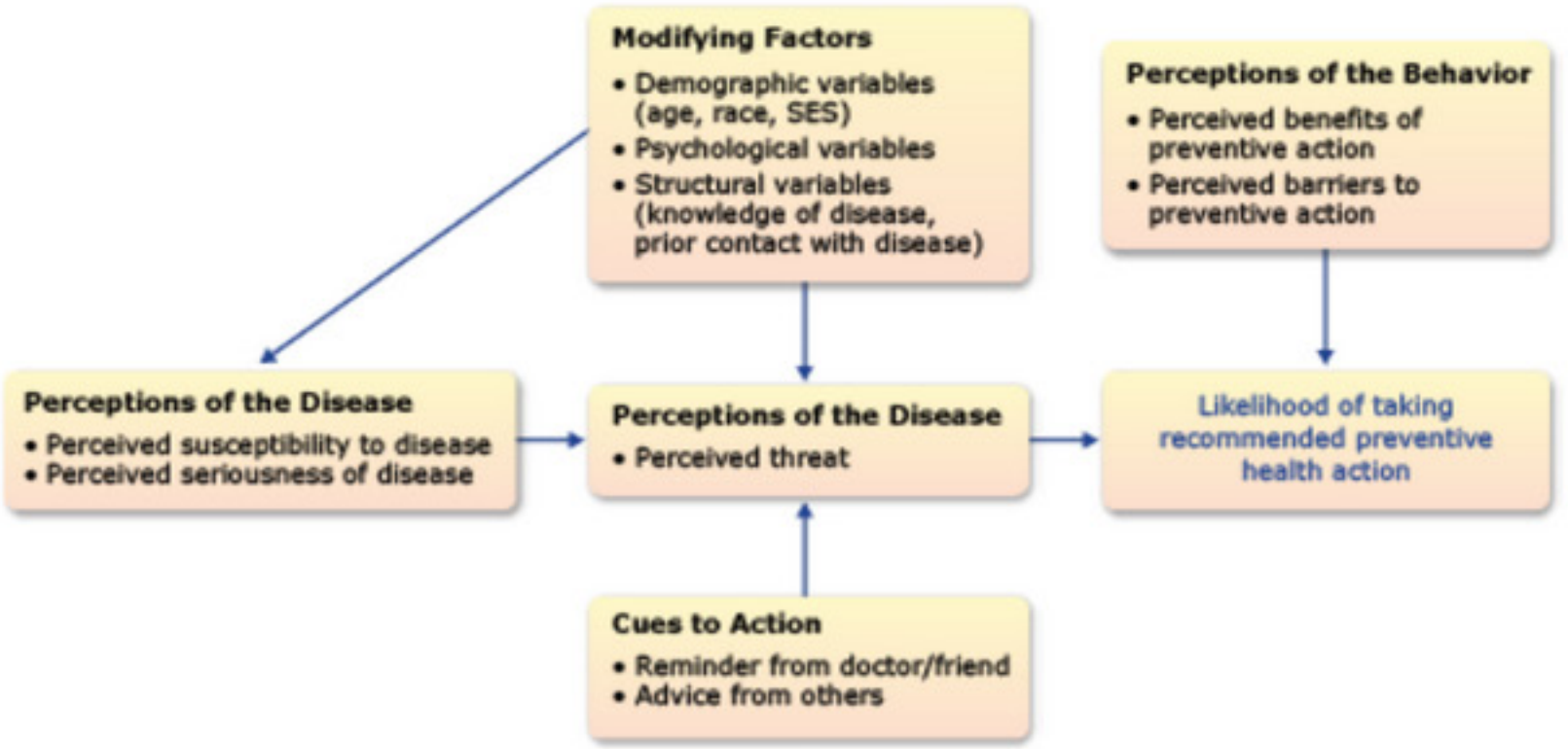
2.3.4 Health Belief Model

The most cited model for understanding adherence and preventive medicine behavior.

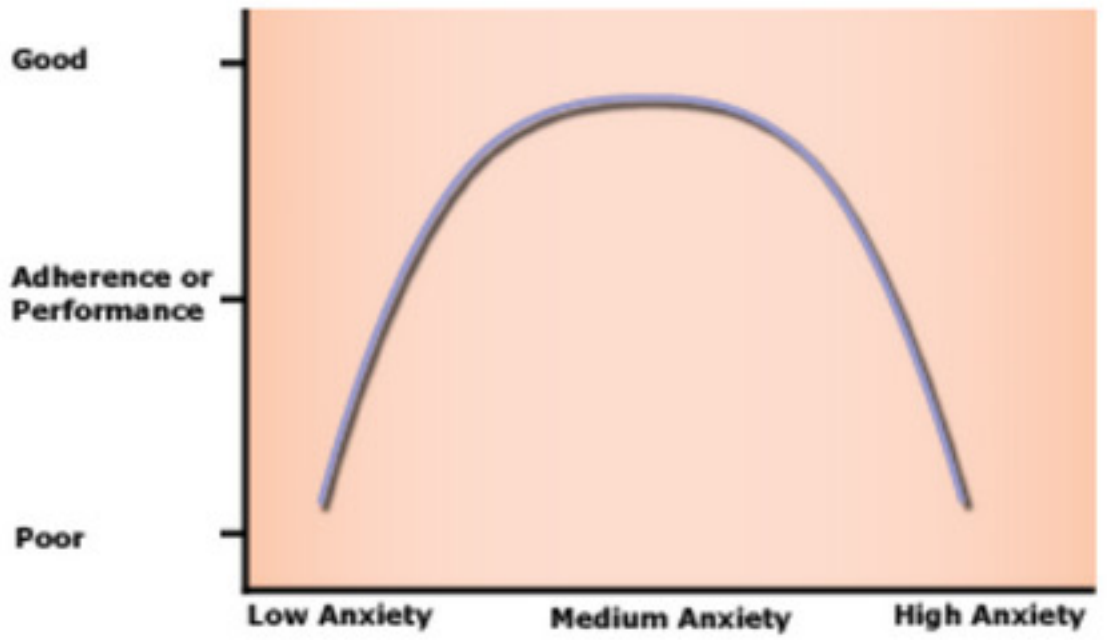
- Motivation for adherence is a function of perceived threat.
  - Seriousness
  - Personal susceptibility
- Moderate fear level is best for adherence.
  - Motivates patient without overwhelming.
  - Increase anxiety, then offer solution.
- External barriers can stop adherence even in those who are motivated.

Important Concept

Telling the patient what to do is not enough. Foster adherence by finding the right motive and removing barriers for the patient.



▲ **Figure 6–2.3A** Health Belief Model



▲ **Figure 6–2.3B** Relationship Between Anxiety and Adherence or Performance

Important Concept

Moderate anxiety yields best performance and best adherence.

2.3.5 Health Care Delivery Issues

- Managing the physician's office.
  - Average length of physician visits: 12 minutes.
  - Work to keep scheduled appointments on time, but not at the cost of leaving a patient who still needs care.
  - If you are running behind schedule, have staff call patients and tell them.
  - Worry about patient care first and payment second.
  - Reduce waiting time by mapping out patient movement in practice. Look for bottlenecks.

2.3.6 Health Care Payment Systems

- **Capitation**

Prepayment for accepting responsibility for patients, not payment for what is done.

Important Concept

Fee-for-service equals payment for work done. Capitation equals pre-payment for responsibility assumed.

▼ **Table 6–2.3** Capitation

	Fee for Service	Capitation
Payment based on:	Money paid after service is rendered.	Fixed monthly payment based on number of patients in panel.
Make more money by:	Doing more procedures.	Keeping patient panel healthy.
Incentivizes physician to:	Do more procedures.	Do only necessary procedures. More primary prevention. Encourage healthier lifestyles.
Patients getting appointment:	Easier	Harder
Payment from:	Traditional insurance	Managed care (HMOs)

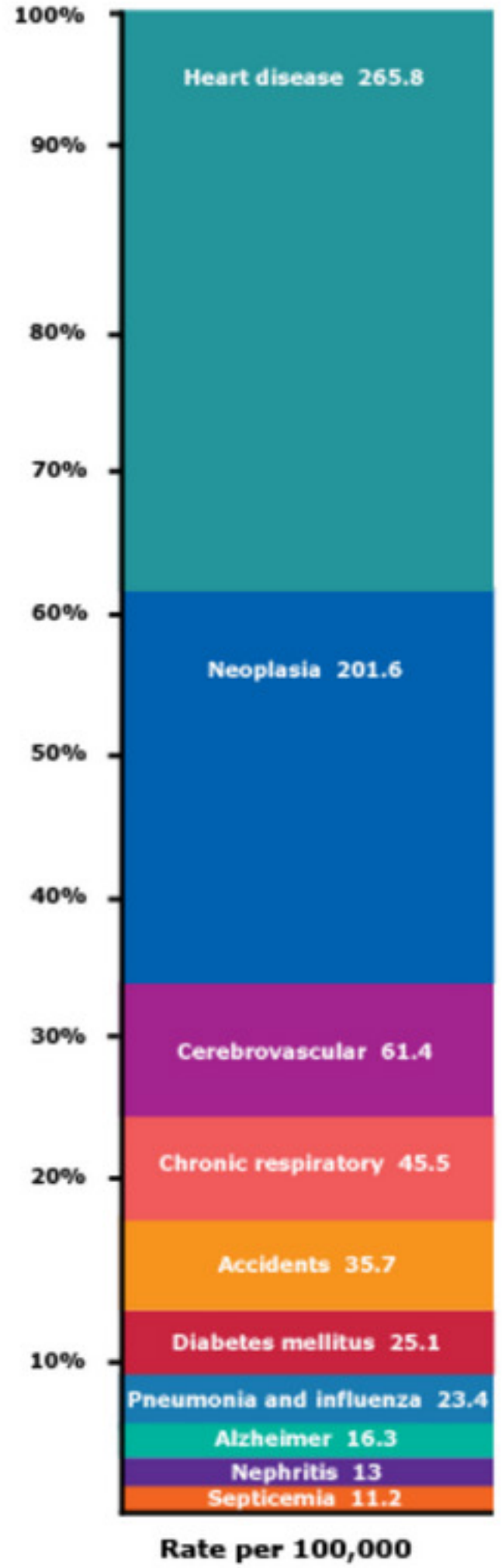
- Key facts:
- Estimates say one third of all medical procedures in the U.S. are unnecessary or even harmful.
- Capitation is *not* salary (payment for time).
  - —Under salary, get more money by asking for a raise.
  - —*Under capitation, get more money by taking on more patients.*

- **Medicare**
  - Federal government payment system.
  - Partner to Social Security.
  - Pays for 65 and older, disabled, dependents of disabled.
  - Does not pay for everything.
  - Deductibles and copayments.
  - Recipients can buy coinsurance from a private company to fill payment gaps.
    - —Part A: Hospital payments
    - —Part B: Physician payments (90% of patients with Part A buy Part B)
    - —Part C: Managed-care payments
    - —Part D: Prescription drugs
- **Medicaid**
  - Joint state/federal program.
  - Pays for the poor or near poor.
  - States set standards for poverty (wide variation by state).
  - Pays for everything: No deductibles or copayments.
  - For older patients who are poor: First spend Medicare, then Medicaid.

Medicare: Care for those 65 and older and for the disabled

Medicaid: Aid for low-income individuals

3 Important Disease Patterns and Trends



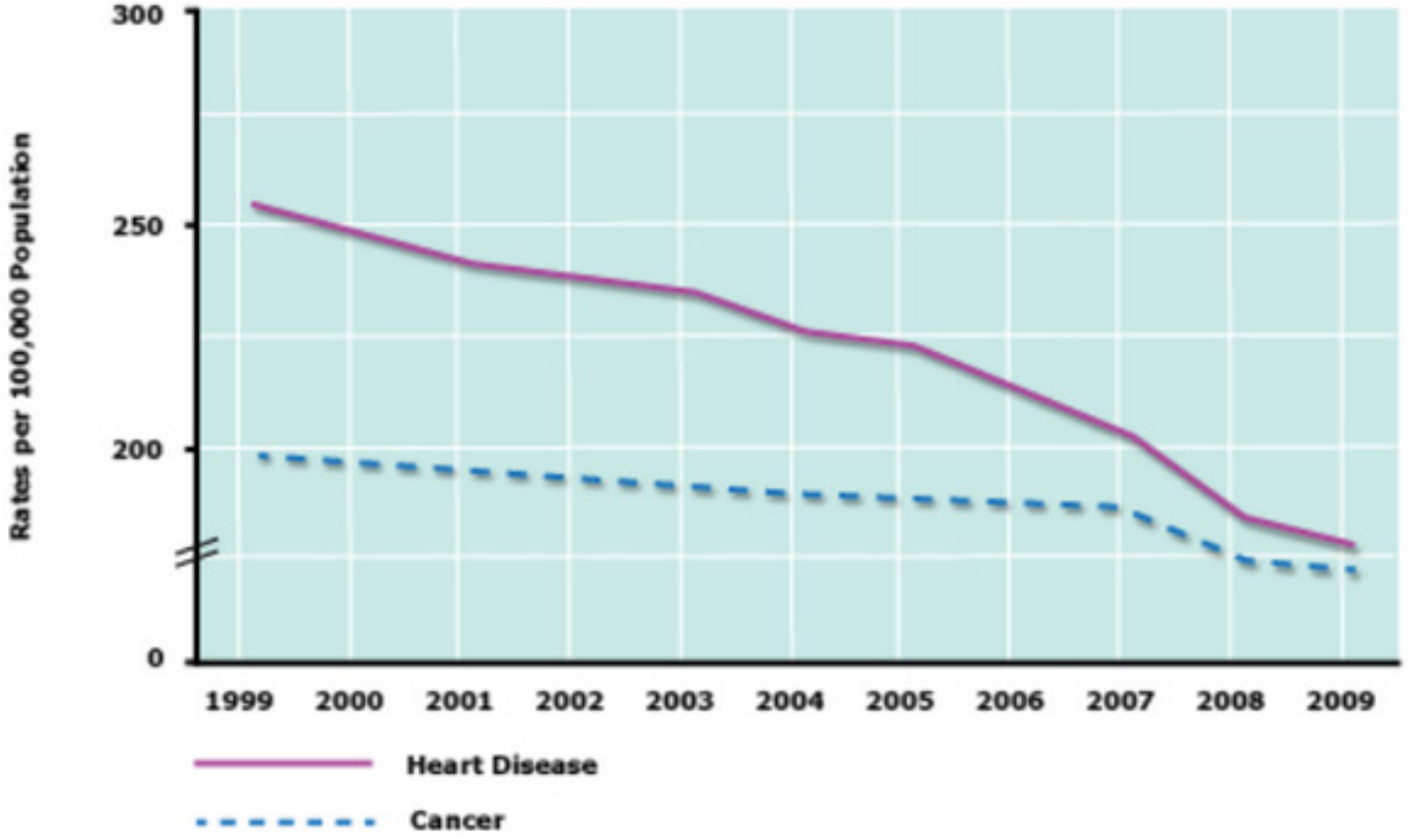
▲ **Figure 6–3.0A** Top 10 Killers in the U.S.

Important Concept

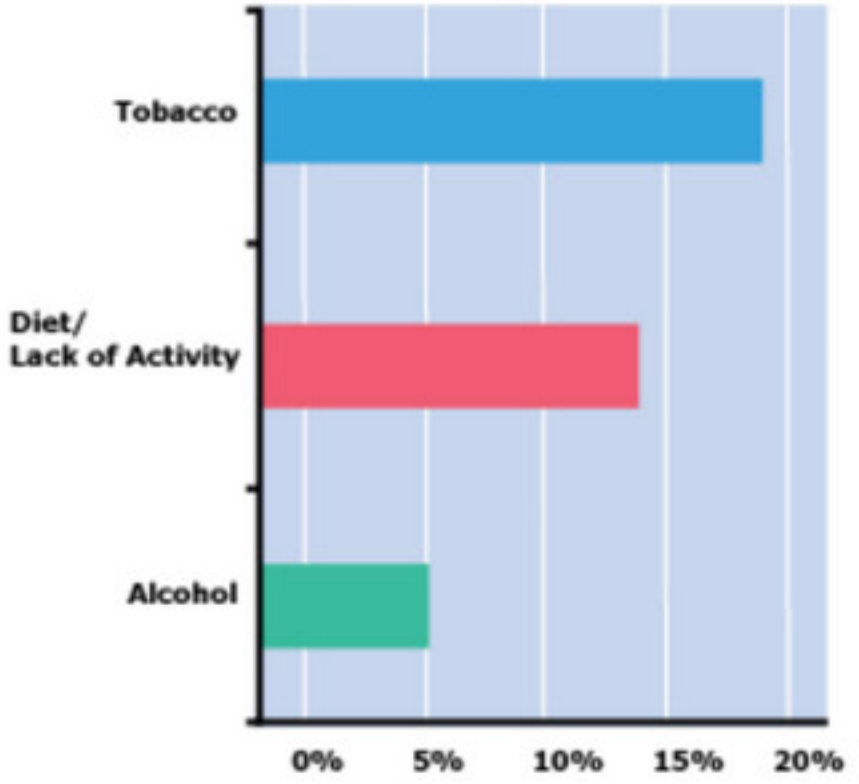
Heart disease and cancer combined kill more than the other eight of the top 10 killers.

▼ **Table 6–3.0** Leading Causes of Death by Age Cohort

Age Cohort	1	2	3
< 1 year	Congenital anomalies	Low birth weight/ Respiratory distress	SIDS
1 to 4 years	Unintended injuries	Congenital anomalies	Neoplasia
4 to 9 years	Unintended injuries	Neoplasia	Congenital anomalies
10 to 14 years	Unintended injuries	Neoplasia	Suicide
15 to 24 years	Unintended injuries	Homicide	Suicide
25 to 34 years	Unintended injuries	Suicide	Homicide
35 to 44 years	Neoplasia	Unintended injuries	Heart disease
45 to 54 years	Neoplasia	Heart disease	Unintended injuries
55 to 64 years	Neoplasia	Heart disease	Bronchitis, asthma, COPD
> 65 years	Heart Disease	Neoplasia	Cerebrovascular
Overall:	Heart Disease	Neoplasia	Cerebrovascular



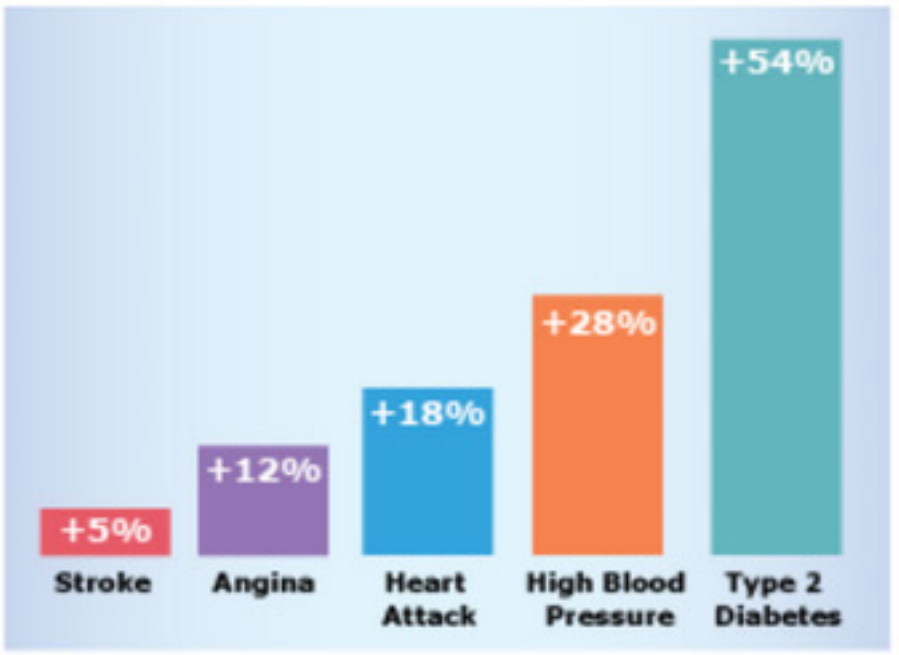
▲ **Figure 6–3.0B** Comparison Between Heart Disease and Cancer Deaths



▲ **Figure 6–3.0C** Percentage of Total Deaths Related to Health Behaviors

Important Concept

Improve patients' health by addressing these three things in this order.

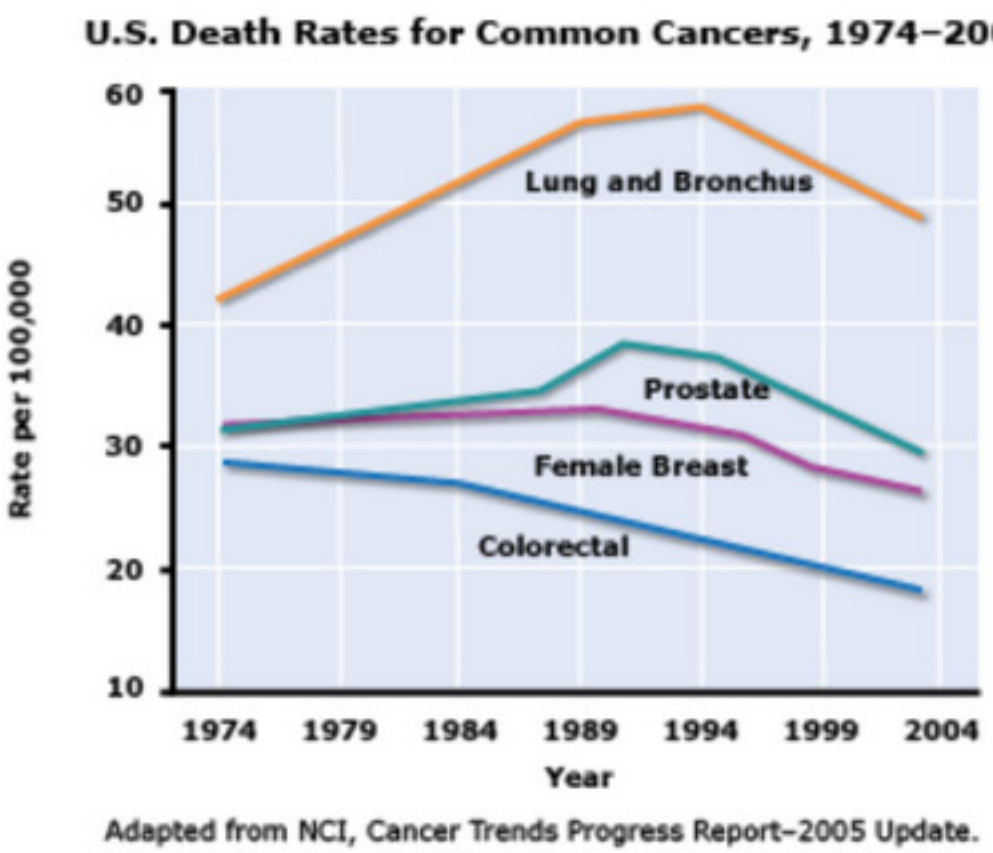


Adapted from HSE 2003.

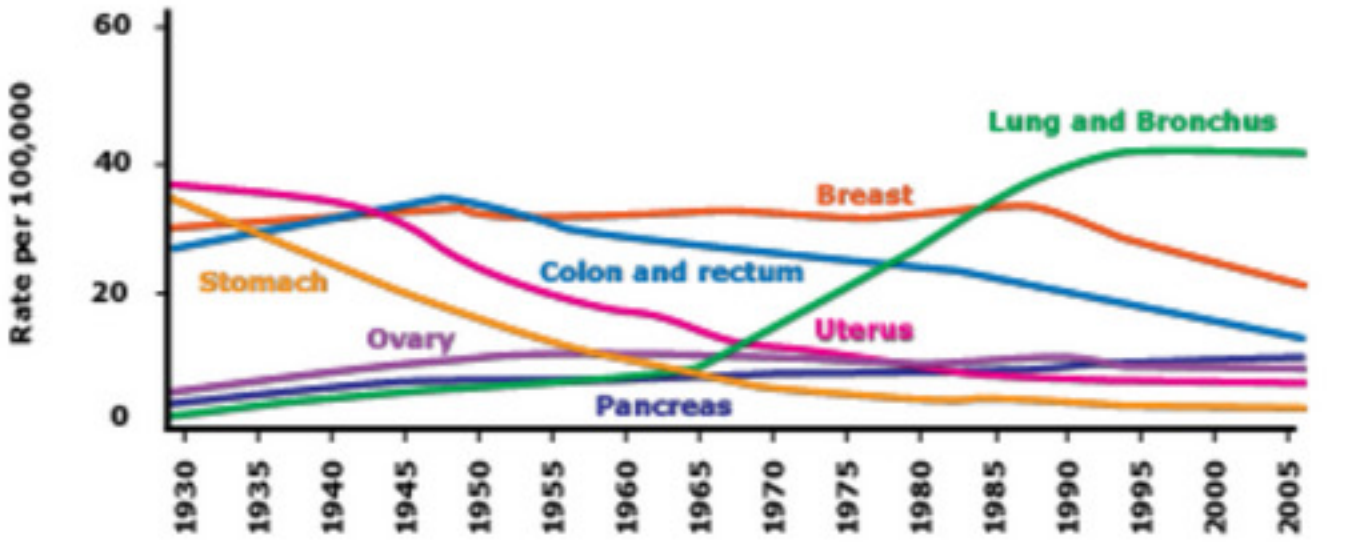
▲ **Figure 6–3.0D** Estimated Impact of the Increasing Trend in Obesity by 2023

Important Concept

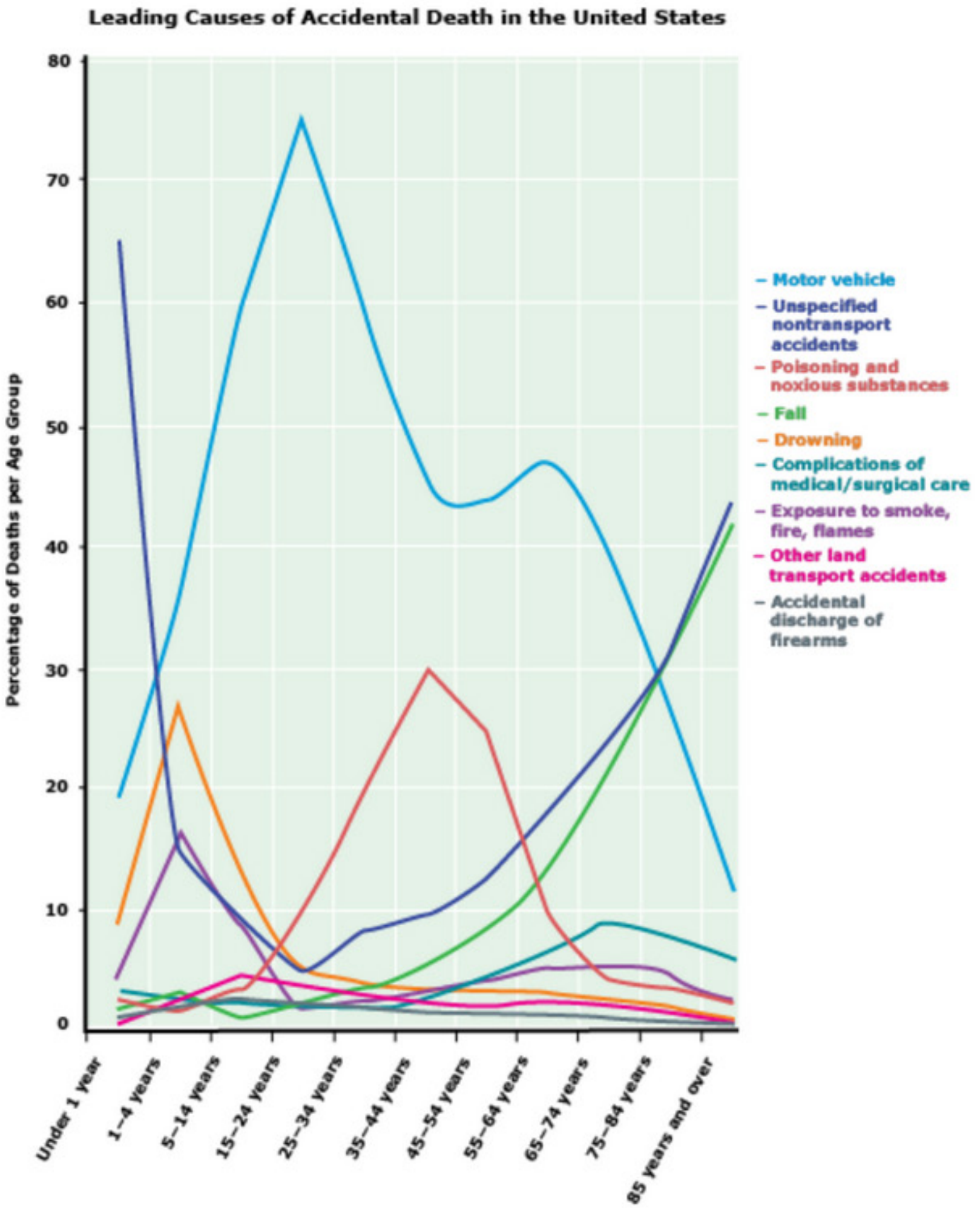
Largest impact of obesity on health is increased diabetes risk.



▲ **Figure 6–3.0E** Cancer Deaths



▲ **Figure 6–3.0F** Cancer Death Rates Among Women



▲ **Figure 6–3.0G** Causes of Accidental Deaths in U.S.

4 Learning and Behavioral Change

This section presents a set of concepts and techniques for understanding and modifying behavior. To fully grasp this content you must adopt the perspective of a *behaviorist*.

4.1 How to "Think Like a Behaviorist"

- Focus only on what is observable.
- Only what can be seen, observed, or measured.
- Internal states such as feelings or ideas are irrelevant and distracting.
- We are not concerned with insight, what a patient understands, but only with behavior.
- Behaviorism and the rest of medicine converge as both focus on outcome.
  - What matters is not what you try.
  - We judge only by what works.

Important Concept

Stimulus: Something in sensory experience—sight, sound, smell, kinesthetic sensation, etc.

Response: Something done, an observable action.

4.2 Simplest Learning

4.2.1 Habituation

- Response *decreases* with additional exposures.
- *Same stimulus, decreasing response:*
  - A child with diabetes stops crying when getting insulin injections as she becomes used to the experience.
  - After several months of winter, the cold does not feel quite as bitter.

Important Concept

Habituation → reduced response

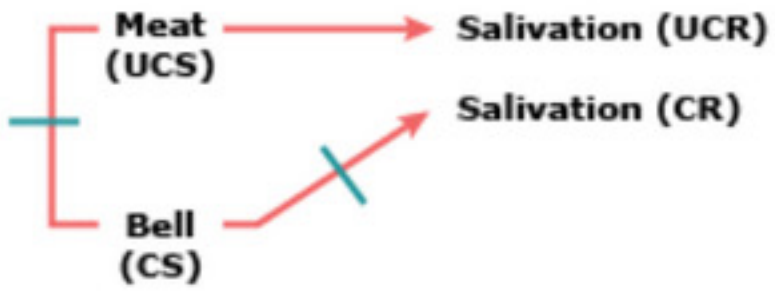
Sensitization → increased response

4.2.2 Sensitization

- Response *increases* with additional exposures.
- *Same stimulus, increasing response*:
  - A person with arachnophobia becomes more frightened with each spider encounter.
  - A child responds with great anxiety when given immunizations because of previous negative experience.

4.3 More Complex Learning

- *Classical Conditioning*



▲ **Figure 6–4.3** Classical Training

- When presented with the meat (unconditioned stimulus, or UCS), the dog salivates (unconditioned response, or UCR). This is *baseline behavior*; what the dog does before any intervention.
- Bell rings consistently with or right before meat is presented.
- Over time, just ringing the bell (conditioned stimulus, or CS) without the presentation of the meat (UCS) is all that is needed to produce salivation, now called *conditioned response* (CR).

4.3.1 Key Points

- In classical conditioning, the *unconditioned response* and *conditioned response* are the same (UCR = CR).
- What is new is not *what* the dog does (salivation), but *when* the dog does it. After learning, the dog salivates to the bell as well as salivating to the meat.
- *Classical conditioning* = *old* response to a *new* stimulus.
- Note that *key triggering stimulus (bell) must occur before the response.* If you wait for the dog to salivate and then ring the bell, no new learning takes place.
- Sometimes this conditioning can happen with only a single event. For example, a man goes to a restaurant, eats a spoiled shrimp, and becomes violently ill. From that point on, the man feels severe nausea whenever he passes the restaurant or sees a commercial for it on TV.

Important Concept

Unconditioned stimulus (UCS): Stimulus that produces a response before new learning.

Unconditioned response (UCR): Response to stimulus before new learning.

Conditioned stimulus (CS): Additional stimulus that produces a response after learning.

Conditioned response (CR): Response to new additional stimulus indicating new learning.

Important Concept

Classical conditioning is also called respondent conditioning.

4.3.2 Important Terms

Stimulus Generalization A similar *stimulus* produces the same response.

- Stimuli which are similar, but not identical, to the CS produce the same CR.
- The dog salivates to a bell that sounds different from the original one used for conditioning. Bell-like stimulus will also elicit the CR.
- A soldier with post-traumatic stress disorder experiences a panic-like response when a ceiling fan at a local restaurant is switched on. (Whirling fan is a stimulus generalized from the whirl of spinning helicopter blades.)

Extinction New stimulus no longer produces the response.

- Note that once extinction occurs the dog will no longer salivate to the bell, but will still salivate when the meat is presented. The response (salivation) does not cease. Rather, the link between the bell and salivation is broken.
- **Spontaneous Recovery** Even after extinction has occurred, the CS may once again elicit the CR. Usually this recovery is temporary.

Important Concept

Use behavioral techniques, not pharmacological, for most phobias.

4.4 Clinical Applications of Classical Conditioning

4.4.1 Systematic Desensitization

Gradual exposure, either mental or physical, to feared stimulus *accompanied by relaxation*.

- **Three Steps**

  This list is ordered from the least feared to the most feared situations:

  1. Generate list of low to high fear stimuli.
  2. Practice at relaxation.
  3. Hierarchy of feared stimuli presented over time while patient practices relaxation during increasing exposure.
- When most extreme stimulus is presented and relaxation is maintained, treatment is successful.
- Best interventions for most phobias.
- *Note*: Fear or anxiety are never addressed directly. Rather, a response (relaxation) that is incompatible with fear replaces the fear response.

4.4.2 Exposure

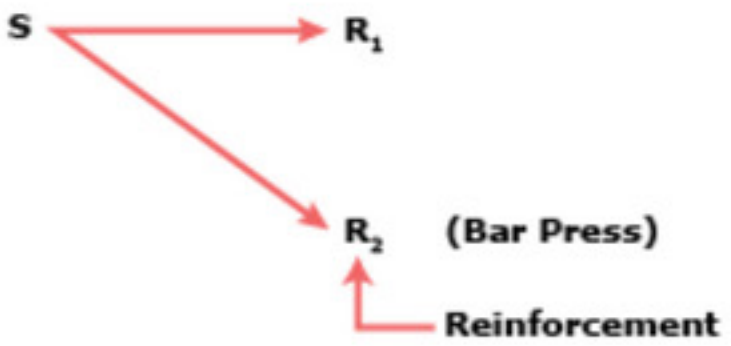
- Maintain person in phobic situation until *response is exhausted* and extinction occurs.
- Extreme forms:
  - **Flooding** Actual physical exposure to highest anxiety.
  - **Implosion** Mental exposure to highest anxiety.

4.4.3 Aversion Therapy

- Stimulus is changed to evoke avoidance, rather than an approach response.
- If you make the dog's meat putrid, the dog will not salivate.
- Disulfiram for alcoholics works by this principle.
- Therapy is used to treat paraphilia, thumb-sucking.

4.5 Operant Conditioning

Adding an aversive stimulus to stop behavior is *operant conditioning.*



▲ **Figure 6–4.5** Operant Conditioning

4.5.1 Skinner's Experiments

- A rat is placed in a cage called a "Skinner Box" (S). The rat explores the cage and exhibits common rat-like behavior (R_1).
- When the rat presses a bar in the cage, the rat is given food. After getting the food, the rat presses the bar again (R_2).
- *Reinforcement:* Anything which increases the probability of the response occurring again in the future. In this example, food is the reinforcement.
- Key points:
  - Operant conditioning is when a new response occurs, is reinforced, and repeated in the future.
  - *Operant conditioning* = a new response to an old stimulus.
- Now when the rat is put in the Skinner Box, the rat presses the bar, something not done before.
- The milieu of the Skinner Box is the old stimulus; the bar-pressing is the new response.
- Note that the *reinforcement must occur after the response.* First bar press, then food.
- *Important*: A reinforcer is defined by its effects.
  - Something that changes behaviors is a *reinforcer*. If it does not change behavior, then it is not a reinforcer.
  - Intention does not matter, only observable effects.
  - Reinforcement depends on the state of the organism. Food may be a reinforcer to a hungry rat, but not for one that is sated.
  - Law of economics applies: Scarcer things have more value. With each bite of food, the food becomes less of a reinforcer in that moment.
  - Development matters. What is reinforcing to a child may not have the same effect when applied to an adult.

Important Concept

If it changes behavior it is a reinforcer. If it does not, then it is not.

Important Concept

Operant conditioning also is called instrumental conditioning.

4.5.2 Important Terms

Extinction Reinforcement no longer occurs, so behavior stops. The rat presses the bar and no longer gets food. Eventually, the rat stops pressing the bar.

- Note that behavior may continue for a while after reinforcement ceases before the behavior stops.
- **Spontaneous Recovery** After extinction, even with no new reinforcement, the behavior occurs again. Recurrence of the behavior usually is temporary unless met by new reinforcement.

Secondary Reinforcer Something that gains reinforcing properties by becoming associated with something that already is reinforcing.

Examples:

- A coupon is a valued prize because you can turn it in for a free meal.
- Money is just paper, but changes behavior because of what you can do with it.

Modeling (Social Learning)

- Observing *someone else* being reinforced is sometimes all it takes to change behavior.
  - For example, after watching your sister get money from your parents for getting good grades, you try to work harder in school.
- Follows same principles as operant conditioning.
- Performing a behavior learned by modeling is more likely when the person being imitated is not present.
- Group therapy, socialization, and the idea that watching violent movies produces violent behavior are based on this idea.

5 Types of Reinforcement

		Response	
		Decreases	Increases
Stimulus	Added	Punishment	Positive reinforcement
	Removed	Extinction	Negative reinforcement

▲ **Figure 6–5.0** Stimulus/Response

5.1 Positive Reinforcement

- "Added reinforcement."
- Something *added that makes behavior more likely.*

Examples:

- Giving food to the rat elicits more bar pressing.
- Praising a child is followed by the child doing better in school.
- Scolding a child who throws temper tantrums results in increased temper tantrums.

5.2 Negative Reinforcement

- "Subtracted reinforcement."
- Something *taken away that makes behavior more likely.*

Examples:

- Rat presses the bar to stop electric shock.
- Taking a pill causes muscle pains to fade.
- Buckling the seatbelt silences the car's annoying automatic reminder.

5.3 Punishment

- Something *added that makes behavior less likely*.
- Apply a stimulus, stop a behavior.

Examples:

- Rat stops pressing bar when shocked.
- Yelling at child stops child from running into street.

5.4 Extinction

- Something *taken away that makes behavior less likely*.
- Remove a stimulus, behavior stops.

Examples:

- Rat no longer is fed when bar is pressed; rat stops pressing bar.
- Professor turns away when students ask questions; students stop approaching with questions.

Important Concept

- Both positive and negative reinforcement generate *more* behavior.
- Both punishment and extinction generate *less* behavior.

Important Concept

Positive Reinforcement vs. Punishment

- Fastest way to stop behavior is punishment.
- But tells person *what not to do, not what to do.*
- Why is positive reinforcement preferred? It tells them what to do.

6 Reinforcement Schedules

Continuous Reinforcement Each behavioral response is followed by consequence (reinforcement or punishment).

- Fast learning
- Fast extinction

Intermittent Reinforcement Some behavioral responses are followed by consequences; others are not.

- Slow learning
- Slow extinction

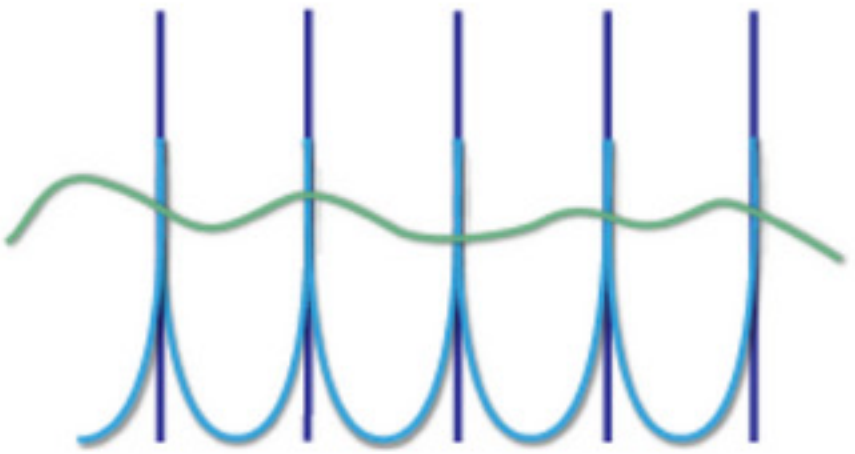
6.1 Types of Intermittent Reinforcement

6.1.1 Interval Schedule

About the passage of time.

- Consequence given for response after *period has passed.*
- Highest reward for minimal effort is by delaying response.
- *Fixed*: The amount of time needed to pass to trigger reinforcement is constant, therefore predictable.
  - Produces varying rates of behavior linked to reinforcement interval.
  - For example, you have to wait for regularly scheduled dinner times to eat. Asking for food between mealtimes gets you nothing. Asking for food tends to increase as mealtime nears.
- *Variable*: The amount of time needed to trigger reinforcement changes in a random, unpredictable pattern.
  - Because the timeframe for reinforcement is changing and unknown, the rate of response tends to be higher and more constant than a fixed interval.
  - You can only eat at mealtimes if you want to eat. But, mealtimes are erratic and irregular so you are not sure when it is time to eat.

Fixed Interval and Variable Interval



▲ **Figure 6–6.1** Reinforcement Schedules Effect on Behavior

Important Concept

The best way to get someone to learn to do and keep doing a behavior is to *start with continuous reinforcement* and, once the person has learned the behavior, *switch to intermittent reinforcement.*

6.1.2 Ratio Schedules

About the number of behaviors that are done.

- Consequence given after a *number of responses*.
- Doing more gets you more.
- *Fixed*: Number of responses needed to trigger reinforcement is constant, therefore predictable.
  - Higher, steadier rate of responding than with interval schedules.
  - For example, you always have to call someone three times before he calls you back.
- *Variable*: Number of responses needed to trigger reinforcement changes in a random, unpredictable pattern.
  - Highest level of response and hardest to extinguish.
  - Gambling works on this reinforcement schedule.
  - For example, you have to call someone many times before you get a call back. The number of times you have to call keeps changing.

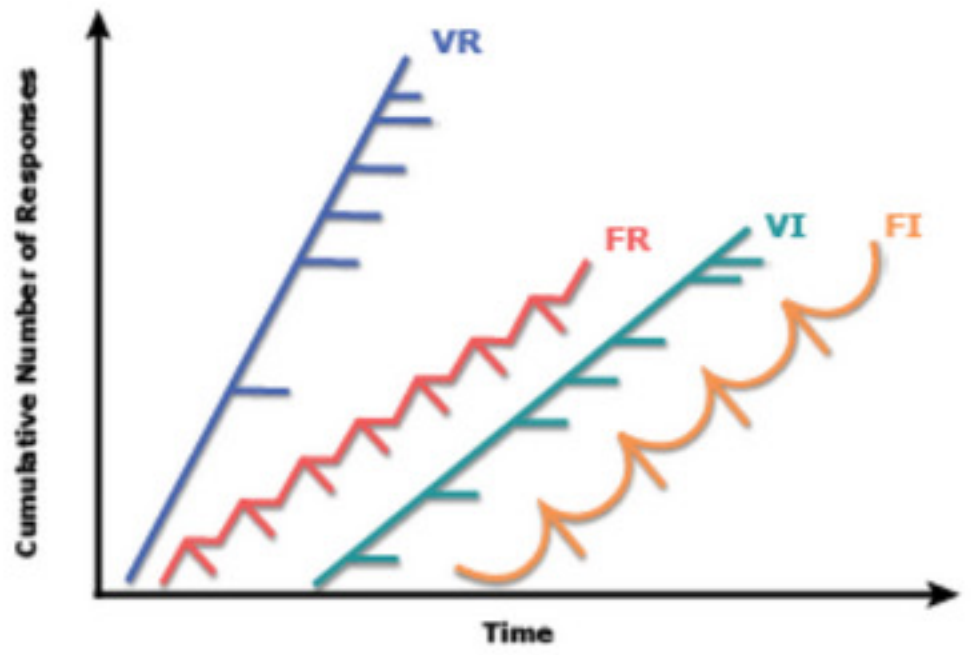
Important Concept

- Interval schedules: reinforcmeent limited to the passage of time
- Ratio schedules: reinforcement linked to the number of behaviors done
- Fixed schedule: pattern is predictable
- Variable schedule: pattern is unpredictable

6.2 Types of Reinforcement Schedules

		Predictability	
		Constant (Predictable)	Changing (Unpredictable)
Reinforcement Trigger	Time	Fixed interval (FI) R: On and off	Variable interval (VI) R: More regular
	Behaviors	Fixed ratio (FR) R: Higher rate	Variable ratio (VR) R: Highest rate Extinction is hard

▲ Figure 6–6.2A Triggers/Predictability



▲ Figure 6–6.2B Response Times

Important Concept

FI = on and off responses

VI = more steady rate

FR = higher rate, rest after reinforcement

VR = highest rate, hardest to extinghish

6.3 Clinical Uses of Operant Conditioning

6.3.1 Shaping

- Successive approximations of the desired response: From the *general to the specific.*
- "Behavioral funnel."
- Reinforcement modified to move behavior from approximate to exact behavior desired.
- How education works: Teaching from basics to details.
- How speech is taught to autistic children: Gradually moving them from nonsense utterances to comprehensible language.

6.3.2 Token Economy

- Uses positive secondary reinforcement.
- Desired behavior is awarded with a "token," which can be converted to something desired (candy, privileges).
- For example, if you collect enough bonus points you get a free night's stay at a hotel.

6.3.3 Extinction

- *Discontinuing reinforcement* so behavior stops.

Examples:

- Reducing temper tantrums by ignoring child when tantrums occur.
- "Time out": Put child in stimulus-free environment until unwanted behavior abates.
- Wait silently and only answer a patient's questions when the patient stops yelling.

6.3.4 Stimulus Control

- Stimuli inadvertently acquire control over behavior.
- *Avoid stimuli, reduce behavior.*
- Substance abuse
  - For example, stay out of a bar to reduce drinking.
- *First, best choice to treat primary insomnia:*
  - Get out of bed when not sleeping.
  - Only go near bed when sleep occurs.

6.3.5 Biofeedback (Neurofeedback)

- External feedback provides information about your own internal physiological states.
- By learning to modify external stimuli, you can change internal physiological states.
- Works by trial and error; what works is repeated.
- Can be used for anything for which clear representation of internal states can be presented and monitored.
- Affects the parasympathetic system.
- Can effectively treat
  - Hypertension: Blood pressure is measured.
  - Migraine and muscle-contraction headaches: Electromyography.
  - Raynaud syndrome: Temperature is measured.
  - Anxiety: Galvanic skin response.

6.3.6 Fading

- Reinforcer removed by gradual process where behavior is maintained.
- Gradually removing supportive agent, but keeping behavior.
- Tapering doses of antidepressants so, at the end, the patient is taking no medications and is not depressed.
- For example, a patient who learns to exercise with the help of a personal trainer is able to keep the exercise schedule even as sessions with trainer decline.

6.4 Important Topics

6.4.1 Learned Helplessness

- Illustration: A rat is shut in a Skinner Box, shocked, and not allowed to escape.
  - Eventually, the rat ceases to try to escape and lies down passively.
  - Demonstration:
    - —Put rat back in box.
    - —Provide obvious escape door.
    - —Rat lies passively and does not use door.
- *All avoidant responses are extinguished.*
- More likely in people who are less capable or have experienced fewer life options.
- Treating depression requires at least *two* levels of interventions:
  - Pharmacology: Potential for sane behavior.
  - Break learned helplessness: Practice sane behavior.
- Depressed people either never learned or forgot how to engage the world.
- Without intervention, past (passive) behavior tends to be repeated.

6.4.2 Intrinsic vs. Extrinsic Motivation

- *Intrinsic*: Behavior itself is rewarding.
  - The activity is its own reward.
  - Behaviors tend to not extinguish.

  For example:
  - You sing because you like singing.
  - You read because you enjoy reading.
- *Extrinsic*: Added reinforcement is motive for behavior.

  For example:
  - Getting paid or getting a prize to do something.
  - I will pay you by the hour to sing.
  - I will pay you $20 for each book you read.
- *Key idea*: If intrinsically motivated behavior becomes extrinsically rewarded:
  - Once external reinforcement stops, behavior tends to stop.
  - Offering external reward for things that are intrinsically motivating can, over time, cause a decrease in the behavior.
  - The extrinsic reward becomes the motive and the intrinsic motivation is lost.

Memory Aid

Sanity is learned behavior.

Important Concept

Giving extrinsic reward can wipe out intrinsic gratification

CHAPTER 7 Ethical and Legal Issues

1 Orientation to Ethics for USMLE

1.1 The USMLE Can Test Only What Is Consensus

- Local rules and laws will not be on your exam.
- Issues that are the subject of professional debate cannot be tested.

1.2 Taking the Test

- Take what is presented in the question at face value.
- Answer in terms of the "best possible conduct, by the best physician."
- Main Topics—"The 9 Cs":
  - Choice
  - Consent
  - Competence
  - Children
  - Confidentiality
  - Context of Practice
  - Controlling Risk and Preventing Harm
  - Conduct of Others
  - Concluding Issues

USMLE® Key Concepts

For Step 1, you must be able to:

- Identify the maximum ethical standards of behavior.
- Understand patients' rights.
- Understand individual roles in a patient-physician relationship.
- Know the 9 Cs.

2 Choice: Patient Is the Primary Decision Maker

2.1 Patient, Not Physician or Family, Is the Decision Maker

- The physician provides the options; the patient decides.
- The physician can give an opinion, but ultimately the decision rests with the patient.

Important Concept

Exam Issue: What is the best way to gain a sense of the patient's wishes?

2.2 Competent Patients Can Refuse Treatment

- A patient can refuse treatment for any reason, even if treatment is vital for survival.
  - For religious reasons (such as Jehovah's Witnesses object to blood transfusions).
    - —But, do not assume that because someone is a member of a religious group that the person shares all of its beliefs.
    - —The person's decision, not religious guidelines, is the focus.
  - Pregnant women can refuse intervention that could save a threatened fetus.
    - —Can refuse testing.
    - —Can refuse a C-section.
  - All patients have the right to get a new physician even if the request is for reasons of prejudice (race, religion, etc.).
    - —The patient has the right to refuse treatment from residents or medical students.
    - —Prisoners also have the right to refuse treatment from residents or medical students.

2.3 Patient Chooses When Treatment Starts and Stops

- Turning off a respirator is not killing the patient; it is stopping treatment at the patient's request.
- If you think chemotherapy has only a small chance of success, but the patient selects this option, then go with the patient's choice.

2.4 If You Can Access a Patient's Wishes Directly, That Is Best

- If a patient is unconscious, but likely to wake up, wait until he or she awakes.
- Only turn to others to make decisions for the patient when you cannot access the patient.

2.5 Directives

If you cannot talk directly with the patient, use one of the three principles below. Pursue them in this order:

1. Subjective standard (advance directive)
2. Substituted judgment
3. Best-interest standard

2.5.1 Subjective Standard (Advance Directive)

What has the patient said in the past?

- Oral or written statements are the same.
- Decision expressed to you or to someone else is the same.
- If multiple statements have been made by the patient, the most recent statement prevails.
- **Types of Advance Directives**
  - **Living Will**
    A written document in which a competent patient gives direction for personal care in the event that the patient becomes incompetent.
    — The document itself directs or forbids actions. Another person is not required.
    — Usual form: "If I am in the following state as certified by two physicians ... ."
    — Only applies to end-of-life care.
    — But not always clear. Physicians may disagree about a patient's status. The case may involve complexity beyond the issues anticipated by the document.
  - **Durable Health Power of Attorney (HPA)**
    Competent patients designate a surrogate who will make decisions for them if the patient becomes unable to do so.
    — The document allows another person to make decisions.
    — The designated person "speaks with the patient's voice."
    — An HPA who is not a family member overrules wishes of family.
    — Follow the designated person's decisions unless:
      - The patient tells you not to.
      - Your decisions contradict a living will for an end-of-life situation.
  - **Do Not Resuscitate (DNR)**
    — DNR discussions should happen during the first encounter with a patient.
    — Physician should broach the topic and not wait for the patient to bring it up.
    — When having a DNR discussion:
      - *Talk specifics*: "If your heart stops do you want me to ...?" "If you stop breathing do you want me to ...?"
      - *Avoid jargon*: Do not say, "What are your 'do not resuscitate' wishes?" or, "What are your DNR wishes?"
    — DNR with no qualifiers means, "No heroic measures."
      - No cardio or pulmonary resuscitation.
      - But already agreed on treatments should be continued.
      - New treatments, including surgery, can be initiated.
      - Watch for partial DNR
        Pulmonary DNR—no respiratory support.
        Cardio DNR—do not restart heart.
    — *Question:* If there is a DNR, can patient be put on respirator after surgery? Answer: Yes, if it is part of standard post-op care. But it should not be prolonged beyond what is standard.

Important Concept

Most recent statement by the patient carries the most weight.

Important Concept

Ask patient about DNR wishes early.

2.5.2 Substituted Judgment

Someone who knows the patient offers a best guess about what the patient would want.

- Consider the people presented and decide who is best to guess patient's wishes.
- Next of kin is *not* the issue, rather, who can best guess the patient's wishes.
  - Next of kin often will be among the best people to guess.
  - But knowledge of the patient, not blood relationship, is the determining issue.
- Example: Karen Ann Quinlan case.
- Note that this is not about what the patient said to someone. If that occurred, it would be back to the subjective standard.

Important Concept

Who knows patient best, not next-of-kin, matters most.

2.5.3 Best-Interest Standard

What would most patients in this situation want?

- Rational-person standard: Benefits weighed against burdens.
- What would a disinterested, dispassionate jury decide?
- Benefits for the patient only may be considered.
- Who makes the decision now does not matter as long as the standard is followed.
- Do not go to the ethics committee. Make the decision yourself.
- The decision maker must put aside personal and even religious beliefs and make the decision.
- No standard beyond *best interest* is needed. Handles everything not covered by previous standards.

Important Concept

If no sense of patient's personal wishes, then do for this particular patient what most patients in general would want.

2.5.4 Steps to Take to Get Directives

Do these things, in this order:

- Talk to the patient directly.
- Subjective standard.
- Substituted judgment.
- Best-interest standard.

3 Consent: Informed Consent Is a Must

3.1 Physician Must Obtain Consent

Must have written or oral consent from competent patient prior to *any* medical intervention.

- There is no such thing as partial consent.
- There is no such thing as implied consent.

3.2 Informed Consent Requires Five Elements

1. Nature of procedure: What are we going to do?
2. Goal of procedure: Why are we going to do it?
3. Benefits of procedure: What good are we seeking?
4. Risks of procedure and risks of electing to *not* have procedure: What could go wrong?
5. Alternative treatment options: What other options are there?

- *All five required, or no consent.*
- *The patient must "receive and understand" all five elements.*
  - Consent must be voluntary and without coercion.
  - Patient must have time to consider.
  - Must understand English (or translation).
  - Signature on a piece of paper is not the issue. Patient's understanding is the focus.

3.3 Consent, Once Given, Can Be Withdrawn at Any Time

- Written consent can be revoked orally.
- If you are not sure whether patient has revoked consent, then act as if it has been revoked.

Important Concept

All five elements must be communicated or there is no informed consent.

Important Concept

We make it easy for patients to change their minds.

3.4 Exceptions

Circumstances when physicians do not get informed consent:

- **Incompetence**
  - Objective behavior.
  - Court designation.
  - Patient is a minor.
- **Emergency**

Life-or-limb-threatening case of unconscious patients: Use the best-interest standard.

- **Waiver**

The patient agrees to allow intervention even though full informed consent has not occurred.

- Patient, not family, grants waiver.
- Common situations for waivers:
  - Research in which all risks and benefits may not be known.
  - Surgery in which something unanticipated is discovered.
    - —If life threatening: Act under emergency exception.
    - —If not life threatening: Wake patient and get consent before proceeding.
- **Therapeutic Privilege**

Patient is deprived of autonomy in the interest of personal health or well-being.

- For example, patient who is violent or high on drugs and out of control is put in restraints.
- Does not mean a physician can withhold information from a patient.
- If telling a patient information puts that person at risk, then find a way to inform that minimizes risk.

3.5 Family Members

Family members and friends cannot influence what or when physicians provide information to patients.

- Patients must be given full information.
- Patients may include family members in decision if they wish.

Important Concept

Four exceptions to informed consent:

- Incompetence
- Emergency
- Waiver
- Therapeutic privilege

4 Competence: Ability to Make Decisions

4.1 Begin by Assuming the Patient Is Competent

Patients do *not have to prove competence.*

4.1.1 Diagnosis Tells Nothing About Competence

- Competence is a legal designation, not a medical diagnosis.
- Neither a mental-status exam nor a psychiatric consultation can determine competence.

4.1.2 Key Idea: Can You Get and Give Information From and to the Patient?

- If yes, we assume competence.
- If no, then obviously not.

4.1.3 Mentally Ill or Mentally Retarded Patients Are Considered Competent

- Begin by assuming competence for patients diagnosed with mental retardation, schizophrenia, depression, Alzheimer dementia, or a patient who is drunk or "high."
- Can make decisions to accept or refuse medical treatments, even though they may not be able to make competent decisions in other areas.

Important Concept

If unsure, assume competence

4.2 Psychiatric Emergencies

- Patients can be hospitalized for 48 to 72 hours without their consent.
- Then, they are entitled to a jury hearing.

4.2.1 Reasons for Involuntary Hospitalization

- *Must be dangerous to self or others.*
- Unable to *provide self-care* (*not merely self-neglect*).
- Patients in mental health facilities retain most of their civil rights, including the rights to:
  - Receive or refuse treatment, such as medication, surgical procedures, and even electroconvulsive therapy.
  - Marry or divorce.
  - Contact an attorney or anyone else.
  - Conduct business.
  - Vote.
- *Note*: Only if the patient is a danger to self or others can treatment be imposed.
  - You can medicate violent or aggressive patients against their will but only to control acute incidents.
  - Voluntarily admitted patients are not allowed to leave the facility against medical advice until physician staff can assess threat of harm.

4.3 Legally Competent

- To be legally competent to make decisions regarding health care and treatment, one must:
  - Understand the nature of the condition.
  - Understand risks and benefits of treatment versus no treatment or alternative treatment.
- But, if physicians are unsure, they give the patients the benefit of the doubt—assume competence.
- If an adult's competence is questioned, a jury is required to make a determination.
  - Courts decide competence, not physicians.
  - But, if you think you are sure about what the jury would say, then go with that.
- Competent patients have the right to:
  - Accept or refuse treatment.
  - Request a second opinion.
  - Ask for alternative treatments.
  - Change physicians.

Important Concept

Inpatient psychiatric patients retain their civil rights.

4.4 Objective Evidence of Incompetence

- Under 18 years old (although there are exceptions).
- Patient attempts suicide.
- Physician cannot give or get information to or from the patient.

4.4.1 It Is Ethical to Allow a Patient to Die

Even if treatment options are available, regardless of family's pressure to continue "anything."

- This is not assisted suicide.

4.4.2 Ethically, It Is Important to Make Certain Patient Is Not Depressed

Pain should be under control and not a factor in a patient's decision.

- But we err on the side of following the patient.
- Doctors decide lack of life, not lack of hope.
- A physician thinking a patient is *hopeless is no reason to stop treatment.*
- What if a patient is brain dead, but family wants treatment to continue?
  - Stop treating.
  - Patient is dead.

5 Children Are Special Cases

5.1 For Anyone Under 18, Begin by Assuming Incompetence

- They, therefore, cannot legally make medical decisions for themselves.
- Those younger than 18 cannot consent for themselves so parents or legal guardians must consent for:
  - Examination
  - Prescription
  - Surgical or medical treatment
- Exceptions:
  - Emergencies in which the child could be harmed by delaying intervention.
  - Partial emancipation issues (see 5.3.1).
- If parents/legal guardians refuse medically life-saving treatment, physician should:
  - Act under the best-interest standard if time is short.
  - Seek an immediate court order if time permits.
- Parents are decision makers but cannot refuse life-or-limb-saving care.
  - Parents can refuse:
    —Experimental treatments for a minor child.
    —Child's participation in research.
- What if one parent says "no" to a surgery and the other says "yes"?
  - If married or there is joint custody, then you have the permission you need. You only need one "yes."
  - If parents are divorced and no joint custody, then only the parent with custody may consent.

Important Concept

Children are incompetent unless emancipated.

5.2 Serious Medical Issues

For children born with serious medical conditions, should physician continue life-sustaining treatments?

5.2.1 Three Questions Typically Asked

1. What are the parents' wishes?
2. What does the best-interest standard say?
3. What will be the child's quality of life?

- Infant Doe case: best-interest standard
  - A child was born with many medical problems. Treatment was unlikely to be effective. Therefore, parents and doctors decided not to treat.
  - Note that if parents had decided on treatment for the child, it should have been done.

Important Concept

If "best interest standard" agrees, we can withhold treatment from children.

5.3 Exceptions to Idea That Children Are Incompetent

5.3.1 Emancipated Minors: In Most States, Age 13 and Older

- When emancipated, minors have full legal rights, including the right to make decisions regarding medical care.
- De jure: Court designates emancipation.
  - Court order.
  - Marriage emancipates.
  - Anyone in the U.S. military is emancipated.
- De facto: Behavior demonstrates emancipation.
  - Living and caring for self as an adult.
  - "Contributing to the household in an adult-like manner."
    - —Examples: Earning money legally or helping pay for rent, food, etc.

Important Concept

Treat emancipated minors as you would an adult.

5.3.2 Partial Emancipation: In Most States, Age 14 and Older

Privileges come with the birthday.

- Child does not need to demonstrate any adult-like capacity.
- Gains the right to make medical decisions in these four areas:
  - Contraceptives
  - STD treatment
  - Substance disorders
  - Pregnancy and prenatal care
- Note that confidentiality rules apply here.
  - If child is treated, parents are not informed.
  - Therefore, do not bill parents' insurance company.
  - However, try to get permission to involve parents for important issues such as pregnancy.
  - Rules about abortion and minors are covered in the Concluding Issues section.

Important Concept

Partial emancipation is limited to four areas only.

6 Confidentiality Is Even Stricter Than You Think

6.1 Physicians Cannot Discuss Patient Information

- Physicians cannot discuss patient information with *any* third party without express permission from the patient.
- The fact that someone is your patient is confidential information.
- Even the fact that there is a health problem is confidential.
- Do not discuss with patient's spouse or family.
  - Family members do not have a right to know about other family members.
  - You may only tell family members if the patient gives permission.
- Do not use a case for teaching without permission from the patient.
- Patients control the flow of information outside the medical staff.
- Of course, you can consult with colleague for the benefit of the patient.
  - During and after consultation, colleagues are bound by same confidentiality.
  - A physician cannot access the records of a patient who is not his or her own without permission.
- The USMLE issue is *where* you have the consultation.
  - Should be a private space with the "expectation of privacy."
  - Avoid discussions in elevators or while at a restaurant.
- You cannot even talk to an insurance company without permission.
  - Permission from patient to talk about one issue does not mean permission to share everything.
  - Permission to file insurance for treatment for depression does not give permission to file for treatment of heart disease.
- Just not telling is not sufficient. You have to *make sure people cannot find out.*
  - Medical files should be locked and secured.
  - Computer networks should be firewalled and password protected.
  - E-mail is not secure and should not be used unless encrypted.
  - Do not leave medical information in a phone message for patient because others might hear the message.
    - —Be very careful about giving information over the phone to someone who says he or she is your patient (unless you confirm person's identity).
    - —This applies to you and your office staff.

Important Concept

Do not tell anyone, anything, about your patient.

Important Concept

You are responsible for guarding patient information.

6.2 Exceptions

The only time confidentiality is violated is when there is "threat of harm to self or others."

- The court may ask a physician to violate confidentiality if an issue threatens the lives of patient or others.
- Example: *Tarasoff v. Regents of the University of California (1976)*
  - Duty to warn.
  - Duty to protect.
- Mandatory reportable diseases: Local health department must be notified.
- STDs and sexual partners
  - Spouse must be told.
  - Ideally, both partners should be in your office, where the infected partner can inform and you can mediate and offer guidance or referral.
  - If not a spouse, "voluntary notification."
    - —Urge the person to inform current and former partners.
    - —If they will not, offer to contact partners yourself while maintaining confidentiality.

6.3 When Physician Must Break a Minor's Confidentiality

- The minor patient is suspected of child or elder abuse.
- Minor is at risk of suicide.
- Minor poses threat to another person.
  - First, determine credibility of threat.
- If unsure, act by detaining the child and notifying the person at risk and law enforcement agencies.

Important Concept

If "threat of harm," it's OK to violate confidentiality to stop the harm.

7 Context of Practice

7.1 Physician Is Responsible for Maintaining Boundaries of Physician–Patient Relationship

- Physician should not treat self, family, colleagues, or personal friends.
  - This is an ethical, but not a legal, requirement.
  - Send friends and family to a colleague for care.
- Because of the inherent inequality of a doctor-patient relationship, *romantic or sexual relationships with current or former patients are prohibited.*
  - What if you are "in love" with a patient? Then get counseling.
  - Even hinting you are attracted to a patient without action is inappropriate.
- Avoid social situations with patients.
  - These can turn into situations in which relationship boundaries can be breeched.
  - Do not go to meals or attend parties with patients.
  - Do not engage patients on social media (such as Facebook).
- Nominal gifts (child's picture, cake) from patients are acceptable.
  - Valuable gifts are considered unethical.
  - Politely decline the gift when offered.
- Do not get in the way of another physician-patient relationship.
  - If a patient complains about another physician, ask if the patient has told that doctor about the concerns.
  - If patient tells you about inappropriate behavior, intervene.
  - Help patient report behavior.
  - Provide referral to alternative physician.
- Remember that you, not the patient, are responsible for maintaining these relationship boundaries.

7.2 Solve the Problem With Information You Have

- Referrals are fine medical practice, but bad exam answers.
- Do not go to court.
- Do not go to the ethics committee.
- Do not seek the advice of another physician.

Important Concept

Physician-patient relationship is sacred and should never be put in jeopardy.

7.3 Never Abandon Anyone Who Is Your Patient

- You do not have to take on a patient.
  - But once you do, you cannot abandon the patient.
  - Patients can leave you; you cannot leave them.
- Even if the patient is obnoxious, annoying, makes sexual advances, or does not pay.
- When a patient is inappropriate, tell the person what appropriate behavior should be but continue to be his or her physician.
- Abandonment includes:
  - Failing to return calls or give appointments.
  - Failing to discharge properly.
  - Threatening that you cannot remain as the physician unless the patient adheres to treatment recommendations.
- In the real world: You must follow certain steps, help the patient find a new provider, and give reasonable time to do so (but not on the USMLE).

Important Concept

Consider a patient as your patient for life.

7.4 Good Samaritan Laws

Laws limit legal liability in nonmedical settings.

- Designed to protect physicians trying to help in emergencies (accidents).
- Physicians have no requirement to stop to help.
- If a physician does stop and help, he or she is protected from liability if:
  - Only standard, accepted procedures and techniques are used.
  - Does not venture outside of physician competence.
  - Stays with patient until relieved by other competent medical personnel (for trauma, EMTs qualify).
  - Is not paid for his or her services.
- If physician is paid in any way (gift, privileges), then the Good Samaritan becomes standard *fee-for-service* with all the associated legal liability issues.

Important Concept

You do not have to stop to help, but if you do you are protected.

8 Controlling Risk and Preventing Harm

8.1 Prevent Harm From Happening

- This is the overarching, most important ethical principle governing medical practice.
- The only reason to breach confidentiality.
- Stop harm even if it puts you at some risk to do so.
  - Patients with infection
  - Violent patients
- You cannot help patients kill themselves and must do whatever you can to prevent suicide.
  - You cannot give the means or offer an occasion when they can commit suicide.
  - Not treating (at patient's request) and patient dies = acceptable.
  - Taking action to kill or facilitate a patient's death = unacceptable.
  - Giving an opiate-based painkiller at dosages that induce respiratory arrest is not acceptable.
  - Euthanasia and assisted suicide are not acceptable.

Important Concept

Best medical practice is anticipating and avoiding harm.

8.2 Detain Patients to Protect Them or Others

- You can, and must, detain any patient to stop the person from hurting self or others.
  - Detain for 48 to 72 hours, and then he or she can have a jury hearing to determine competence.
  - Courts commit; physicians detain.
    - —Commitment means the patient is mandated to a locked unit and unable to come and go.
    - —The patient retains all other civil liberties.
- Children can be committed only if:
  - There is imminent danger to self or others. Evidence indicates:
    - —Violence.
    - —Self-mutilation.
    - —Starting fires.
    - —Inability to care for daily needs.
    - —Parents have no control over child.
    - —Parents being unwilling to discipline their child is not a reason to commit the child.

Important Concept

Stopping harm is paramount.

8.3 Reduce Risk for Patient as Much as Possible

- Prevention should be a part of every medical conversation.
- Talk about issues that are most likely, given a patient's age and demographics.
  - Ask about substance abuse, STD, and driving issues for adolescents.
  - Check on driving issues, bicycle helmet use, and gun in house with patients who are young adults.
  - Talk to all ages about sun exposure and sleep issues.
  - Ask about smoke detectors and carbon monoxide detectors.
  - Prod patients with family history to get screening tests.

Focus on age-appropriate risks.

9 Conduct of Others Also Is Your Concern

Think about the profession as a whole, not just your own conduct.

9.1 Stop Unethical Behavior by Others

- Sexual
- Substance abuse
- Mental health issues
- Physical health issues (vision, hearing)
- Incompetence
- Inappropriate prescribing (many opiate prescriptions)

9.2 When You See Inappropriate Behavior by Other Health Professionals

- Three things must be done in this order:
  1. Separate offender from patient contact.
  2. Report offense to the appropriate authorities.
  3. Get offender to treatment or provide guidance as to proper behavior.
- *If you are aware of unprofessional conduct by another physician and do nothing, you are as liable as they are.*

9.3 Where to Report Physician Impairment

- Physician in a hospital: Hospitals normally have a reporting center, but Step 1 questions usually refer to the hospital's chief of the medical staff.
- Medical school students: For Step 1, the dean of the medical school or the dean of students.
- Physicians in residency: Residency program director.
- Licensed community physician: State licensing board.
- If a physician's conduct violates state or federal laws, you must report that to law enforcement agencies as well.

Important Concept

Treat bad behavior by others as an ethical breach on your part.

10 Concluding Issues

10.1 Organ Donation

- Deceased must have previously signed organ donor card *and* informed relatives or other surrogates of a wish to donate.
- Do not force organ donation if next of kin says "no."
- Parents or legal guardians can donate the organs of a child who is legally dead.
- Living adults and living minor children (with parental consent) can donate certain organs to others.
- For children, donation must meet criteria:
  - The minor should be the only possible source of the organ or tissue.
  - The donation cannot result in serious risks of immediate or long-term complications.
  - The donation or transplant should provide "clear benefit" to the recipient.
  - Recipient should be a close family member.
  - The procedure must be standard of care and not an experimental protocol, and have a reasonable chance of success.
- Example: Minor child would like to donate bone marrow to sibling who has leukemia.
  - Donation has good chance of success. Donate?
    - —OK if:
      - Minor will not be harmed.
      - Legal guardian does not object.
      - No other source available.
    - —Same scenario, but minor refuses to donate and chance of success is 75%?
      - Minor can be compelled to donate if only source.
      - Minor will not be seriously harmed.
      - But try to talk to the minor and get him or her to agree.

Important Concept

Organ donation is a good action but must occur with patient and family consent.

Important Concept

Parents control organ donation by their children.

10.2 Genetic Testing

Appropriateness of genetic testing depends on several factors:

- The average age of onset for disease process.
- Availability of recognized, standard-of-care treatment options.
- For illnesses that manifest during pediatric years, genetic testing is approved and often required by state laws.
- However, if no treatment is available, testing is left to parents' discretion.
- If a child has a potential genetic disorder that presents in adulthood with no proved interventions (Huntington disease), genetic testing usually is not done unless parents request it.

Important Concept

Be sure patients are aware of issues and consequences before testing.

10.3 Physicians With HIV

- Not required to inform patients or coworkers.
- However, should consider doing so.

10.4 Patients With HIV

- Physician cannot refuse to treat a patient with HIV.
- In needle-stick situations, a patient *can* refuse be tested for HIV.
- Pregnant patients with possible HIV infection can refuse HIV testing and treatment, despite the fact that treatment can prevent transmission to fetus.

10.5 Abortion

- Encourage patients to *make their own decisions* when it comes to abortion.
- Encourage patient to speak with family and counselors so the patient (not the physician) can make the decision.
- Never advise abortion to a patient unless pregnancy poses a direct medical threat.
- Never advise abortion because the patient is a teen, fetus has a birth defect, or teen's parents are demanding abortion.
- Never perform an abortion without girl's consent even if it is her parents' wish.
- Most states require *parental notification* for abortion involving a minor.
  - Parents are notified 48 hours before procedure.
    - —Cannot veto procedure.
    - —Parents have a chance to talk girl out of getting procedure.
  - If parental notification may cause harm:
    - —For example, the girl might be beaten or kicked out of the home.
    - —Girl can go before judge and have notification waived.
  - Physician should inform the minor of the notification rules.

Important Concept

Remember, the best answer on the UMSLE is not the minimum the law requires, but the maximum that ethics demands. Choose the best possible conduct, not merely what is acceptable.

1 Sleep Basics: Stages of Sleep

1.1 Non-rapid Eye Movement Sleep (NREM)

- Stages 1, 2, 3, and 4.
- Slower EEG rhythms.
- Higher muscle tone.
- Absence of eye movements.
- Absence of "thought-like" mental activity.
- NREM sleep is an idling brain in a moveable body.

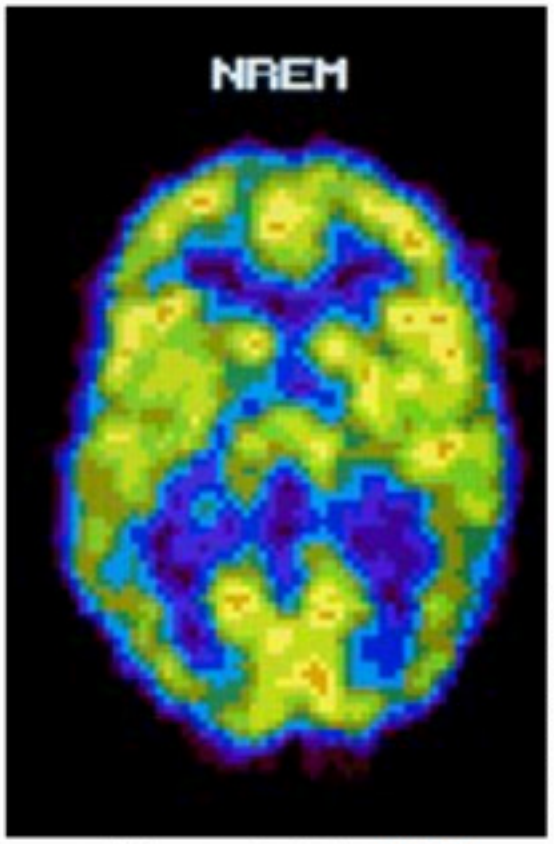
1.2 Rapid-Eye Movement Sleep (REM)

- An aroused EEG pattern.
- Sexual arousal.
- Saccadic eye movements.
- Elaborate visual imagery.
- Associated with pons activity.
- REM sleep is an awake brain in a paralyzed body.

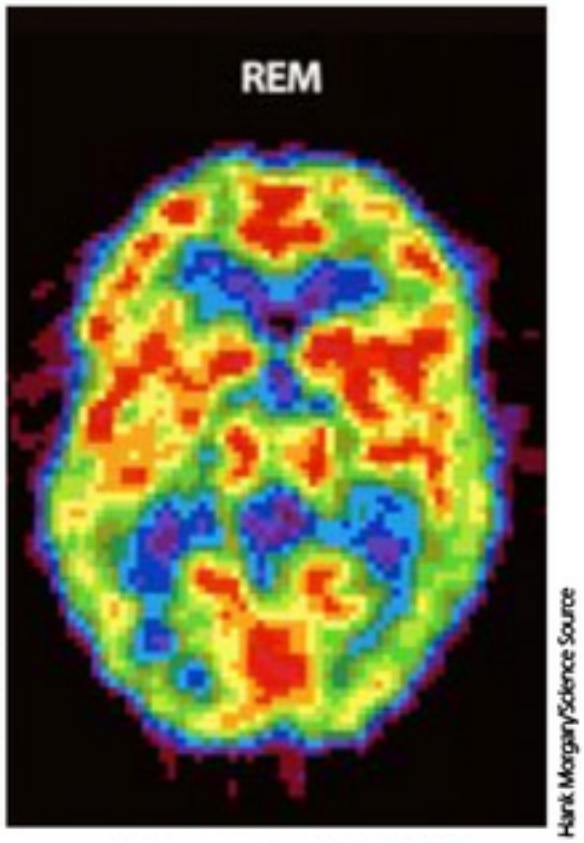
Important Concept

NREM = Brain off, body on

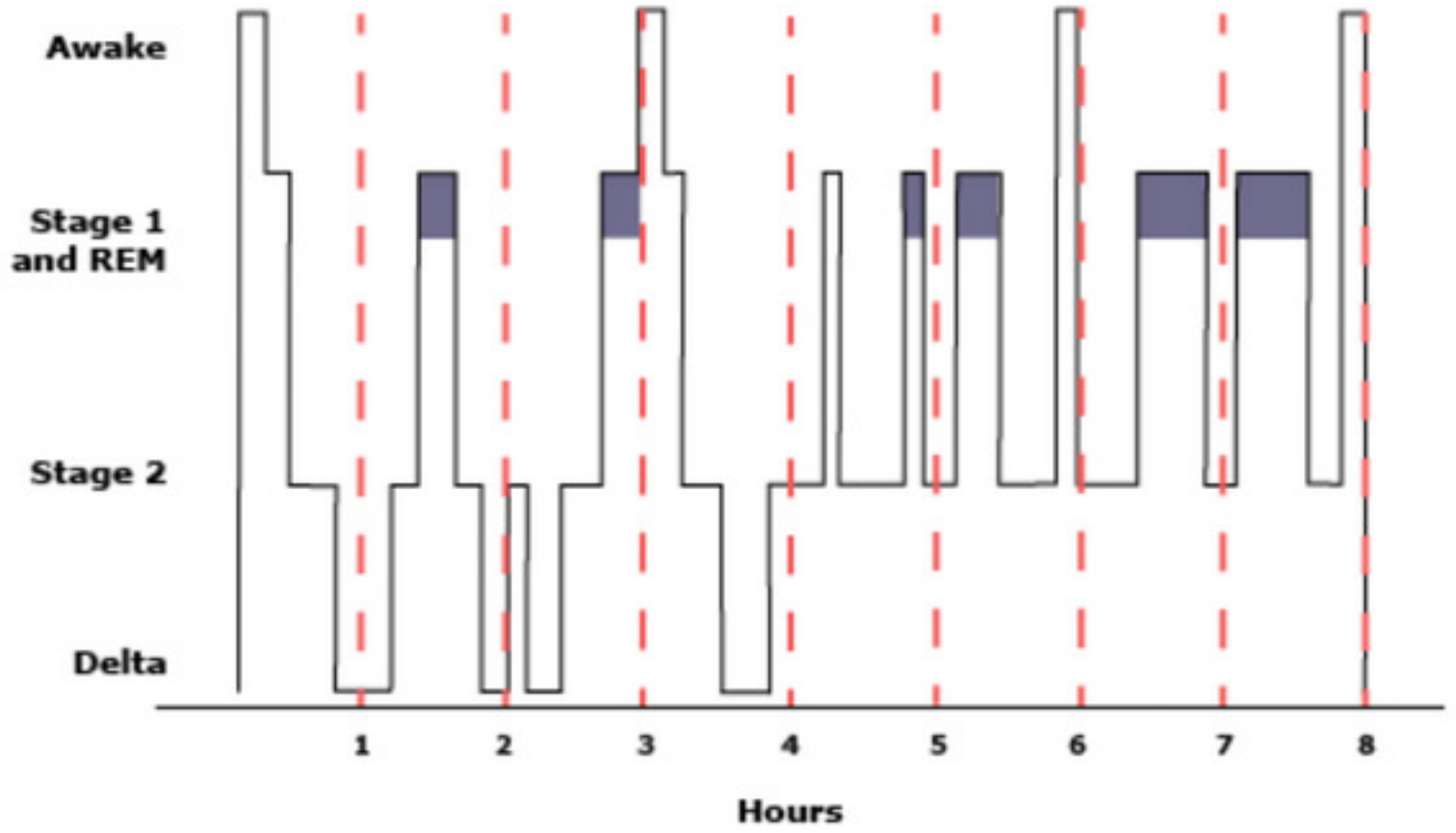
REM = Brain on, body off



▲ Figure 8–1.2A NREM



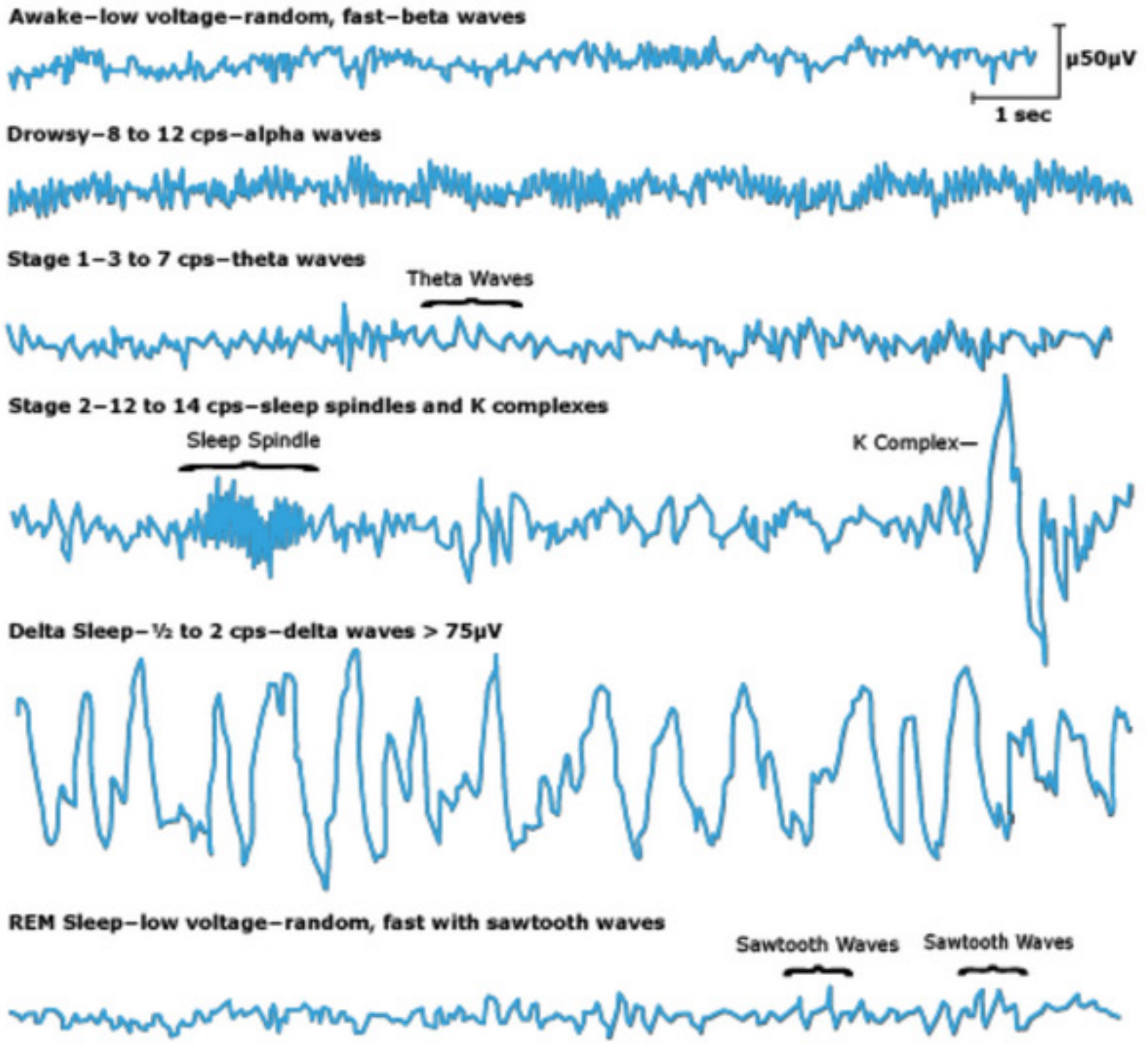
▲ Figure 8–1.2B REM



▲ **Figure 8–1.2C** Sleep Stages (Graph)

1.3 Important Patterns in Normal Sleep

- Waking up from REM is easy and common. Natural waking usually occurs from either REM or stage 2 sleep.
- Waking up from delta is difficult and a person usually requires several minutes or more to become fully oriented to surroundings.
- Initial sleep cycle is 90 minutes.
  - Subsequent sleep cycles become shorter as the night progresses.
  - By the end of the night the sleep cycle may be no more than 40 minutes.



▲ **Figure 8–1.2D** Sleep Stages (Wave Patterns)

▼ **Table 8–1.3** Summary of Features for Waking and Sleeping Stages

	% of sleep time, avg. adult	EEG	Eyes	Muscle tone	Heart activity
Awake and alert	NA	Low voltage, random, fast Beta waves	Open, scanning	High, reflexes OK	Fast, irregular
Awake and prepping for sleep	NA	Alpha waves	Closed, slow movements	High, reflexes OK	Fast, irregular
Stage 1 NREM	5%	Theta waves	Closed, no movement	High, reflexes OK	Fast, irregular
Stage 2 NREM	50%	Sleep spindles, K complexes	Closed, no movement	Reduced	Slower
Delta Sleep Stages 3 and 4 NREM	25%	Delta waves	Closed, no movement	Disappearing but still detectable	Still slower, regular
REM Sleep	20%	Low voltage, random, fast	Closed, fast, jumpy movements	No reflexes detected	Fast, irregular

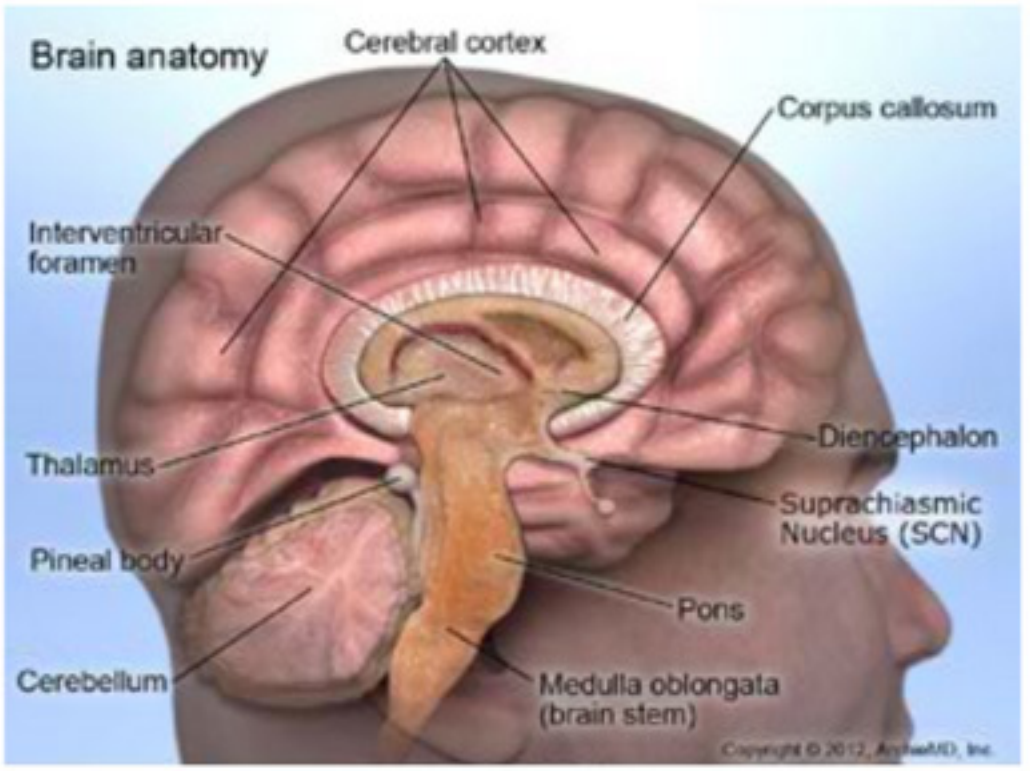
2 Neurochemical Correlates of Sleep

2.1 SANDman

- **Serotonin** Helps initiate sleep.
  - Rises with sleep onset.
  - Falls with waking.
- **Acetylcholine (ACh)** Higher during REM sleep (associated with erections in men).
- **Norepinephrine (NE)** Lower during REM sleep.
  - NE pathway begins in the pons, which regulates REM sleep.
  - Ratio of ACh and NE is the biochemical trigger for REM sleep.
- **Dopamine** Produces arousal and wakefulness.
  - Increasing dopamine increases wakefulness.
  - Rises with waking.
  - Falls with sleep onset.
- In the first three hours of sleep:
  - Increases in HGH, prolactin.
  - Decreases in TSH.

2.2 Melatonin

- Not related to sleeping, but to feelings of sleepiness.
- Made in:
  - Pineal gland.
  - Directly in the retinas of the eyes.
- Effects the suprachiasmatic nucleus (SCN) above the optic chiasm.



▲ **Figure 8–2.2** Suprachiasmatic Nucleus

- Sensitive to light via a pathway from the eyes.
- Daylight inhibits release. Light from blue part of spectrum seems most important.
- Likely mechanism by which light and dark regulate circadian rhythm.
- Responsible for "jet lag" (difficulty re-setting biological clock when traveling around the globe).
- Use bright light, not pills, to regulate.
- Linked to Seasonal Affective Disorder (SAD).
  - Depressive symptoms in the winter months.
  - Time with least amount of daylight.
  - Patient typically:
    —Eats a lot.
    —Sleeps a lot.
    —Is tired, irritable, has a hard time concentrating, is unmotivated, feels sad.
  - Treat with "bright light" therapy.

3 Substance Use and Psychiatric Correlates With Sleep

3.1 Benzodiazepines

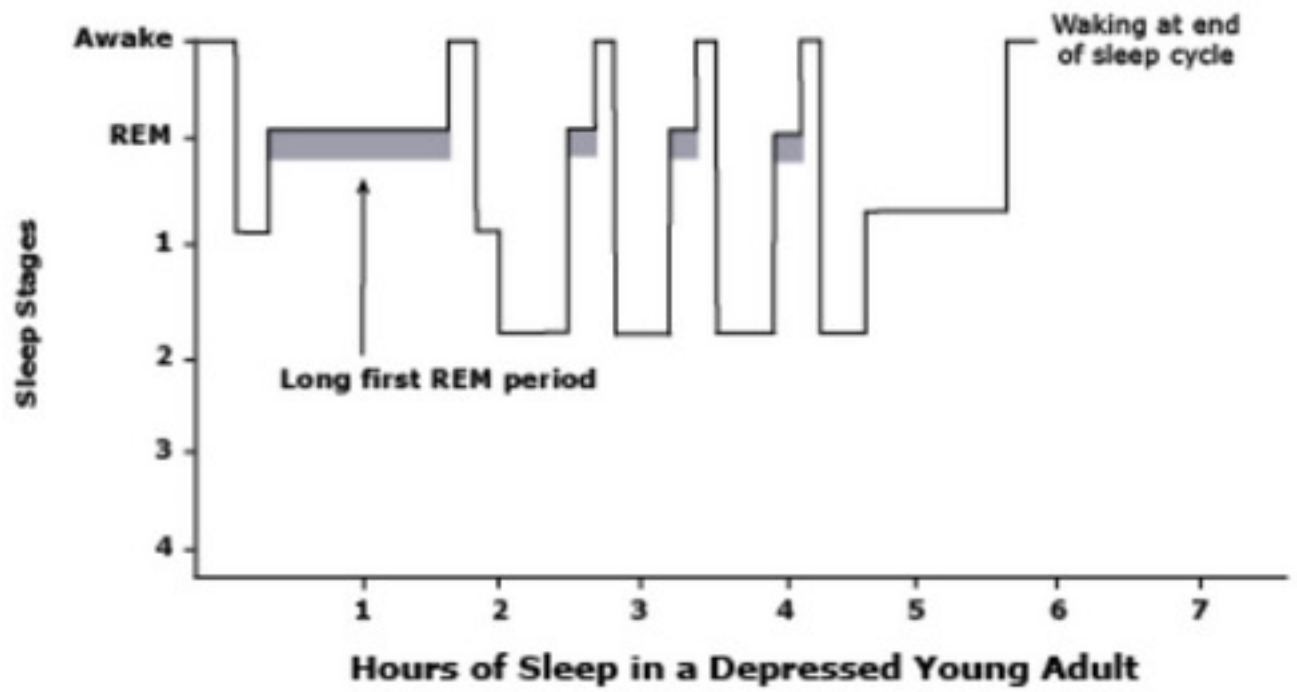
- Some decrease in:
  - REM
  - Stage 4 sleep
- Use for more than two weeks often results in dependency and insomnia.

3.2 Alcohol Use

- Moderate alcohol consumption
  - Early sleep onset
  - But, increased wakefulness—second half of night
- Higher level of alcohol consumption
  - Decrease, even disappearance, of REM
  - REM rebound (nightmare REM)

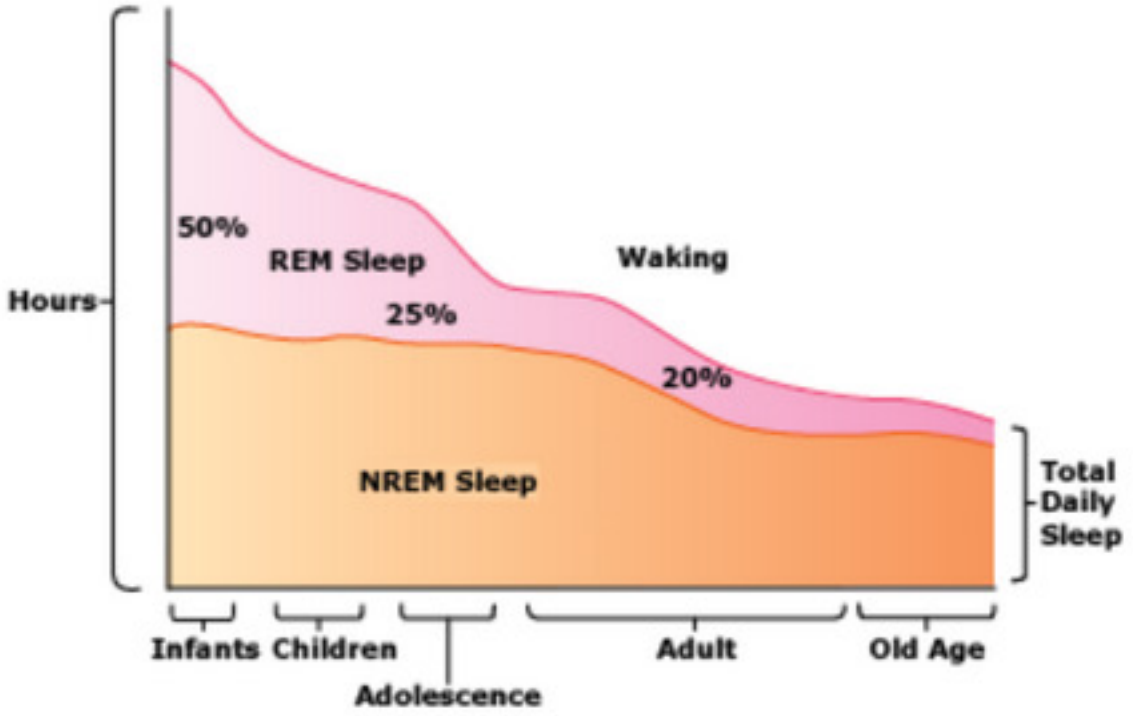
3.3 Unipolar Disorder

- Increased REM.
- Decreased REM latency (45 rather than 90 minutes).
- Decrease, sometimes disappearance of, delta sleep.
- Noticeably increased or decreased sleep time.
- In multiple periods of sleep over 24 hours.
- Early morning waking.
- Diurnal improvement.
- Sleep deprivation produces temporary remission from symptoms in 60% of patients.
- People who characteristically get a lot of REM are more susceptible to the onset of depression.



▲ **Figure 8–3.3** Sleep Stages/Awakenings

4 Sleep Changes Over the Life Span



▲ **Figure 8–4.0** Sleep Stages by Age

4.1 Neonates Sleep a Lot

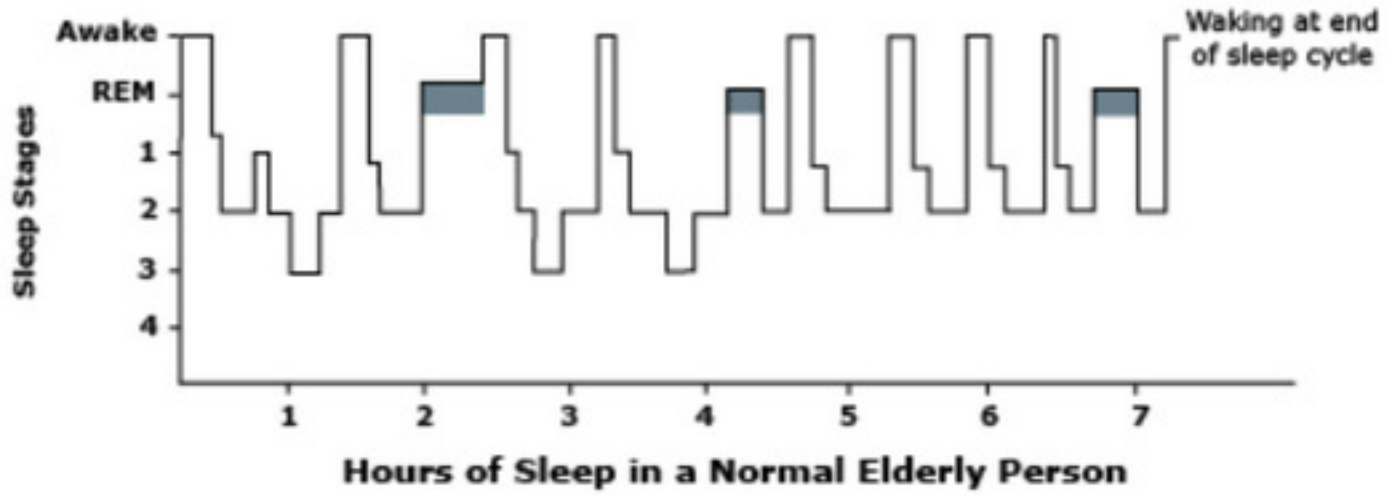
- From 16 to 18 hours every day.
- Sleep happens in 6 to 8 separate periods across the day.
  - Single sleep period emerges when children are ages 5 to 10.
- About half of neonatal sleep time is REM.
- Sleep periods are essentially random and hard to predict.
- Initial sleep cycle is only 30 to 40 minutes.
- Produces sleep fragmentation for parents as child wakes them up often in the middle of their delta sleep.

Important Concept

- Both REM and total sleep time decline with age
- Neonates spend most time in REM, elderly spend the least
- For adults about 20% of sleep time is REM

4.2 Ages 65 and Older

- Total sleep time continues to decline.
- REM percentage stays 20% until age 80, and then declines further.
- Stage 4, then stage 3, sleep stages *vanish*.
- Lack of delta is why older patients often complain about not sleeping well.
- Do not prescribe pharmacology to aid sleep. (Don't medicate "normal.")
  - Acute sleep aids do not address the long-term developmental issue.
  - Work with older patients to develop and maintain regular schedules to foster better sleep hygiene.



▲ **Figure 8–4.2** Hours of Sleep for Normal Person 65 or Older

5 Sleep Deprivation

- What puts us to sleep?
  - Pressure for sleep builds because of the release of adenosine from astrocytes (non-neuronal cells in the brain).
  - Caffeine suppresses sleep by blocking the adenosine receptors.

5.1 Cerebral Cortex Shows the Greatest Effects of Sleep Deprivation

- Rest of the body seems relatively unaffected.

5.2 Most Lost Sleep Is Not Recovered

- Only about one third of sleep is made up.
- 80% of lost stage 4 is recovered.
- 50% of lost REM is recovered.
- Short sleepers lose the latter part of sleep (REM).
- Most people, if getting only *five hours of sleep at night*, function at the level of someone *legally drunk.*
  - Sleep need varies by individual: From six to nine hours a night for adults.
  - About one-third of sleep need is genetically determined (gene DEC2).
  - People with gene DQB1*0602 have a harder time coping with sleep loss.

5.3 REM Sleep and Learning

- REM sleep *increases* somewhat after learning, especially learning complex material.
- REM sleep is when conceptual, long-term memories are consolidated by the hippocampus.
- REM "clears out the brain," providing uncluttered mental space.
- REM organizes and files away information for later use.
- Rote memory seems to be linked to stage 2 sleep.

Important Concept

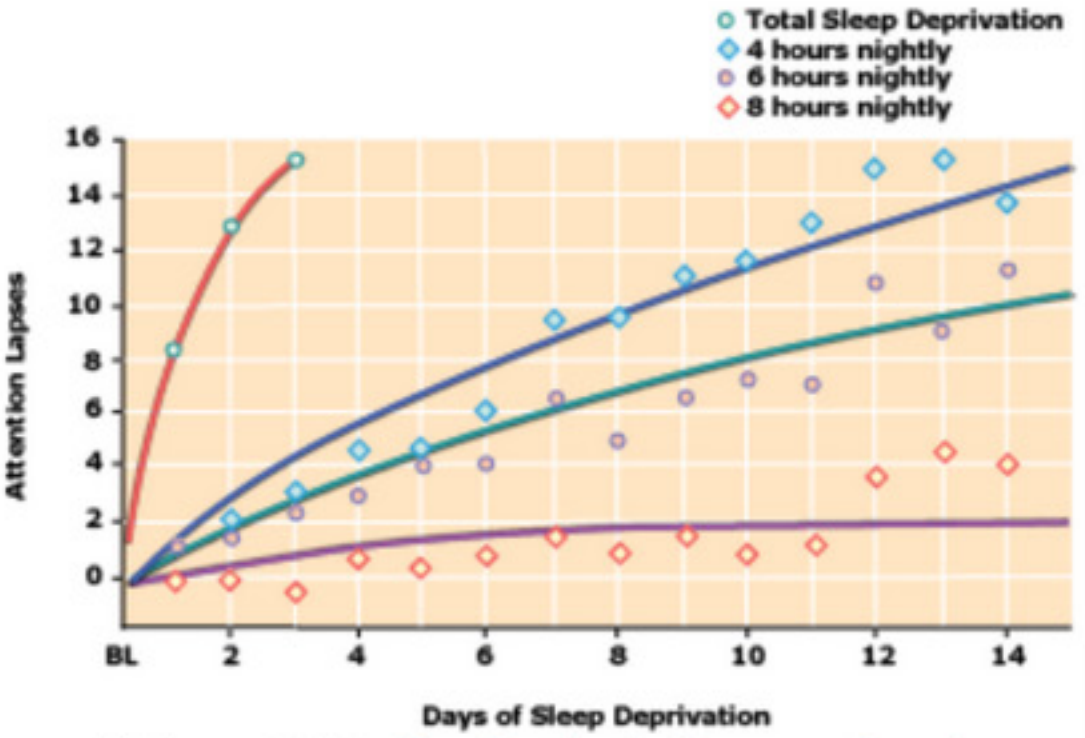
- Melatonin produces desire for sleep
- Adenosine responsible for producing actual sleep

Important Concept

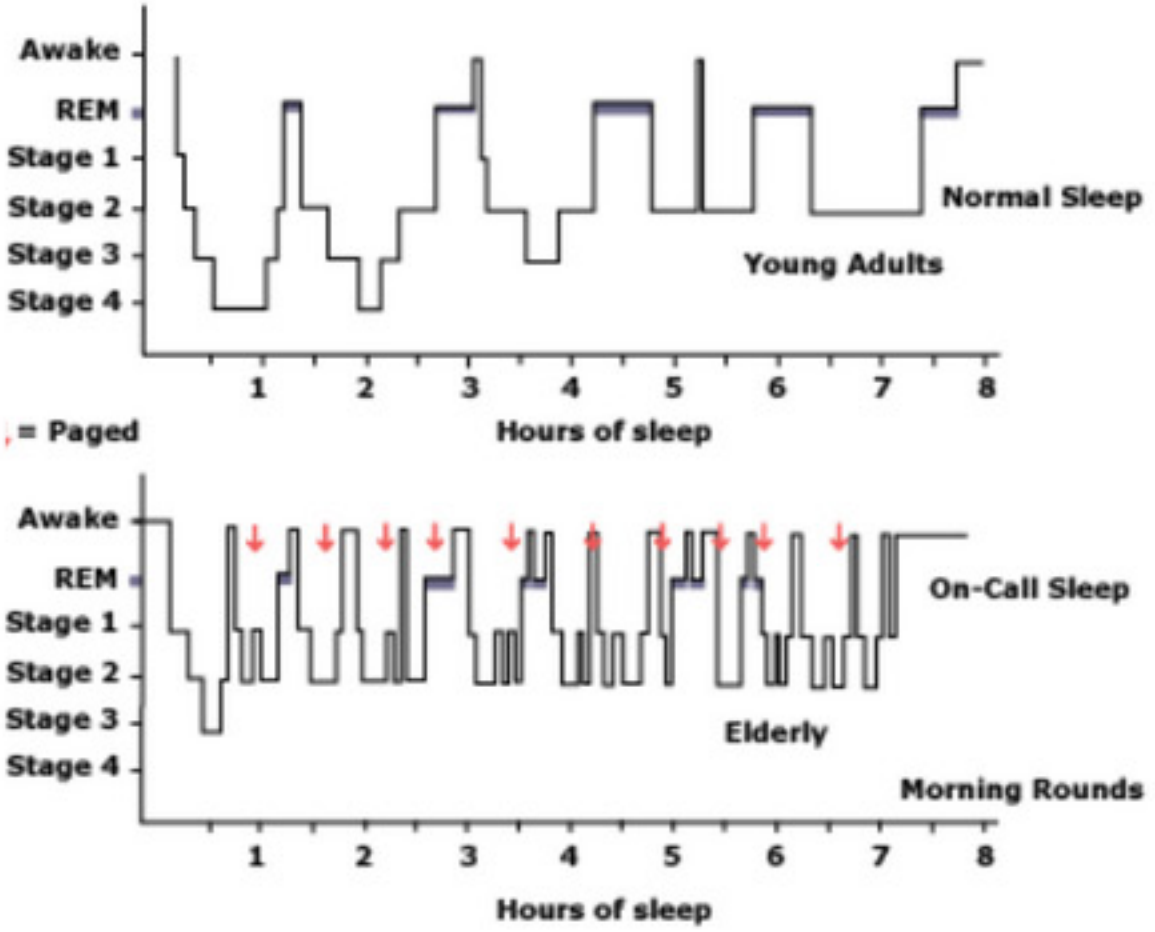
Learning increases need for sleep.

5.4 In Sleep-Deprived Individuals

- Increase in cortisol levels, blood pressure, and amygdala activation.
- Decrease in lymphocyte levels, glucose tolerance, and prefrontal cortical activity.
- Sleep deprivation is associated with increased inflammation. Mechanism for this is not clear.
- Effects of sleep deprivation are cumulative and become more pronounced across time.
- Medical residents on-call have sleep patterns that are "fragmented" and closely resemble sleep patterns in people 65 and older.



▲ **Figure 8–5.4A** Sleep Deprivation Decreases Attention



▲ **Figure 8–5.4B** Sleep Fragmentation Affects Sleep Quality

Important Concept

The effects of sleep deprivation accumulate over time.

6 Sleep Disorders

6.1 Serious Sleep Disorders

6.1.1 Narcolepsy

- Patients must have *one or more* of these symptoms:
  - Sleep attacks
  - Excessive daytime sleepiness (EDS)
  - Cataplexy (important diagnostic sign)
  - Hypnagogic hallucinations
  - Sleep paralysis
- Disruption of life and function needed for clinical diagnosis
- A disorder of REM sleep:
  - Onset of REM within 10 minutes of falling asleep
  - "REM out of control"
- Proposed mechanism: Deficiency in hypocretin protein transport (orexin)
- Treatment:
  - Regimented sleeping schedule with frequent naps
  - Modafinil
    - —Action: Inhibits DA re-uptake, activates glutamate, inhibits GABA.
    - —Orexin activation hypothesized
  - CNS and cyclic stimulants not really effective

Important Concept

Narcolepsy is a disorder of REM sleep.

Memory Aid

Hypnagogic hallucinations:
While falling asleep.

Hypnopompic hallucinations:
While waking up.

6.1.2 Insomnia

- *Key issue*: Is the insomnia a *symptom* or the *problem*?
- When patient says, "I can't sleep," first explore what is meant:
  - Unable to *get to* sleep?
  - Unable to *stay* asleep?
  - How frequently? How persistent?
- Insomnia is a symptom for many conditions:
  - About 50% of patients also have a psychiatric disorder.
  - 50% of insomnia evaluated in sleep labs is due to psychological factors.
  - Insomnia is the best predictor of onset of manic episode.
- Causes of insomnia:
  - The most common cause of insomnia is depression, followed closely by anxiety disorders.
  - Sedative-hypnotic medication abuse.
  - Withdrawal from drugs or alcohol.
  - Conditioned poor sleep.
- Patients reporting insomnia have GABA levels 30% lower than patients who do not have insomnia.

Important Concept

Insomnia is a symptom of many things.

- Treatment:
  - Behavior therapy (first choice)
  - Pharmacology
  - Action at GABA receptors
    —Zolpidem
    —Zaleplon
    —Eszopiclone: No tolerance; but disrupts normal sleep cycle
  - Common side effects:
    —Hangover
    —Impaired thinking
    —Insomnia rebound
  - Ramelteon
    —Melatonin receptor agonist (MT1 and MT2).
    —Very low chance of dependence.
    —No hangover or insomnia rebound.
    —Do *not* combine with drugs that cause sedation, such as fluvoxamine.

▼Table 8–6.1 Insomnia Treatments

Drug	Zolpidem	Zaleplon	Eszopiclone	Ramelteon
Action	Binds to GABA receptors	Binds to GABA receptors	Binds to GABA receptors	Stimulates melatonin receptors
Helps patient fall asleep?	Yes	Yes	Yes	Yes
Time to fall asleep	30-45 minutes	50 minutes	15-20 minutes	85 minutes
Helps patient stay asleep?	Yes	Yes	No	No
Rebound insomnia?	Yes	Yes	Low	No

6.1.3 Sleep Apnea

- Periodic interruptions in breathing during sleep.
- Number of apneic episodes per hour:
  - Mild: 5 to 15
  - Moderate: 16 to 30
  - Severe: >30 is diagnostic
- Major types:
  - *Obstructive* (upper airway): Blocking of air passage.
    —Tongue, tonsils, adenoids, esophageal thickening
    —Middle-aged patients
    —Overweight
    —Loud, rasping snoring
  - *Central:* Failure of part of respiratory process.
    —Often diaphragmatic
    —Elderly patients
    —Overweight
    —Cheyne-Stokes respiration

- Obesity hypoventilation syndrome (Pickwickian Syndrome)
  - —BMI > 30 kg/m2
  - —Hypoxia during sleep
  - —Increased blood CO_2 levels during day
  - —One third of people with morbid obesity (BMI >40 kg/m2) have elevated CO_2 level in blood
- Sleep apnea epidemiology for ages 40 to 80
  - —Men: 58% have some apnea, 8.2% severe
  - —Women: 36% have some apnea, 3.0% severe
- Clinical presentation and features:
  - —High risk of sudden death
  - —Nocturnal cardiac arrhythmias
  - —Bradycardia, then tachycardia
  - —Males outnumber females
  - —Kicking, punching of sleep partner
- Other clinical features:
  - —Excessive daytime sleepiness with insomnia often reported
  - —Obesity is (often) part of the clinical picture
  - —Short sleep duration, frequent nighttime waking
  - —Decreased delta and REM
  - —Sleep fragmentation
  - —Hypertension
- Upon waking: Headaches; difficulty concentrating

■ Apnea patients are two times more likely to have depression, anxiety disorders, PTSD, and bipolar disorder.

- Treatment:
  - —Weight loss
  - —Continuous positive airway pressure (CPAP)
  - —Bi-level positive airway pressure (BiPAP)
  - —Behavioral conditioning (sleep position): Position alarm; tennis balls + t-shirt

Important Concept

Sleep apnea can kill.

Don Gartberg/Photoaisle, Inc.

◀ **Figure 8–6.1**
CPAP Machine in Use

6.2 Less-Serious Sleep Issues

▼ **Table 8–6.2** Sleep Interruptions

Night Terror	Nightmare (Distress dream, anxiety dream)
Stage 4 sleep	REM sleep
• Physiological "explosion." • Panic attack while sleeping.	• Heightened physiological arousal, but not extreme. • Rather than normal extinction of fear response, fear response is rehearsed.
Tachycardia, tachypnea, profuse sweating, Flailing, and screaming.	Activation of amygdala, medial prefrontal, hippocampus and anterior cingulate gyrus.
Events *not recalled* after waking.	Dream content *recalled* after waking.
Runs in families, more common in boys, ages 4 to 12 most likely.	Common for ages 3 to 8.
Can be a precursor to temporal lobe epilepsy.	*If chronic,* can be sign of pathology. Check for unipolar disorder, anxiety disorder, PTSD, substance abuse.

- Neither really are sleep disorders, but waking-time anxiety that invades sleep time.
- Resolve waking anxiety and incidence of either will decrease.
- Having patient get more sleep (half hour a night) reduces incidence of both.

6.2.1 Somnambulism

- Sleep walking.
- Can engage in complex activities.
- First one third of the night (stage 4 sleep).
- No memory of events.
- If awoken, person is confused and disoriented because of waking up from delta sleep.
- Distinguish from "sleep talking," which occurs in REM sleep.

6.2.2 Enuresis (Bed-Wetting)

- Stages 3 and 4 sleep.
- Prevalence
  - Age 5: 10%
  - Age 8: 6%
- Boys twice as likely as girls.
- Boys cease wetting later.
- Often history with same-sex parent.
- Treatment:
  - First, check for life stressors (classic: new sibling)
  - Pharmacology
  - Desmopressin
    - —Synthetic analogue arginine vasopressin
    - —Antidiuretic
  - Imipramine (reduces delta sleep time)

6.2.3 Restless Legs Syndrome

- Uncomfortable sensations in legs.
- Feeling of something running up and down.
- Uncontrollable impulse to move legs.
- Worse with sitting and resting in bed.
- Makes sleeping difficult.
- Check for diabetes, anemia, heart condition.
- Treatment:
  - Exercise and increase sleep time
  - Ropinirole (DA agonist)
  - Gabapentin (anticonvulsant)
  - Benzodiazepines

6.2.4 Bruxism

- "Teeth grinding"
- Stage 2 sleep
- Consequences:
  - Wears away teeth
  - Headaches
  - Temperomandibular joint dysfunction
- Interventions:
  - Oral devices
  - Anxiety reduction

1 General Issues

1.1 Neurological Processes Associated With Addiction

- NAC pathway: A *dopamine pathway*
  - Medial forebrain bundle (MFB) → Nucleus accumbens (NAC) → Ventral tegmental area (VTA).
  - Activation = feelings of *positive reinforcement*, a sensation that the behavior was good and should be repeated.
  - *NAC pathway* helps to make behavior more adaptive, goal-directed, and synchronized with the environment.
  - *"Sanity is when brain matches environment."*
  - Taking neurologically active chemicals gives a positive reinforcement without the linkage of behavior to the broader environment.
    - —Breaks linkage between behavior and feedback from the environment.
    - —Dopamine shots on NAC pathway for ingesting chemistry deliver 3 times to 30 times more dopamine than the dopamine provided by behavior. Power and persistence far exceed that of natural activity.
    - —Consequence: Over time, the addict is increasingly less responsive to the environment.
    - —Thought and behavior become focused on the drug, not the ambient environment.
  - People with naturally low levels of dopamine are more vulnerable to addictions.
  - This addiction pathway (NAC) is not exclusive to any substance, but is activated by *all* substances that produce addiction/dependence. Action on this pathway is what addiction is all about.

USMLE® Key Concepts

For Step 1, you must be able to:

- Recognize the role of the addiction pathway (NAC) in dependence and addiction.
- Identify specific drug intoxication and withdrawal symptoms.
- Identify appropriate intervention and/or treatment for substance abuse.

Important Concept

MFB → NAC → VTA

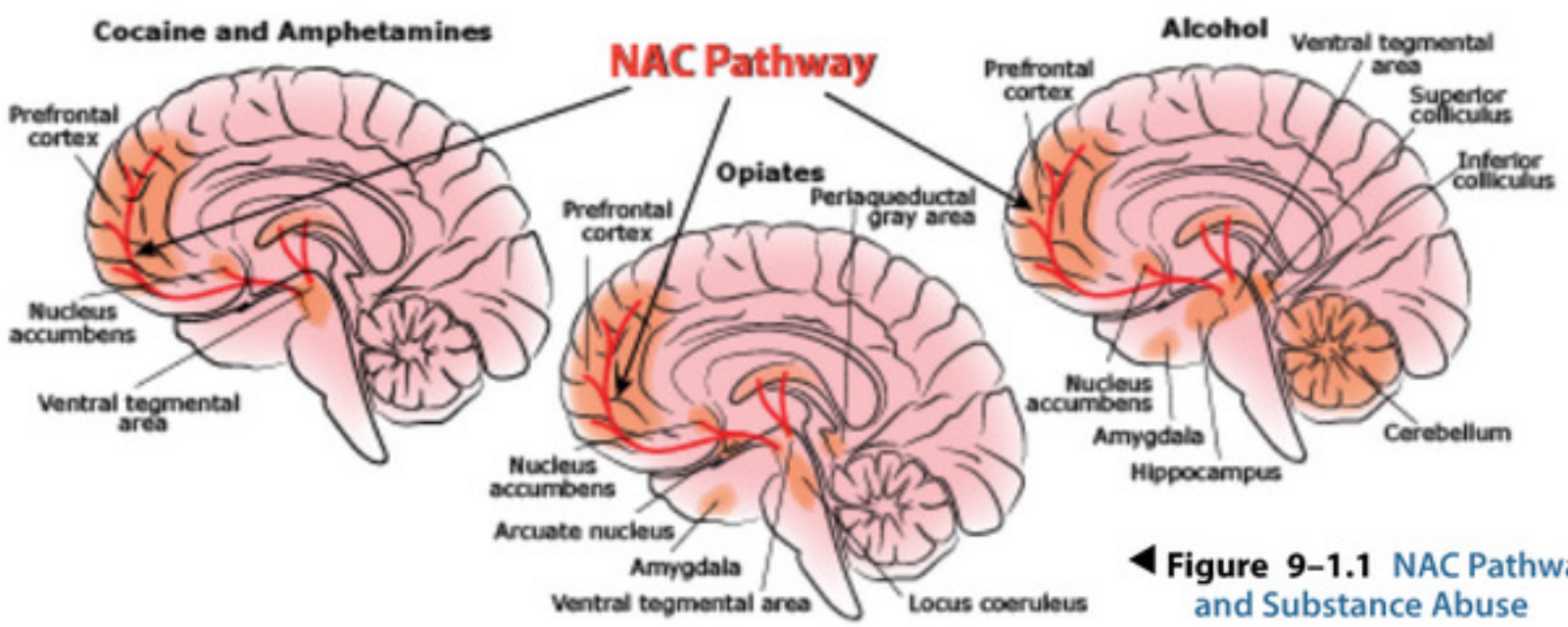


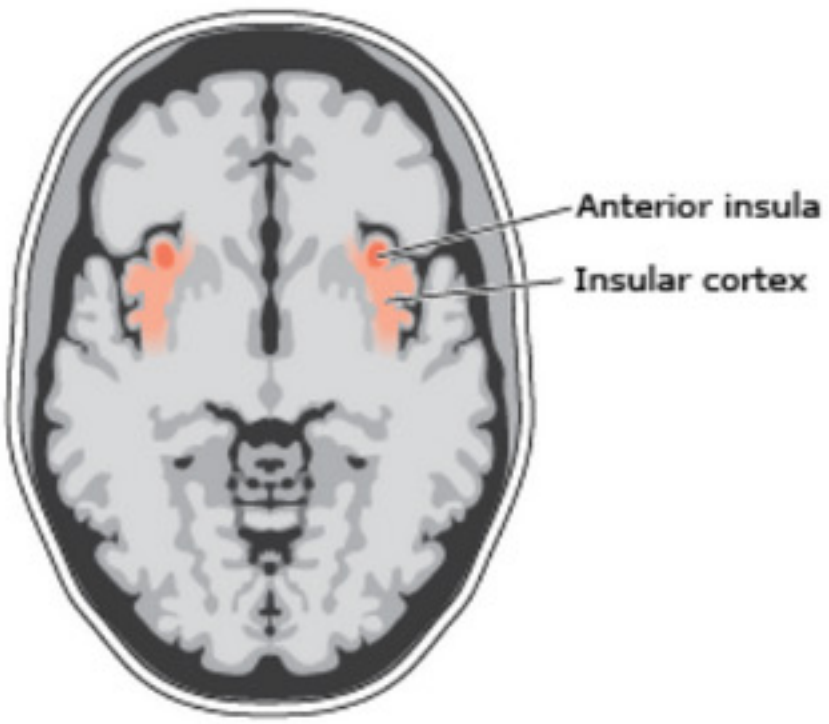
Figure 9–1.1 NAC Pathway and Substance Abuse

1.2 Serotonin (5-HT) Also Plays a Role in the Addiction Process

- Regulation of "impulse control."
- Low levels of serotonin correlate with more impulsive, violent behavior.
- Subjectively felt as "willpower" or satiation.
- Dopamine and serotonin work inversely in the frontal lobe.
- Rough, but useful metaphor: Dopamine is the gas petal, serotonin is the brake.
- Increasing serotonin levels to combat addiction is generally ineffective because dopamine impulse overwhelms the serotonin control.

1.3 Role of the Insular Cortex

- Anterior Insula
  - Direct projection *from* the thalamus and the amygdala.
  - Projects directly *to* the amygdala. Amygdala is important for emotional anticipation and conditioned response.
- "The brain does not simply respond, it anticipates!"
- Activated when drug abusers are exposed to reminders of the drug.
- Functions:
  - Conscious desire
  - Craving
  - Feeling that the body needs the drug
- Damage to this area (by a stroke):
  - Addiction to cigarettes is eliminated.
  - As if the body has forgotten the urge to use.



▲ **Figure 9–1.3** Stroke Damage

2 Alcohol

2.1 The Most Abused Drug

- One in six (16%) U.S. adults is a problem drinker.
- Men > Women (4:3)
- Problem drinker: Addiction and abuse
  - **Addiction:** Physical withdrawal reactions, or inability to stop, along with the disruption of health, social, vocation, and/or relationships.
  - **Abuse:** Inability to control consumption, noticeable impairment in functioning.
- Most common illegal drug for teenagers
- Most costly health problem
- Increased risk for alcohol problems:
  - Family history (Heritability index: 43%)
    - —Inherited trait: Capacity to tolerate alcohol.
      - If more tolerance, greater risk
      - Mechanisms: Enzyme induction, more tyrosine kinase
  - Depression, anxiety disorders, bipolar, schizophrenia
  - Excessive consumption:
    - —Men: >15 drinks a week
    - —Women: >12 drinks a week
    - —Either: >5 drinks at one time each week (binge drinking)
    - —Glass of beer (12 oz.) = Glass wine (4 oz.) = Shot of 80-proof liquor (1.5 oz.)
    - —Rule of thumb: One drink is metabolized an hour.
- BAC of .08% = Legally drunk (most states)
- Over past several decades, consumption has declined, but binging has increased.
- Alcohol implicated for 50% of:
  - Auto accidents without pedestrian
  - Auto accident mortality
  - Homicides
  - Hospital admissions
- Recall that fetal alcohol syndrome (FAS) is the leading known cause of mental retardation.
  - Substantial risk requires fairly continuous alcohol consumption.
  - However, best advice to pregnant women is, "Do not drink."

Important Concept

You should be able to recognize:

- What drug is the person intoxicated with?
- What drug is the person withdrawing from?
- What physiological mechanism accounts for this behavior?
- What intervention (treatment) is most appropriate?

Important Concept

Risk for alcohol problems: "Genetic vulnerability actuated by ennvironment and experiences."

2.2 Assessment

- Four **CAGE** questions ("yes" to one question = positive test):
  - Have you ever tried to ***C**ut* down on alcohol intake and not succeeded?
  - Have you ever been ***A**nnoyed* about criticism concerning your drinking?
  - Have you ever felt ***G**uilty* about your drinking behavior?
  - Have you ever had to take a drink as an ***E**ye-opener* in the morning to relieve the anxiety and shakiness?
- Single question: How often in the past year have you had _____ or more drinks at any one time?
  - Insert "5" for males and "4" for females.
  - Any answer greater than once = positive on this screen.
- If positive on initial screen, then ask:
  - Have you ever missed work because of drinking?
  - Do you ever drive when you have been drinking?
  - Have you ever had a blackout after drinking?
- Physical Findings
  - Higher levels: Triglycerides, uric acid, amylase, AST, and ALT
  - Lower levels: Magnesium, calcium, phosphorus white blood cell count, platelet count, hematocrit, and cholesterol

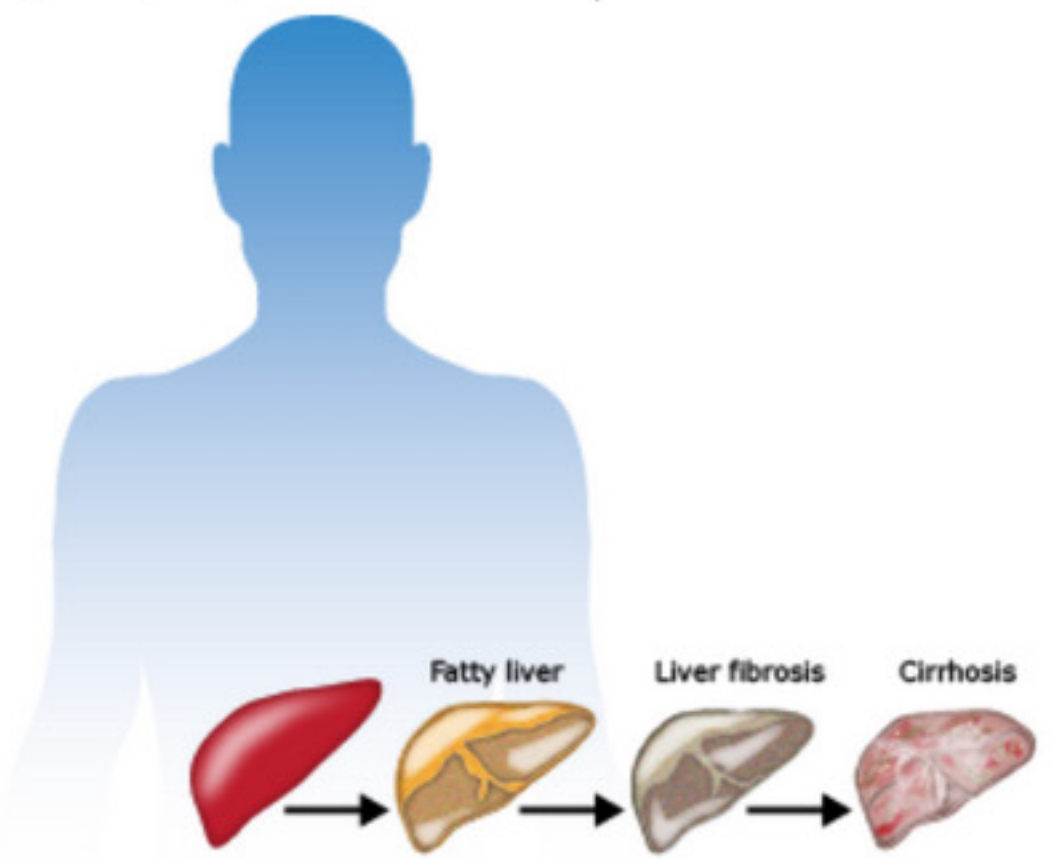
2.3 Medical Complications From Chronic Use

2.3.1 Wernicke (Alcoholic) Encephalopathy

- Acute neurological condition: Caused by thiamine deficiency.
- Symptom triad: *Altered mental status, ataxia, opthalmoplegia.*
- Most symptoms reverse with thiamine administration.
- If the syndrome doesn't clear, it progresses to Korsakoff.

2.3.2 Korsakoff Psychosis

- Chronic neurological condition
- Wernicke triad plus *anterograde and retrograde amnesia, confabulation, disorientation, and polyneuritis*
- Irreversible infarction of the mammillary bodies
- Thiamine administration is of limited use at this stage.



▲ **Figure 9–2.3** Stages of Alcohol-Induced Liver Damage

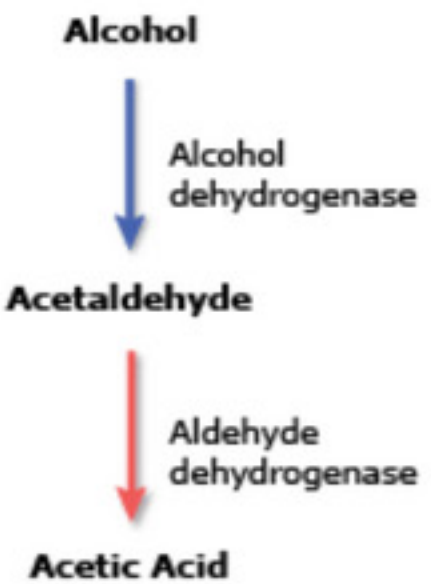
2.4 Withdrawal Reactions

- **Stage 1**
  - 6 to 8 hours after last drink
  - Mild tremor ("shakes"), anxiety, N/V, increased BP and P, sweating, flushed face
- **Stage 2**
  - 1 to 2 days after last drink
  - Moderate tremor, insomnia, hyperactivity, hallucinations (usually auditory)
- **Stage 3**
  - 1 to 2 days after last drink
  - Grand mal seizures (rum fits)
- **Stage 4**
  - 3 to 5 (and up to 12) days after last drink
  - Delirium tremens (DTs)
    - —Rare, with current interventions
    - —Delirium
    - —Vivid hallucinations—usually visual and tactile
    - —Paranoid delusions
    - —Severe tremor and psychomotor agitation
    - —Autonomic hyperactivity—sweating, fever, tachycardia, hyperthermia, hyperventilation, diarrhea
    - —15% mortality secondary to vascular collapse

2.5 Treatment Options and Issues

2.5.1 To Gain and Support Abstinence

- Alcoholics Anonymous (AA)
  - First and best choice
  - Original 12-step program
  - Meetings, sponsors
  - Supportive organization
  - Voluntary
  - Philosophy: Once an alcoholic, always an alcoholic. No cure, only behavior change.
- Al Anon
  - For friends and family of an alcoholic.
  - Codependence: Benefiting from others' addiction.
  - Enabling: Shielding others from consequences.
- Pharmacology Options:
  - **Disulfiram (Antabuse)**
    - —Helps prevent relapse.
    - —Aldehyde dehydrogenase inhibitor, leads to accumulation of acetaldehyde.
    - —Extremely unpleasant reaction if alcohol is used concomitantly.
    - —Not really effective on its own.
    - —Use only in conjunction with AA or psychotherapy.



▲ **Figure 9–2.5**
Alcohol Dehydrogenase

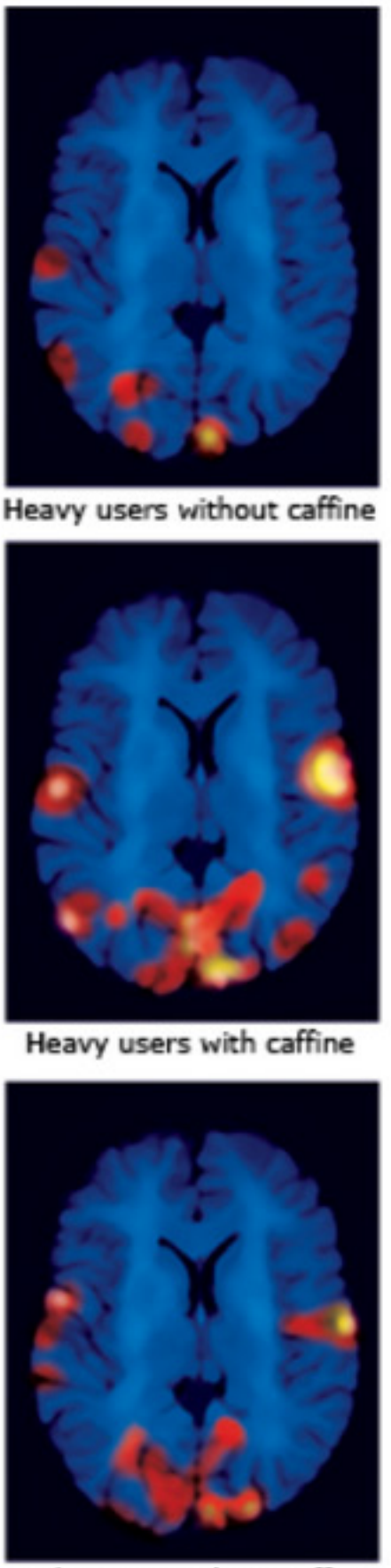
- **Acamprosate (Campral)**
  - —Increases rate of abstinence.
  - —Acts on GABA and NMDA systems.
    - Chronic alcohol users have increased numbers of these receptors.
    - Lowers activity of these receptors.
  - —Effects persist after treatment ends.
- **Topiramate**
  - —Anticonvulsant
  - —Helps prevent relapse (6x abstinence 1 month).
  - —Stimulates GABA → blocks glutamate action.
  - —Slows release of dopamine on NAC pathway.
- **Naltrexone (Revia)**
  - —Decreases cravings
  - —Reduces relapses to 50% (vs. 95%).
  - —Blocks the release of endogenous opioids.
- **Flumazenil**
  - —Benzo receptor antagonist
  - —For reducing relapse

2.5.2 To Manage Withdrawal Reactions

- Benzodiazepines:
  - **Chlordiazepoxide (Librium)**
    - —Long-acting; self-tapers
    - —Drug of choice
  - **Lorazepam (Ativan)**
    - —Short-acting alternative
    - —For patients with severe liver disease, cognitive impairment, >65, unstable medically.
    - —Needs to be tapered over four to five days.
- Nutritional supplementation
- Supportive measures
- Antipsychotics:
  - For behavioral control.
  - Must be *used with caution* as they can precipitate seizures.
  - High potency antipsychotics (haloperidol) preferred.

3 Caffeine

- Main delivery mechanism: *Coffee*
  - But also:
    - —Some teas
    - —Many soft drinks
    - —Chocolate
    - —"Energy drinks"
  - Average adult takes in 280 mg a day
  - 8 oz. cup of coffee = 100 mg
- Intoxication symptoms:
  - Excitement
  - Restlessness and agitation
  - Wakefulness
  - GI disturbances
  - Diuresis
- Withdrawal symptoms:
  - *Headache*
  - *Fatigue and drowsiness*
  - Nausea
  - Repeated vomiting
  - Lasts one to four days
  - Varies by individual
- Action:
  - Antagonism of adenosine receptors
  - Elevated cAMP in neurons with these receptors
- Can trigger anxiety reactions, migraine headaches.

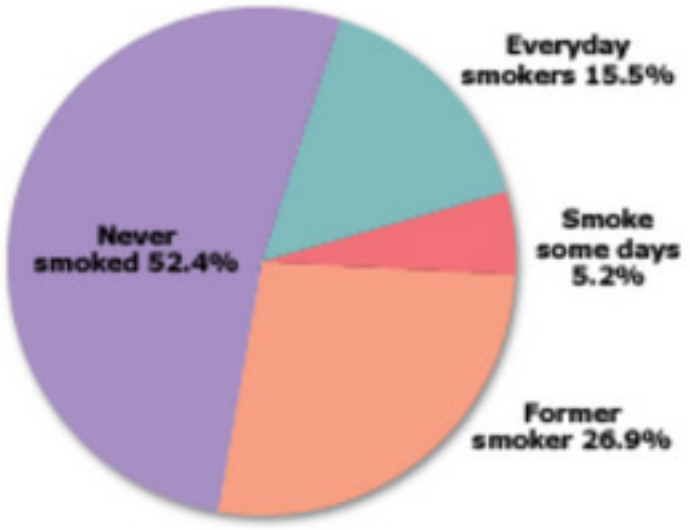


▲ **Figure 9–3.0** Brain Activity Comparisons

4 Nicotine

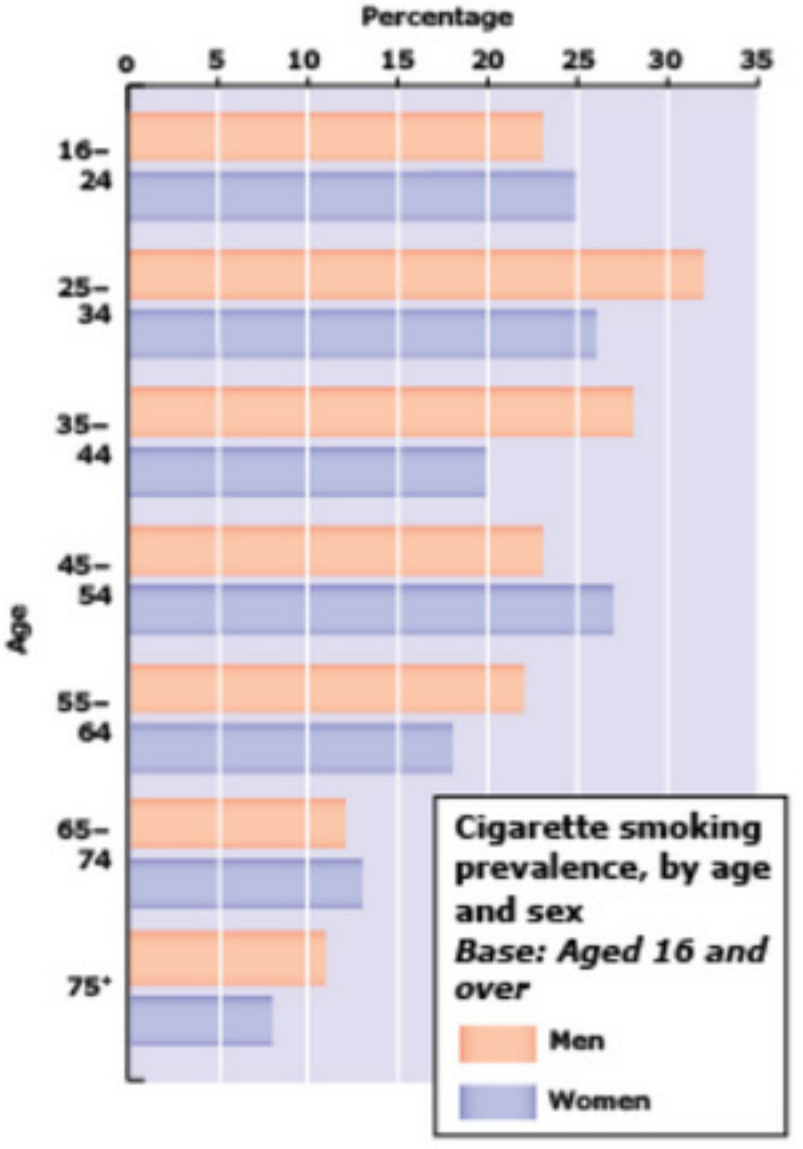
4.1 Main Delivery Mechanism: Cigarettes

- Also smokeless tobacco, chewing tobacco
- E-cigarettes
- Smokers are more likely to have:
  - Depression (twice as likely as nonsmokers)
  - Traffic accidents
  - Days lost from work
  - Erectile dysfunction
- Mechanism of action:
  - Agonist at ACH receptors
  - Activates NAC pathway
  - Accentuates the flow of glutamate
- Most smokers start smoking before age 18.
- Prevalence:
  - About 20%
  - Half of people who were smokers have quit.
  - Smoking rates are higher for lower-income, less-educated people.



▲ **Figure 9–4.1A** Smoking Rates

▲ **Figure 9–4.1B** Smokers by Annual Income



▲ **Figure 9–4.1C** Smoking Rates Decline by Age

- Smoking is the No. 1 preventable cause of death in the U.S.

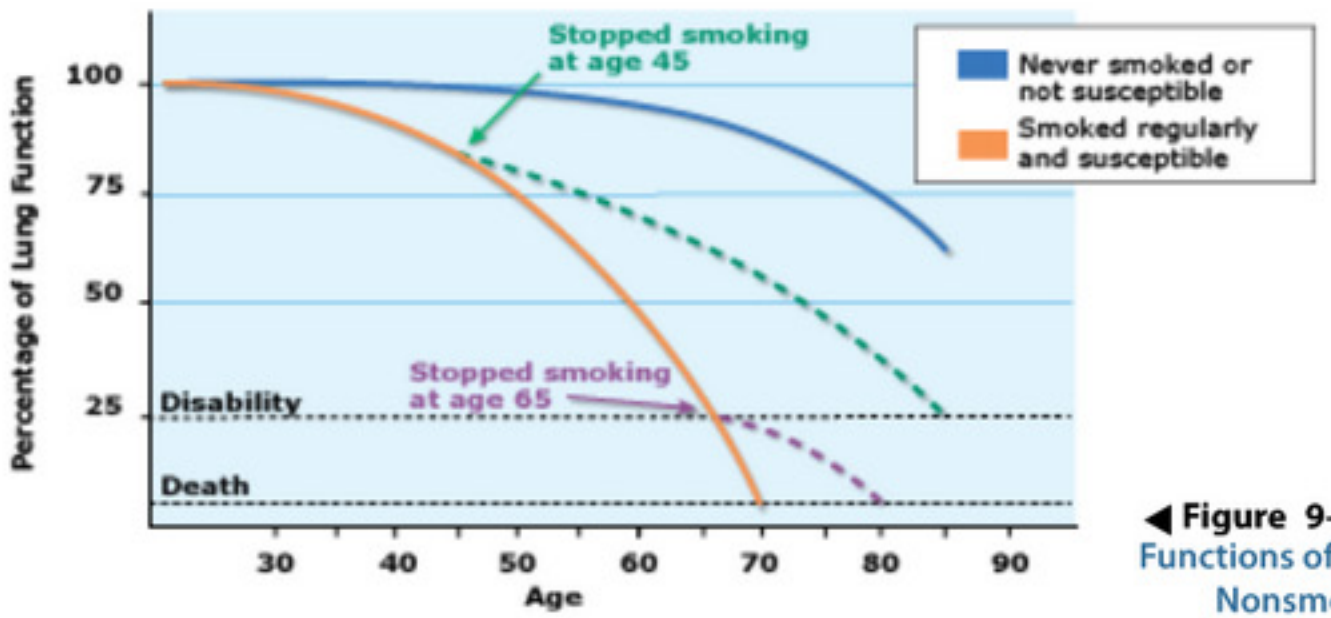
▲ **Figure 9–4.1D** Deaths Caused by Smoking

4.2 Key USMLE Issue: Get Patients to Quit Smoking

- Withdrawal symptoms:
  - Depressed mood
  - Reduced heart rate
  - Irritability
  - Trouble sleeping
  - Anxiety
  - Increased appetite
    - —80% who quit gain weight
    - —68% who do not quit gain weight
- 74% of smokers say they want to quit.
- Quitting smoking is not "an event, but a process."
  - Success rate for single attempt: 8%.
  - Multiple attempts usually required.
  - Physician assistance doubles rate for quitting.
  - Quitting is the single best thing to do to improve health.

Important Concept

On the USMLE, always try to get the patient to *quit smoking regardless of age.*



◀ **Figure 9–4.2** Lung Functions of Smokers/ Nonsmokers

4.3. Helping Patients to Quit Smoking

- If you can't get them to quit, then work on getting them to cut down.
- Motivation matters:
  - Person has to really want to quit (stage of behavioral change).
  - Support of family and peers is very helpful.
  - Finding the right motivation for the patient is key (very idiosyncratic).
  - Motivation changes with age:
    - —Teenagers
      - Appearance (yellow teeth, wrinkles).
      - Appeal to opposite sex (smell, what it says about you).
      - Athletic performance.
      - Talk about health consequence usually not effective.
    - —Adults
      - Effects on children (second-hand smoke, example set).
      - Increasing cost. Other uses for the money.
    - —Ages 65 and older
      - Adding more years to life to travel, see grandchildren.
      - Prolonging function: Maintain stamina; enhance mobility (rates of hip fracture for smokers are much higher).
- Exercise
  - Activity to replace smoking.
  - Helps with weight control.
- Pharmacology
  - Nicotine patches and gum
    - —Alternative delivery mechanism.
    - —Reduces harm. Patient is still addicted, but damage is reduced.
  - **Bupropion (Zyban):**
    - —Antidepressant, but useful even if no depression.
    - —Reduces craving and withdrawal symptoms.
  - **Varenicline:**
    - —Doubles rate of quitting.
    - —Nicotinic receptor partial agonist receptor.
    - —Reduces craving for and pleasure from smoking.
    - —Side effect: Impulsive behaviors, suicide risk.
  - **Bromocriptine:**
    - —Dopamine agonist on the NAC pathway.
    - —Reduces craving and impulse to smoke.
- Hypnosis
  - Available option.
  - As effective as behavioral counseling and nicotine patch.

Important Concept

When helping patients quit smoking, think "Stages of Behavioral Change." (Chapter 6)

5 Cannabis

- Marijuana, hashish, THC
- Street names: Pot, weed, reefer, Mary Jane, ganja
- Usually smoked, or baked into food (brownies)
- Mechanisms of action:
  - Inhibitory G protein
  - GABA
  - Increases 5-HT
  - Effect on NAC is only one sixth of the level of opiates
- Intoxication symptoms:
  - Red, glassy eyes
  - *Dilation of pupils*
  - Inappropriate laughter
  - Impaired motor coordination
  - Slower reaction time
  - Impaired judgment
  - Possible reactive anxiety
  - Short-term memory loss
  - Dry mouth
  - Increased appetite
- Users may display:
  - Sleepiness
  - Loss of interest
  - Lack of motivation (amotivational syndrome)
  - Respiratory effects (one joint = five cigarettes)
  - Weight gain or loss
  - Associated with more mental illness
- No real withdrawal symptoms:
  - Not considered addicting in the traditional sense.
  - Dependency can develop (look for self-medication of underlying condition).

6 Cocaine/Amphetamines

- Mechanism—increases dopamine (NAC pathway)
  - Cocaine: Blocks reuptake of dopamine.
  - Amphetamines: Stimulate the release of dopamine.
  - Street names: Methamphetamines, crystal meth, crack, crank.
- Smoked, snorted, injected
- May be used to enhance sexual experience
- Intoxication symptoms:
  - Euphoric mood
  - Excessive talking
  - Grandiosity
  - Paranoia
  - Hypervigilance
  - Anxiety
  - Tachycardia
  - *Dilation of pupils*
  - Hallucinations and delusions
- Users may display:
  - Periods without eating or sleeping
  - Weight loss
  - Dry mouth
  - Itchy/bleeding nose
  - Irritability
- Withdrawal symptoms:
  - "Crash"
  - Exhaustion
  - Excessive sleep and fatigue
  - Depression
  - Ravenous appetite
  - Unpleasant dreams (nightmares)
  - No vomiting or shaking
- Treatments:
  - Cocaine Anonymous (CA): 12-step program
  - Benzodiazepines
  - Antidepressants
  - Antipsychotics (for severe reactions)
  - To reduce craving
    - —Bromocriptine
    - —Amatadine

7 Opiates

- Heroin, morphine, codeine, oxycodone, Percocet, meperidine, oxymorphone
- Street names: Horse, smack, H, junk, china white, scag
- Mechanism: Bind to Greek-letter opioid receptors:
  - μ-opioid receptor: analgesia, *dependence*, respiratory depression, constipation
  - δ-opioid receptor: analgesia
  - κ-opiod receptor: analgesia, diuresis, sedation
  - Locus coeruleus pathway (NE)
  - NAC pathway (DA)
- Intoxication symptoms:
  - *Pupillary constriction*, nonreactive to light
  - Constipation
  - Drowsiness and droopy eyelids
  - Slurred speech
  - Respiratory depression
  - Bradycardia
  - Coma leading to death
- Users may display:
  - Needle marks
  - Sweating
  - Coughing, sniffling
  - Twitches
- Withdrawal symptoms:
  - Last 7 to 10 days
  - "Flu-like"
    - —Muscle aches
    - —Nausea and vomiting
    - —Yawning
    - —Piloerection
    - —Runny nose
    - —Fever
    - —Muscle spasms ("kicking the habit")
    - —Trouble sleeping
  - *Dilated Pupils*
- Treatment:
  - Narcotics Anonymous (NA): 12-step program
  - **Naloxone**
    - —90-minute half-life
    - —To deal with respiratory depression
  - **Naltrexone**
    - —24-hour half-life
    - —To facilitate the onset of withdrawal reactions

Important Concept

Most likely source of drug for opiate abuser is physician.

- **Clonidine** (palliative)
  - —Alpha-2-adrenergic agonist inhibits noradrenergic hyperactivity.
  - —Palliative: Helps with CV and GI symptoms, but not with cravings, muscle aches, insomnia.
- **Methadone** (daily dosing) and LAMM (L-alpha-acetylmethadol, 3 times a week dosing)
  - —Substitute addiction
  - —More addicting than heroin (withdrawal: 7 to 10 weeks)
  - —Used for "harm reduction"
  - —Reduces crime
  - —Reduces spread of hepatitis, HIV by IV drug use
- **Buprenorphine**
  - —Partial μ-agonist
  - —Sufficient agonism to all, stopping use of heroin or methadone
  - —Satisfies craving and prevents withdrawal
  - —Blocks reinforcing effects
  - —No euphoria
  - —Taken sublingually
  - — Half-life: One to three days
  - — Used in combination with naloxone

8 Hallucinogens

8.1 LSD ("Acid"), Mescaline, Peyote, Mushrooms ('Shrooms)

- Mechanism:
  - *Partial* agonist at postsynaptic 5-HT receptors
  - Hallucinogenic quality from action on 5-HT2 receptors
- Intoxication symptoms:
  - Hallucinations
  - Illusions
  - Fascination with objects or scenes
  - Ideas of reference
  - Depersonalization
  - Reactive anxiety
  - Dilation of pupils
  - Tremors
  - Lack of coordination (perceptual)
  - Convulsions (not common)
- Users may experience:
  - Flashbacks
  - Synesthesia
  - Altered sense of reality
- No real withdrawal symptoms: No addiction or dependency
- Treatment:
  - Supportive counseling, "talking down"
  - Benzodiazepines
  - Antipsychotics

8.2. Anesthetic Hallucinogens: Phencyclidine (PCP, Angel Dust, Dust) and Ketamine ("Special K")

- Originally used as an animal anesthetic.
- NMDA receptor antagonists.
- Direct effects on the dopamine D2 and serotonin 5-HT2 receptors.
- Often mixed with cannabis or opiates; patient may not know he or she has taken it.
  - Intoxication:
    - —*Violent,* hostile, assaultive
    - —Agitation and unpredictability
    - —Hyperacusis
    - —Impaired judgment
    - —Psychosis
    - —Diminished responsiveness to pain
    - —*Vertical nystagmus*
    - —Ataxia and muscle rigidity
    - —Hypersalivation
  - Treatment:
    - —*Non-stimulating* environment
    - —Restraints often required
    - —Vitamin C (acidifies urine to speed clearance)
    - —Antipsychotics

Important Concept

Hallucinogens have no withdrawal reactions.

9 Sedatives/Hypnotics

- Barbiturates and benzodiazepines
- Prescribed to >15% of population in any given year
- Mechanism:
  - Enhance the effects at GABA-A receptors
  - Watch for cross-tolerance
- Intoxication symptoms: Similar to alcohol
  - *Contracted pupils*
  - Impaired judgment
  - Slurred speech
  - Clumsy, lack of coordination
  - Unsteady gait
  - Sleepy
  - Stupor
  - Coma
  - Death
    - —Greater for barbiturates
    - —Lesser for benzodiazepines
- Issues for long-term users:
  - Decreased cognitive performance
  - Overdose and withdrawal danger
  - Elderly prone to hip fractures
- Withdrawal symptoms (after three to four days without drug):
  - Pupillary dilation
  - Autonomic and behavioral hyperactivity
  - Trouble sleeping
  - Confusion, disorientation
  - Hallucinations
  - Anxiety
  - Fever
  - Grand mal seizures (benzodiazepines)
- Treatment Issues:
  - Barbiturates
    - —Pentobarbital challenge test
    - —A test of tolerance
  - Benzodiazepines
    - —Withdrawal: Slowly taper dose
    - —Overdose: Give flumazenil (benzo receptor antagonist)

Important Concept

Cross-tolerance: Use of one drug increases tolerance for a different drug.

10 Inhalants

- Glue, paint thinner, shoe polish, turpentine, cleaners, marker pens
- Street term: "Huffing"
- Users are more likely to be:
  - Poor
  - Male
  - Young
  - Not using other drugs
- Intoxication symptoms:
  - Impaired judgment
  - Nystagmus
  - Lack of coordination (cerebellar interference)
  - Lethargy
  - Unsteady gait
  - Headaches and nausea
    - —Users may have:
      - Brain and liver damage
      - Delirium can develop over time
      - Crusting around mouth and nose
      - Rashes on face
- Withdrawal symptoms:
  - Irritability
  - Trouble sleeping
  - Jitters
  - Sweats
  - Nausea and vomiting
  - Tachycardia

Important Concept

Inhalant users tend to be poor, young, male, and not using other drugs.

11 MDMA (Ecstasy)

- Designer amphetamine/hallucinogen
- Street names: "E," "X," "XTC"
- Mechanism: Acts as releasing agent for dopamine, norepinephrine, and serotonin
- Intoxication:
  - Increased sensory sensitivity
  - Sense of personal closeness with others
  - Peacefulness, energy, self-confidence
  - Sensory distortion
- Disrupts thermoregulation
  - Leads to hyperthermia and dehydration
  - Especially at "raves"
- Long-term use may cause:
  - Serotoninergic nerve damage
  - Impulsive behavior

11.1 GHB (Gamma-Hydroxybutyric Acid)

- "Liquid ecstasy"
- Previously sold OTC as a steroid alternative for its alleged function of stimulating muscle growth.
- One of the "date rape" drugs
- Intoxication symptoms:
  - Slight euphoria
  - Amnesia
  - Seizures
  - Coma and death

12 Anabolic Steroids

- Increased use in:
  - Athletes
  - Young males and females to enhance physique and performance
- Long-term use can cause:
  - Cardiomyopathy (left ventricle)
  - Early osteoporosis due to bone mineral loss
  - Hypertension
  - Diabetes
  - Shrinking of testes (males)
  - Mood labiality ('roid rage)
  - Depression
  - Atypical psychosis
- Presenting signs:
  - Skin atrophy
  - Unusual, spontaneous bruises
  - Acne on face, back, and arms
  - Low serum potassium levels
  - High hematocrit

13 Bath Salts

- MDPV: Methylenedioxypyrovalerone
- "Artificial cocaine"
- Street Names: Aura, Blue Silk, Bonsai Grow, Ivory Wave
- Stimulant: Norepinephrine-dopamine reuptake inhibitor (NDRI)
- Snorted or injected
- Can cause hallucinations, paranoia, rapid heart rate, suicidal thoughts.
- Treat overdose with lorazepam or antipsychotics.
- Declared illegal by the U.S. Congress in 2012.

14 Look to the Pupils

▼ **Table 9–14.0** What Pupils Can Show

Pupils	Intoxication	Withdrawal
Dilation	Alcohol Cocaine Amphetamines LSD Cannabis Antidepressants	Alcohol Opiates Sedatives/hypnotics
Contraction	Opiates Sedatives/hypnotics	Cocaine/ Amphetamines

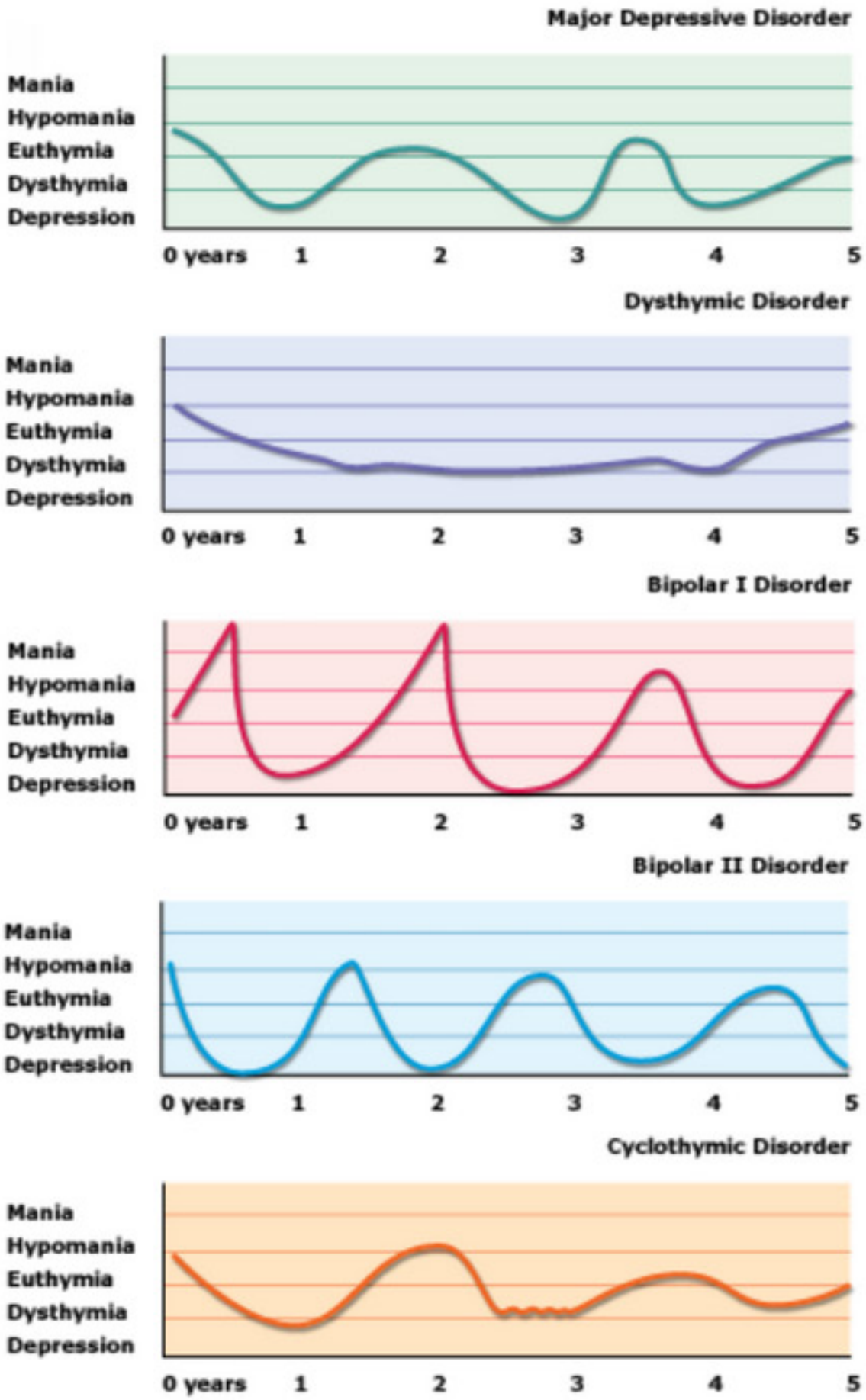
15 Issues for Substance Abuse Among Physicians

- Physician impairment issues are dealt with by state licensing boards.
- If presented on the exam with a colleague you *suspect* has a substance-abuse problem, you must take action.
  - Do these three things *in this order*:
    1. Get the colleague to suspend patient contact.
    2. You must report it to hospital administration or the state licensing board.
    3. Ideally, get the colleague into treatment.
  - More details in chapter 7 "Ethics and Legal Issues."

CHAPTER 10

Psychiatric Diagnoses and Related Treatments

1 Mood Disorders



▲ **Figure 10–1.0** Mood Disorders

USMLE® Key Concepts

For Step 1, you must be able to:

- Identify psychiatric disorders by patient's symptoms and behaviors.
- Distinguish between depression, grief, and psychiatric disorders.
- Recognize and identify appropriate treatment for psychiatric diagnoses.

1.1 Unipolar Disorder

- Depression is more than feeling sad
  - A sense of nothingness.
  - A disorder when mood does not change, "When it does not go away."
- Lifetime prevalence
  - 10% to 25% for women
  - 5% to 12% for men
  - Two times more common in women
  - 10% to 15% of these may really have bipolar and are misdiagnosed
- Mean age of onset is 20 to 30 years old
- Risk factors
  - No close relationships (divorced)
  - Heritability index: 42%
  - Parents depressed or alcoholic
  - Parental loss prior to age 11
- Consequences of depression
  - Increased overall mortality
    - — Independent risk factor for coronary heart disease
    - — Possible link to impaired immune function
    - — Suicide risk
  - A leading cause of disability
  - Dysfunction in social and occupational roles
  - Depressed individuals consume a disproportionate amount of medical resources.
- Criterion: Requires only a single major episode lasting *at least two weeks.*
  - Symptoms
    - — Must have:
      - *Depressed mood* or anhedonia
        Not sad, but empty
        "Everything is gray, tasteless"
      - *Impairment* in functioning
    - — Must change from previous functioning
    - — Must also experience *at least five other symptoms*:
      - Decreased interest, turning inward
      - Almost constant feelings of guilt or worthlessness
      - Decreased energy
      - Difficulty concentrating
      - Change in appetite (up or down)
      - Psychomotor (agitation or retardation)
      - Somatic complaints
      - Change in sleep (too much or too little)
        - – REM sleep increases in first half of sleep, has shorter latency and increased time overall.
      - Decrease (maybe disappearance) of delta sleep

Important Concept

Depression ≠ sadness

Important Concept

Unipolar must be for at least two weeks.

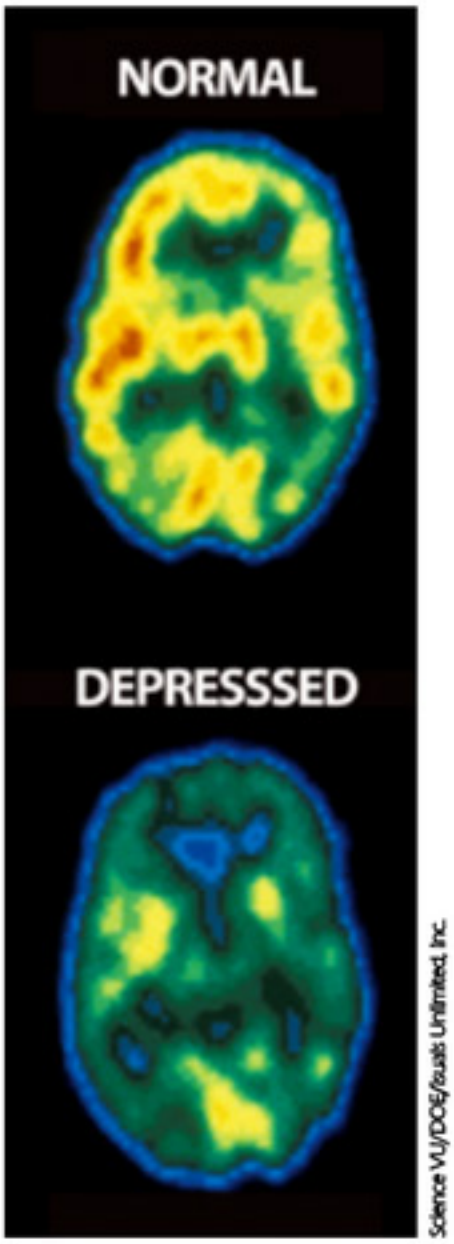
  - *Early morning waking*
  - Suicidal ideations
    - Only found in 60%
    - 15% commit suicide
  - Other issues
    - Complete loss of sex drive
    - Can have delusions and hallucinations if mood congruent
- Biological findings for unipolar
  - High glucose metabolism in amygdala
  - Smaller hippocampus, greater atrophy if depressed longer
  - Abnormally high levels of glucocorticoids
  - Decreases in DA, NE, 5-HT, and their metabolites
- Key differential diagnosis
  - Normal grief (recent loss)
  - Dysthymia
  - Bipolar (manic episode in history)
  - Substance abuse (history and pupils)
  - Hypothyroidism (check TSH, T3, and T4 levels)
  - Parkinson disease (look of symptoms)

1.2 Dysthymic Disorder

- Mild, chronic form of depression
- Experience symptoms for *at least two years*
- Symptoms are similar to unipolar but:
  - Not severe enough for hospitalization
  - Patient is functional, but at a sub-optimal level
  - Think "limping through life versus crawling through life"
- Treatment:
  - Psychotherapy
  - Recent data suggest antidepressants may not be helpful for milder depression.

1.3 Seasonal Affective Disorder (SAD)

- Symptoms appear during the winter months, the time of least natural light.
- "Atypical" symptoms:
  - Increased sleep
  - Increased appetite
  - Decreased energy
  - Disengagement from the world
- Caused by abnormal melatonin metabolism
- Treat with:
  - Bright light therapy (a light box)
  - Vacation in a sunny climate during crucial winter months
  - Not melatonin tablets



▲ **Figure 10–1.1**
Depressed/Not Depressed

Important Concept

Dysthymia for at least two years.

1.4 Special Topics Related to Depression

1.4.1 Grief and Bereavement

- Triggered by loss
  - Of a loved one by death, divorce, etc.
  - Includes loss of a pet
- Not pathology, in that this is a normal reaction to a loss.
- Symptoms can mirror depression (crying, loss of appetite, withdraw from usual activities, inability to concentrate).
  - Guilt is less common than depression.
  - Suicide and suicide ideation are very unusual.
- Waxing and waning of symptoms
- Time span should be self-limiting
  - Expect abatement of severe reaction within two months.
  - Expect lingering grief reactions up to one year.
  - Noticeable reactions on anniversary of loss common.
- Intervention for grieving patients
  - Avoid pharmacology.
  - See on a regular basis.
  - Reassure them that grief is normal and takes time.
  - Talk with them (usual topic will be the person they lost).

Important Concept

Grief is normal. Avoid medication.

1.4.2 Pathological Grief (Unipolar Disorder)

- Defined by either duration or severity
  - If grief lasts longer than one year
  - If person is grossly dysfunctional (especially after two months)
- May evidence:
  - Abnormal, extensive identification with the deceased
  - Suicidal ideation, intent, or plan
  - Excessive thoughts of death
  - Excessive guilt
  - Worthlessness
  - Marked psychomotor retardation
  - Catatonia, mutism
  - Hallucination becoming predominant
- Treatment
  - Hospitalization may be necessary
  - Antidepressants useful
  - Psychotherapy to address underlying conditions

Important Concept

Prolonged grief (more than one year) is pathological.

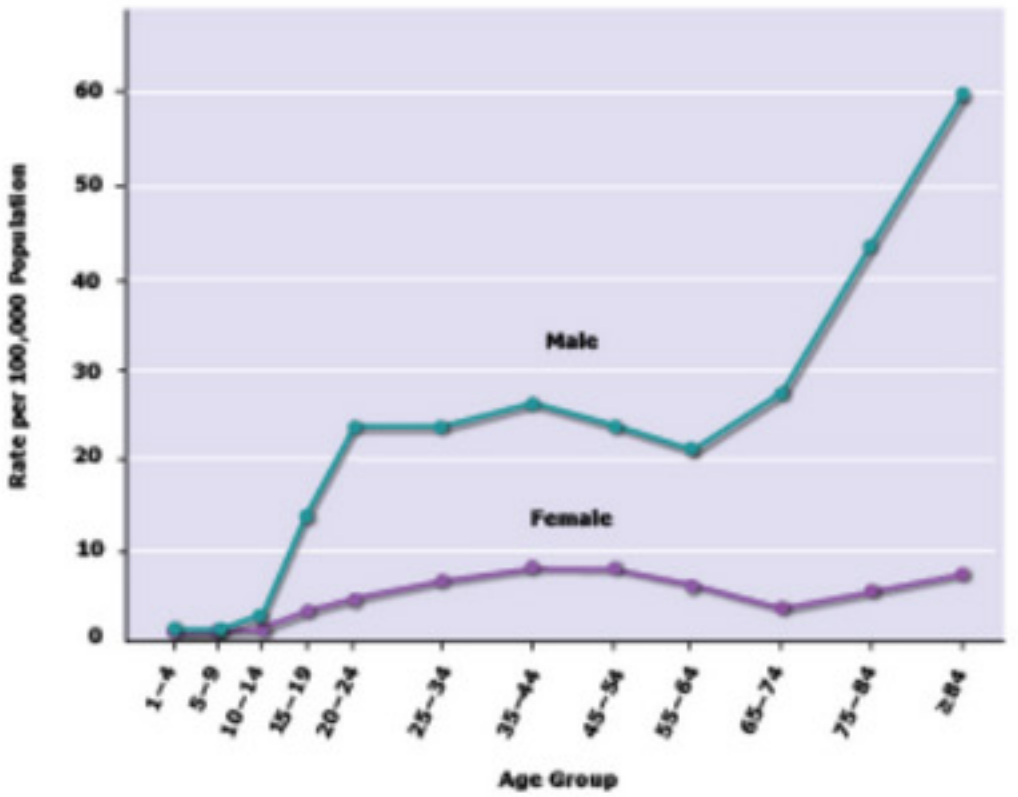
1.4.3 Dealing With Grief and Dying

- Kübler-Ross stages of adjustment to dying:
  - Denial
  - Anger
  - Bargaining
  - Depression
  - Acceptance

- Progression through these stages is commonly seen in grief reactions.
- Earlier stages can be revisited.
- Working through the stages takes time.
- Acceptance is not achieved by all.

1.4.4 Suicide

- Incidence: About 12 per 100,000 population in the U.S.
- Annually
  - More than 30,000 commit suicide.
  - More than 600,000 attempt suicide.
- Attempted suicide versus completed suicide: 20 to 1 ratio.
- Gender:
  - Women attempt suicide four times more frequently than men.
  - Men are successful three times more than women (use more violent means).
  - Rate rises dramatically with age for men but only slightly for women.



▲ **Figure 10–1.4** Male/Female Suicide Rates

- *Adolescent suicide* (ages 15 to 19)
  - Rates now at level of adults
  - Suicidal ideation
    - —Lifetime: 54%
    - —In the last year: 22%
    - —Can state specific method: 10%
  - More than 60% have a friend who committed suicide.
  - For this age group, Native Americans have the highest rate.
  - Almost all in this group had prior mental illness, most undetected.

Important Concept

Not all who commit suicide are depressed.

- *Prevention* is key:
  - —Highest risk: Boys who are depressed or heavy drinkers.
  - —Suicide prevention programs not really effective.
  - —More effective: Screen for and treat underlying condition.
- For all ages:
  - —Individuals with history of psychiatric hospitalization are 34 times more likely to commit suicide.
  - —"Big Four" diagnoses related to suicide:

Diagnosis	% of patients who commit suicide
• Depression:	15%
• Alcoholics:	15%
• Schizophrenia:	10%
• Borderline personality disorder:	5%

  - —Risk factors for suicide:
    - History of prior suicide attempt (strongest risk)
    - White, male, ages 45 and over.
    - Social isolation: Unemployed or retired; divorced or widowed; living alone
  - —Less religious (being a member of a religious community lowers risk)
  - —Any chronic illness
  - —Depression or alcoholism (50 times greater risk)
  - —Time: From 6 p.m. to 6 a.m.
  - —Assessment of suicide risk:
    - Roughly 80% have given some warning.
      - 80% have seen a physician in prior six months.
      - 50% have seen a physician in prior 30 days.
    - Along with previous attempt, look for
      - Affect: Sense of hopelessness
      - Cognition: Detailed plan (more detail = more risk)
      - Behavior: Access to means (a gun in the house)
    - Remember that suicide risk rises when depressed patients are feeling *better*.
    - Recall assessment versus intervention:
      - If you think someone is suicidal, stop assessing risk and intervene!
      - Suicide threats are the clearest reason to hospitalize someone for psychiatric reasons.
      - Stop harm from happening.
      - Patient can be held as long as suicide threat exists (after 48 hours, court oversight applies).

Important Concept

On the USMLE, do *not* help a patient commit suicide.

Not allowed: Assisted suicide, euthanasia.

1.5 Treatments for Unipolar Disorder

1.5.1 Combination of Psychotherapy and Antidepressants Doubles Efficacy of Either Alone

- *Cognitive-behavioral therapy* (CBT) is a particularly effective form of psychotherapy for depression.
- Therapist and prescriber must communicate.
  - Adherence with medication
  - Side-effect issues
  - Suicide risk: For most of these drugs, motor activity is increased before mood is lifted.

1.5.2 Pharmacology

- Antidepressant medications are also used to treat
  - Enuresis—imipramine
  - Panic disorder—imipramine
  - Obsessive-compulsive anxiety disorder—SSRIs, clomipramine
  - Chronic pain (even if no depression)—amitriptyline, duloxetine
- **Cyclic Antidepressants**
- Examples: Nortriptyline, desipramine, imipramine, clomipramine, amitriptyline, doxepin
  - **Nortriptyline:** Least orthostatic
  - **Clomipramine:** Most serotonin action
  - **Doxepin:** Most antihistamine action
- Action
  - Down regulation of alpha and beta receptors
  - Fat soluble
  - Metabolized by liver, excreted by kidneys
- Cautions
  - Potentiated by alcohol
  - Can lower seizure threshold
  - May induce manic episode if really bipolar
  - Not to be taken in first trimester
  - Withdrawal reactions
    - —Akathisia, dyskinesia, anxiety, dizziness, vomiting, sweating, cholinergic and depression rebound
    - —Avoid by gradually tapering dose
- Adverse effects
  - Anticholinergic action
  - CNS effects
  - Cardiovascular
    - —Tachycardia
    - —Orthostatic hypotension
      - Manage by behavior, caffeine, support hose, salt, neurofeedback
  - Sexual effects
    - —Males: ED, testicular swelling
    - —Females: Anorgasmia, breast enlargement
  - Changes in blood sugar

SSRIs (Selective Serotonin Reuptake Inhibitors)

- Most widely prescribed of all antidepressants.
- As a class, the fewest side effects.
  - —Mechanism of action:
    - Increase the amount of 5-HT in the synaptic cleft.
    - Generally speaking, all in the class are equivalent, but some work better than others for certain people.
    - Examples:
      - Sertraline: metabolized faster, most commonly prescribed
      - Escitalopram: long acting
      - Fluoxetine: the original
      - Paroxetine: most potent
      - Citalopram: lowest cost per dose
      - Fluvoxamine: causes sedation
- Also for anxiety and impulse disorders such as bulimia nervosa or trichotillomania
- Side effects:
  - —Common side effects include nausea, joint pain, upset stomach, insomnia, and rashes
  - —Anorgasmia and delayed orgasm in 15% of patients
  - —Serotonin syndrome
    - From: Too high of a dose; or SSRI and MAOI combination; or synthetic narcotic and MAOI
    - Restlessness, sweating, hyperthermia, insomnia, nausea, diarrhea, cramps, delirium
    - Stop medication
    - Give cyproheptadine

Important Concept

SSRIs: most widely used, fewest side effects.

MAOIs (Monoamine Oxidase Inhibitors)

- Mechanism:
  - —Blocks the enzyme monoamine oxidase, which breaks down monoamine neurotransmitters in the presynaptic neuron.
  - —Leaves more neurotransmitters for future synaptic transmissions.
  - —For effect, must reduce MAO activity by 80%.
  - —Examples: Phenelzine, tranylcypromin, isocarboxazid, selegiline (MAOI-B)
  - —*MAOI + tyramine = hypertensive crisis*
    - Problem foods: Cheese, red wine, dried fish, sauerkraut, sausage, chocolate, avocados
    - Safe foods: Cottage cheese, some wines
    - *Signs of hypertensive crisis*
      - –Occipital headache
      - –Stiff neck
      - –Nose bleed
      - –Dilated pupils
      - –Nausea and vomiting
      - –Chest pain
      - –Elevated blood pressure
- *Treatment for Hypertensive*
  - —Stop medication
  - —Give hypotensive: Phentolamine, chlorpromazine, or nitroprusside

Important Concept

MAOI + tyramine = hypertensive crisis

1.6 Antidepressants You Should Know

- **Mirtazapine**
  - Stimulates NE and 5-HT release
  - Side effects:
    - —Somnolence (60%)
    - —Increased appetite
    - —Weight gain
- **Buproprion**
  - Weak inhibitor of dopamine reuptake; some effect on NE; no effect on 5-HT reuptake
  - Non-sedating
  - No sexual effects
  - Side effects:
    - —Appetite suppression
    - —Insomnia
- **Trazodone**
  - 5-HT receptor antagonist, alpha-1 blocker
  - Sedation, effective at improving sleep quality
  - *May lead to priapism*
- **Venlafaxine**
  - Inhibits reuptake of NE and 5-HT; mild dopamine effect
  - As effective as SSRIs
  - Side effects:
    - —Sweating
    - —Hypertension
    - —Nausea
    - —Constipation
    - —Anorexia
    - —Vomiting
- **Duloxetine**
  - Inhibits reuptake of 5-HT and NE
  - For *depression plus pain*
  - Side effects:
    - —Nausea
    - —Dry mouth
    - —Constipation
    - —Sleepiness
    - —Depressed appetite
    - —Hypertension
    - —Decreased libido

1.7 Electroconvulsive Therapy (ECT)

- Indications:
  - Depression (80%)
  - Schizoaffective disorder
  - Bipolar disorder

- Mechanism of action: Electricity is passed from the frontal cortex to the striatum.
- 90% show some immediate improvement.
  - Improvement associated with large increase in slow-wave (delta) activity.
  - Usually requires 5 to 10 treatments.
  - Treats episodes, not for prophylaxis.
- Only contraindication: Increased inner cranial pressure.
- Serious complications <1:1,000
  - Anesthesia eliminates fractures and anticipatory anxiety.
  - Memory loss and headache are common; return to normal in several weeks.
- Although not usually first-line treatment, should be considered for:
  - Highly suicidal patients
  - Depressed pregnant patients

1.8 Bipolar Disorders

- Some combination of mania plus depression
- Depressive phase of bipolar looks exactly like unipolar
  - Differentiation based on
    - —History
    - —Family history
- Lifetime prevalence of <1%
- Heritability index: 63%
- Males = females
- Mean age of onset: 30 years old
- Brain shows enlarged:
  - Amygdala
  - Cerebral ventricles

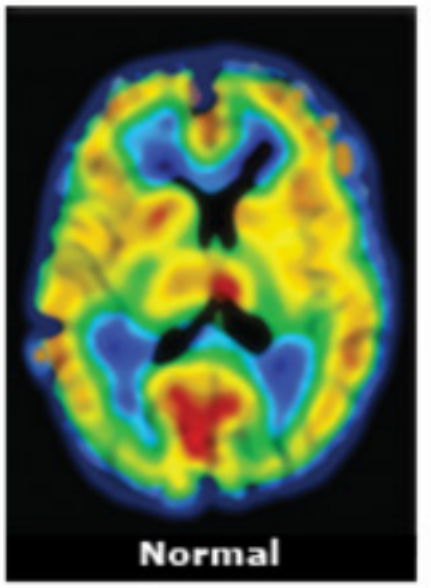
1.8.1 Mania

Abnormally elevated or irritable mood.

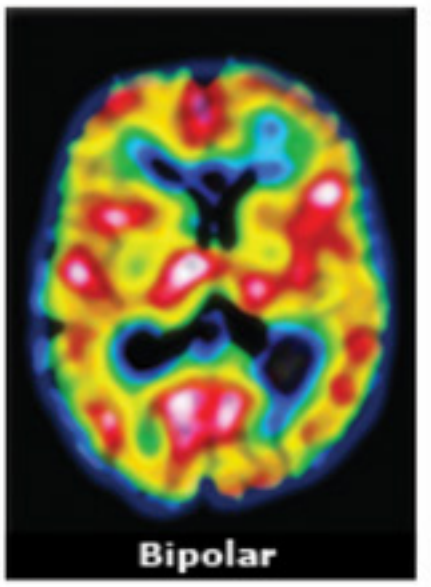
- Lasting one week
- Any duration if hospitalized
- Plus, at least three of the following:
  - Inflated self-esteem or grandiosity
  - Decreased *need* for sleep
  - Pressured speech
  - Flight of ideas or racing thoughts
  - Distractibility
  - Weight loss
  - Increase in goal-directed activity or psychomotor agitation
  - *Excessive involvement in pleasurable activities* with high potential for painful consequences (spending sprees, sexual indiscretions, foolish investments)

Important Concept

ECT does **not** need to produce seizures to produce benefit.



▲ **Figure 10–1.8A** Balanced Pattern of Activation



▲ **Figure 10–1.8B** Bipolar Disorder, Manic Phase

Important Concept

There is no diagnosis of mania. If mania is seen, then diagnosis is bipolar.

1.8.2 Basic Subtypes

- Bipolar I: Mania with some depression
- Bipolar II: Depression with hypomania
- Rapidly cycling bipolar: Four or more episodes of mood disturbance within a one-year period
- Cyclothymia
  - Mild, chronic form of bipolar
  - Episodes over the course of two years
  - Prevalence <1%
  - Ego-syntonic
  - Mood swings are less pronounced
  - Several periods of minor depression and hypomania
- Treatments
  - Antidepressants alone can induce a manic episode
  - Mood Stabilizers
    - **Lithium**

      Effective in 70% of cases.

      Mechanism:
      - Blocks inositol-1-phosphate (second messenger).
      - Changes balance of intracellular cAMP and phosphatidylinositol pathway.
      - Quickly absorbed from the gastrointestinal tract.
      - *Requires reaching plasma levels very close to toxic.*
        - Must monitor blood levels
        - Good kidney function and adequate salt and fluid intake essential

      Adverse effects:
      - Narrow margin of safety
      - Tremor, thirst, anorexia, gastrointestinal distress are common
      - Polyuria and polydipsia
      - Edema
      - Acne
      - Seizures and coma
      - Benign leukocytosis
      - Hypothyroidism

      Cautions:
      - Long-term lithium use: Adverse effects on renal function
      - Compliance often difficult; patient may value manic experiences
      - Teratogenic; produces cardiac malformations (Ebstein anomaly of the tricuspid valve)
      - If rapidly cycling: Use valproate or carbamazapine

— **Valproate**

Enhances GABA activity, decreases degradation of GABA in the CNS.

Adverse effects:

- Sedation
- GI upset
- Hepatotoxicity (must monitor liver function)
- Occasional agranulocytosis
- Teratogenic: Neural tube defect

— **Carbamazepine**

Considered second-line treatment

Mechanism:

- Stabilizes inactive state of voltage-gated sodium channels.
- Decreases the amount of neurotransmitters released.
- Potentiates GABA receptors.

Adverse effects:

- Similar to valproate
- Agranulocytosis and hepatotoxicity possible
- Teratogenic: Cardiovascular and urinary tract anomalies

— **Atypical antipsychotics** also may be used.

2 Schizophrenia

2.1 General Understanding

All about *balance*

- Between action of dopamine and serotonin
- Between coordination of cortical regions and limbic system
- Horse and rider analogy
  - Rider: frontal lobes
  - Horse: limbic system
  - If horse is running wild, what can you do?
    - —Speed up behavior
    - —Shut down activity
- Symptoms may not be the problem
  - Rather, they are the result of the patient coping with the problem.
  - Treatment goal is not simply to limit symptoms but to restore balance.

2.2 Epidemiology

- Prevalence: 1% of the general population
- Clusters in families
  - 40% if both parents are affected
  - Heritability index: 43%
    - —"Genetic vulnerability active by environment and experience."
  - 10% if sibling affected
  - 50% if monozygotic twin is affected
- More common in lower socioeconomic classes (socioeconomic status, or SES)
  - Inheritance
  - Downward drift
- Onset:
  - Male = ages 15 to 24
  - Female = ages 25 to 34
- 50% of patients attempt suicide; 10% succeed.
- Over 90% of schizophrenics smoke tobacco.
- Over 50% of schizophrenics do not live with their families, nor are they institutionalized.

2.3 Neurochemical Correlates

- Dopamine
  - Higher levels, but balance with other neurotransmitters, not absolute level, is the key.
  - PET scan studies show higher levels of dopamine activity in brains of schizophrenics.
  - Older antipsychotics (typicals) reduce the dopamine level and provide symptom relief.

Important Concept

Schizophrenia is due to a lack of balance: biochemically and among parts of the brain.

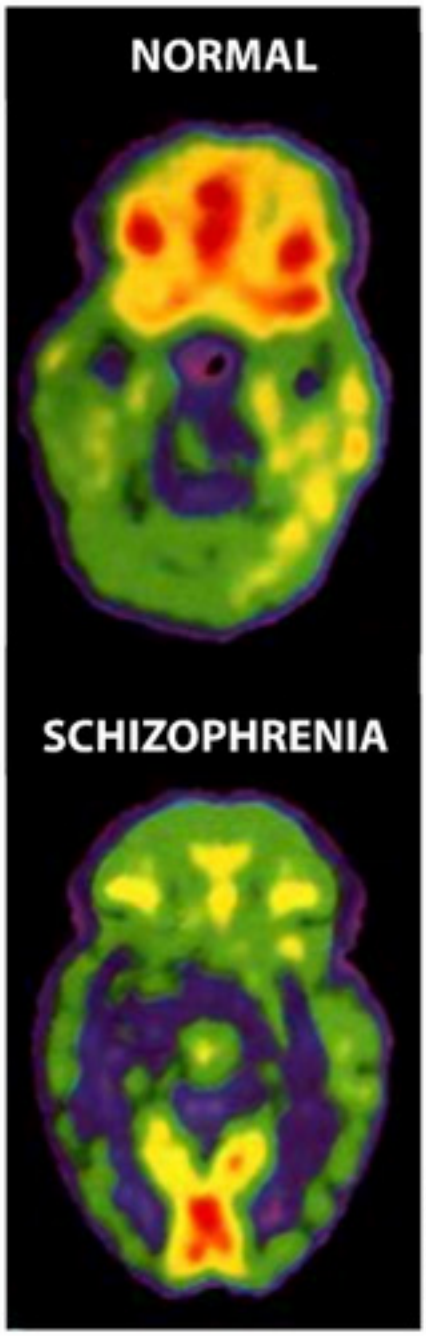
- Serotonin (5-HT)
  - Drugs that affect serotonin (such as LSD) can produce reactions similar to schizophrenic symptoms.
  - Defects in genes related to serotonin transmission are more common in schizophrenic patients.
  - Newer antipsychotics (atypicals) target serotonin or the serotonin/dopamine combination.
- Glutamate
  - Major excitatory CNS neurotransmitter in pathways linked to schizophrenic symptoms.
  - Genetic findings pointing at a reduced functioning of glutamate signaling via NMDA receptors.
  - Phencyclidine and ketamine
    - —Block NMDA channel.
    - —Can produce positive and negative symptoms parallel to schizophrenia.
  - Drugs with enhanced NMDA function can lower negative symptoms and enhance cognitive function.
  - Antipsychotic drugs *may* work by enhancing glutamate activity at NMDA receptors.

2.4 Brain Abnormalities

- Frontal lobe abnormalities (decreased uptake of glucose)
- Atrophy of temporal lobes over time
- Enlargement of lateral and third ventricles
  - Positive correlation between ventricle size and type, and prognosis of illness
- Reduction in size of hippocampus, amygdala, and parahippocampal gyrus
- Loss of inhibitory neurons in second layer of anterior cingulate gyrus

2.5 Measurable Functional Impairments

- Problems with attention control and task-relevant information.
- Failure at smooth pursuit eye movement (SPEM) task.
  - Cannot keep attention on simple, repetitive stimulus over time.
  - 50% of non-schizophrenic relatives also fail.
- Reduced reaction to event-related potentials on the P300 pathway.
  - P300 activated by task-relevant stimuli.
  - Schizophrenics show reduced or no response on P300 pathway when presented with task-relevant information.
- Information processing slower
  - Backward masking: Show two images in quick succession. How much time must there be between images for the person to report seeing both?
  - Three times' greater time required to eliminate backward masking effect.



▲ **Figure 10–2.4** Normal and Schizophrenia

- Reduction in prefrontal cortical activity (PFC) when cognitively challenged.
  - When facing a difficult problem-solving task, most people show increased frontal lobe metabolism.
    —Greater challenge = greater increase in metabolism
  - Schizophrenics show decreased metabolism.
    —Greater challenge = greater decrease in metabolism
- Symptoms
  - Schizophrenia is chronic.
  - Must have symptoms for longer than six months.
  - Symptoms clusters
  - Positive symptoms (Type I)
    —"Add ons"
    —What schizophrenic individuals experience that normal people do not.
    —Some examples: Delusions, hallucinations
    —Associated with dopamine receptors
    —Correlate with better response to drug treatment, better outcome, fewer premorbid symptoms
  - Negative symptoms (Type II)
    —"Deficits"
    —What normal individuals have that schizophrenics lack
    —Examples: Blunted affect, apathy, anhedonia, poverty of speech
    —Associated with muscarinic receptors
    —Correlate with poor response to treatment, poor outcome, more premorbid symptoms, CT abnormalities

▼ **Table 10-2.5A** Symptoms of Schizophrenia

Altered Perceptions	Disturbed Thought
• Auditory hallucinations (75% of patients) • Unusual sensations • Derealization: Disconnect from reality	• Content – Delusions – Ideas of reference – Thought broadcasting • Form – Loose associations – Word salad – Neologisms
Emotions	**Behavior**
• Blunting of emotional response • Inappropriate affect • Heightened sensitivity	• Disprosody (early sign) • Inattention to grooming, dress, social graces • Lack of motivation • Negativism • Stupor • Stereotyped behavior • Echopraxia

- **Subtypes (Will Change for DSM-5)**
  - **Paranoid**
    - —Predominant symptom: Delusions of persecution or grandeur
    - —Normal affect
    - —Often with voices
    - —Less regression of mental abilities
    - —"Least sick" of all the schizophrenias
  - **Catatonic**
    - —Stuporous Type
      - Immobile
      - Mute
      - Rigidity, waxy flexibility
      - Automatic obedience
      - Echolalia
      - May have brief outbursts of violence
    - —Agitated Type
      - Extreme motor agitation
      - Excited and incoherent
      - Collapses in exhaustion
      - Nonsensical repetitive behaviors
  - **Disorganized**
    - Incoherent, primitive, uninhibited
    - Aimless activity
    - Poor personal appearance
    - Pronounced thought disorder
    - Explosive laughter, silliness
    - Incongruous grinning
  - **Undifferentiated**
    - Schizophrenic symptoms, but has features of each of the subtypes and so does not fit any other category.
  - **Residual**
    - No current psychotic symptoms
    - Some lingering negative symptoms
- **Differential Diagnosis**
  - Schizophreniform:
    - —Symptoms for less than six months
  - Brief psychotic disorder:
    - —Symptoms from 1 to 30 days
    - —Full return to former functioning
  - Delusional disorder, paranoid subtype
    - —Developed delusions
      - False beliefs not culturally verified
      - The delusions are usually circumscribed (the patients are absolutely normal).
      - Non-bizarre
    - —Chronic disorder; lasts at least one month
    - —No functional impairment or schizophrenic symptoms

- Schizoaffective disorder
  - —Psychotic symptoms plus prominent mood disturbances
  - —Psychotic features for at least two weeks *without* any mood symptoms
  - —Plus times of mood disturbance severe enough to qualify for a major depressive or manic episode
  - —Bipolar often misdiagnosed as schizophrenia by the unaware
- Substance-induced psychosis
  - —Common drugs that can induce psychosis: alcohol (intoxication and withdrawal), anticholinergics, steroids, and cocaine
  - —Brief course of symptoms
  - —Look to pupils
  - —Urine screen takes two days
- Many medical disorders can present with psychosis: Wilson disease, Parkinson disease, temporal lobe epilepsy, Huntington disease, porphyria, Cushing syndrome, hyperthyroidism, niacin deficiency
- Factors associated with better prognosis:
  - —Paranoid or catatonic
  - —Late onset (female)
  - —Quick onset
  - —Positive symptoms
  - —No family history of schizophrenia
  - —Absence of structural brain abnormalities
- Long-term prognosis: "Rule of Three"
  - —One third of patients recover and lead normal lives.
  - —One third of patients experience symptoms but function somewhat.
  - —One third do not function well and require frequent hospitalizations.

▼Table 10-2.5B Disorder Comparisons

Schizophrenia	Schizophreniform	Brief Psychotic Disorder	Delusional Disorder	Schizoaffective Disorder
Lasts >6 months	<6 months, but >1 month	<30 days, Full recovery to baseline	>1 month	Psychotic symptoms present >2 weeks without mood symptoms
Psychotic symptoms: Auditory hallucinations, bizarre delusions, thought disorders	Psychotic symptoms: Auditory hallucinations, bizarre delusions, thought disorders	Psychotic symptoms: Psychosocial initiating factor	Delusional symptoms only	Mood symptoms present during psychotic and residual phases

2.6 Treatment

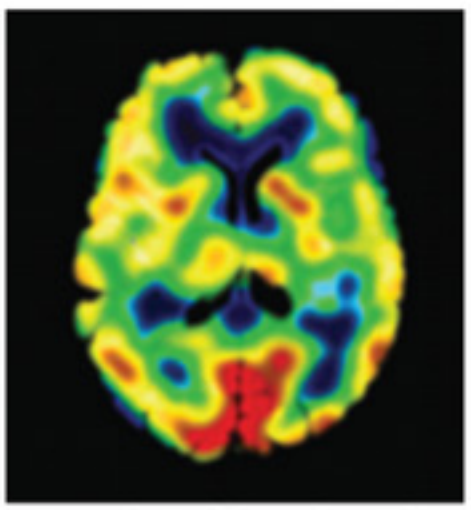
- Schizophrenia is degenerative.
  - Without treatment, most individuals deteriorate over time.
  - Every psychotic break damages the brain.
  - Early detection and intervention is critical.
- Key to successful treatment:
  - Keep the patient on medication.
  - Supportive relationship(s) very helpful.
  - Structured activities and routine support mental organization.
  - Two-year relapse rate on medication versus off medication: 40% versus 80%.
- Hospitalization is often required to stabilize the acutely psychotic patient:
  - Recall that "psychotic" does not necessarily mean incompetent.
  - Unless dangerous, patients must consent.

Connection to Pharmacology

See Pharmacology, Antipsychotics.

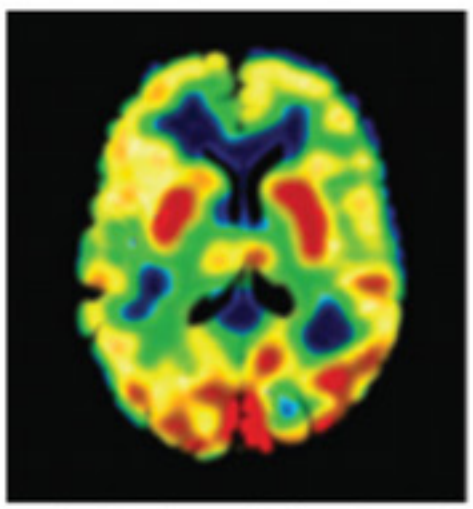
▼ **Table 10-2.6** Common Antipsychotic Medications

Common Antipsychotic Medications	
Typical Antipsychotics, First Generation	
Name	**Key Associations**
Thioridazine	➤ Can prolong QTc interval; second-line drug
Chlorpromazine	➤ Low potency
Thiothixene	➤ Extrapyramidal effects in 50% of patients
Haloperidol	➤ Behavioral control; injectable
Fluphenazine	➤ Long-acting injection (every two to three weeks)
Loxapine	➤ Use if others not effective; D1 and D2 antagonist
Atypical Antipsychotics, Second Generation	
Name	**Key Associations**
Clozapine	➤ High affinity for 5-HT receptors; no EP, TD, or sexual effects; agranulocytosis (check blood)
Risperidone	➤ Action on D2 and 5-HT, like clozapine, but avoids agranulocytosis; more side effects
Olanzapine	➤ Most action on 5-HT; low rate of side effects, but increased rate of diabetes
Quetiapine	➤ D2 and 5-HT2 antagonist; also for mania (not for insomnia)
Ziprasidone	➤ Affinity for DA, 5-HT receptors; injectable; higher mortality in elderly
Aripiprazole	➤ Partial agonist on D2 and 5-HT1, antagonist on 5-HT2; also for mania and resistant depression



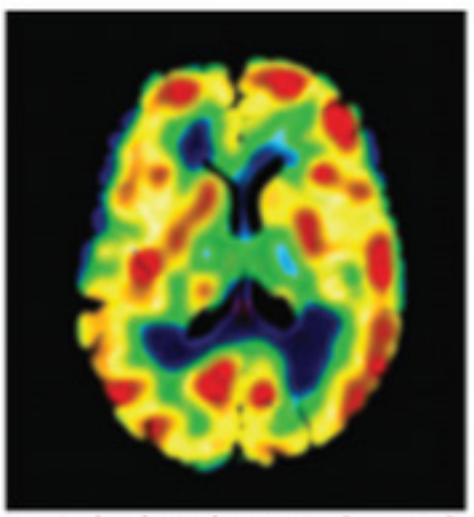
Unmedicated—limited uptake

▲ **Figure 10–2.6A** Undedicated



Typicals—basal ganglia focal reuptake

▲ **Figure 10–2.6B** Typicals



Atypicals—broader cortical reuptake

▲ **Figure 10–2.6C** Atypicals

2.7 Mechanism of Action

- Typical antipsychotics:
  - These are pure D2 receptor blockers.
  - Examples: Haloperidol, chlorpromazine, etc.
  - More likely to have some effect.
  - More side effects.
- Atypical antipsychotics:
  - These block some combination of D4, D2, and 5-HT2 receptors.
  - Examples: Olanzapine, clozapine, and quetiapine.
  - Risperidone also blocks 5-HT2 and D2, but not D4.
  - Relieves positive *and* negative symptoms.
  - They do not always work.

2.8 Side Effects

Side effects are determined by neurotransmitter being blocked.

- Dopamine action
  - The stronger the dopamine blockade, the greater the antipsychotic potency.
  - But, greater risk of movement disorders.
    - —Low potency: Fewer side effects
    - —High potency: More side effects
  - Extrapyramidal reactions
    - —In about half of patients in early months of treatment
    - —Treat with anti-Parkinson drugs
      - Amantadine
      - Benztropine
      - Trihexyphenidyl
    - —Order of symptom appearance
      First week: Dystonic reactions
      Second week: Akinesia
      Third week: Rigidity
      Sixth week: Tremors
      Tenth week: Akathisia
      Eighteen weeks: Pisa and/or Rabbit syndromes
    - —Tardive dyskinesia
      - *Primary reason for non-adherence*
      - Rarely before three to six months on medication
      - Occurs in about one third of patients
      - Signs:
        Tongue protrusion
        Pill-rolling tremor
        Shuffling gait
        General tremor
      - Important: Persists after medications terminated.
        Only fewer than 10% show remission

- Cause: Supersensitivity of postsynaptic dopamine receptors
  Symptoms do not occur during sleep
  Suppressed for short time by voluntary movements
  Anti-Parkinson drugs aggravate
- No treatment, focus on prevention
  Atypicals, especially, *Clozapine,* much less likely to induce this

- Anticholinergic symptoms (blocking of muscarinic receptors)
  - Common and include:
    —Urinary hesitancy
    —Dry mouth
    —Blurry vision
    —Constipation
    —Delirium
  - One way to describe the symptoms: "Blind as a bat, dry as a bone, red as a beet, and mad as a hatter."
- Antihistamine action:
  - Leads to:
    —Sedation (hence, use with agitated patients)
    —Weight gain
    —Impaired memory very common
- Sympathetic blockade often results in hypotension.

2.9 Other Common Side Effects to Know

- Particular "metallic" taste
- Vomiting common
  - Especially for long-term use
  - More likely in smokers
- Sexual effects
  - Men: Lower libido, inhibited ejaculation, retrograde ejaculation
  - Women: Lactation, breast enlargement, lower libido

2.10 Syndromes Related to Antipsychotic Medications

2.10.1 Acute Dystonic Reaction

- Sudden, sustained, involuntary muscle spasm
- Localized to one or a few muscles
- May occur in any muscle group (head and neck most common)
- Higher risk if:
  - High potency
    —90% of cases in first four days on drug
    —Intramuscular administration
    —Young, males, with large muscle mass
  - No alteration in consciousness
  - No alteration in vital signs

- Acute treatment
  - —Stop medication
  - —Because patient will have difficulty swallowing, give drugs by injection or IV
  - —Anticholinergic medications
    - Diphenhydramine
    - Benztropine
    - Diazepam

▲ **Figure 10-2.10** Acute Dystonic Reaction

2.10.2 Neuroleptic Malignant Syndrome (NMS)

- A rare but life-threatening condition
- More likely with high-dose typical antipsychotics
- Look for:
  - Muscular rigidity
  - Hyperthermia
  - Delirium
  - Autonomic instability; can be fatal

3 Anxiety Disorders

- Anxiety is a normal reaction.
- Anxiety is a disorder when it:
  - "Does not go away"
  - Disrupts life and functioning
- Most common psychiatric disorders in women of all ages.
  - For men, substance abuse is most common.
- During evaluation
  - Consider caffeine/nicotine use.
  - Examine for substance abuse.
  - Be careful to rule out coronary heart disease.
- Symptoms both *physiological and psychological*
  - Psychological:
    - —Excess worry and apprehension
    - —Hypervigilance, scanning the environment
    - —Problems concentrating
    - —Restlessness
    - —Fatigue and problems with sleep
  - Physiological:
    - —Tachycardia
    - —Hyperventilation
    - —Tingling sensation on skin
    - —Lightheadedness
    - —Sweating
    - —Dilated pupils
    - —Increased autonomic activity
    - —Muscle tension

3.1 Subtypes of Anxiety Disorders

3.1.1 Generalized Anxiety Disorder (GAD)

- Heightened state of anxiety
- Symptoms more often than not over six months
- Anxiety is normal
- Issue here is one of degree ("Doesn't go away")
- Look for interference with day-to-day functioning
- Treatment:
  - Choose either drug or psychotherapy
  - Biofeedback
  - Relation techniques
  - Cognitive-behavior therapy (CBT)
  - Pharmacology
    - —**Buspirone:** Partial 5-HT1 agonist
      - No anticonvulsant or muscle-relaxing properties
      - Increases serotonin, no GABA effects
      - Seven days for effect

Important Concept

General Anxiety Disorder
Anxiety symptoms for over six months

- Some sedation
- Low abuse potential
- Not potentiated by alcohol
- No withdrawal effects

—**Venlafaxine**

- Antidepressant, also approved for GAD
- Inhibits reuptake of NE and 5-HT along with mild dopamine effect
- Works faster on anxiety than the four weeks needed to see a benefit when treating depression

3.1.2 Panic Disorder

- Series of recurrent, unexpected panic attacks.
  - No clear, circumscribed stimulus as trigger
  - "Phobic reaction without phobic object"
- Attacks followed by a month of:
  - Anticipatory anxiety—concern over future attacks
  - Phobic response—disruption of day-to-day life
- Panic attacks can occur without patient having a panic disorder.
- Panic attack:
  - Overwhelming physiological and psychological event
  - Abrupt onset: Peak in 10 minutes
  - Can mimic symptoms of MI
  - Symptoms:
    - —Physical
      - Palpitations, pounding heartbeat
      - Sweating
      - Trembling or shaking
      - Hyperventilation, shortness of breath/sense of smothering (air hunger)
      - Feeling of choking
      - Chest pain or discomfort
      - Nausea or abdominal distress
      - Feeling dizzy, lightheaded, or faint
      - Chills or hot flushes
      - Numbness or tingling sensations
    - —Psychological
      - Fear of losing control or "going crazy"
      - Fear of dying
      - Feelings of unreality ("in a bubble")
      - Feelings of being detached from oneself (depersonalization)
    - —Premenstrual period is time of heightened vulnerability
  - Two times more likely in women
  - Onset usually early 20s
  - Lifetime prevalence: 4%
  - Can occur with or without agoraphobia
    - —Decide if panic or agoraphobia is primary by history

Important Concept

Panic Disorder

Three panic attacks in three weeks

- Treatment:
  - —Panic-focused cognitive-behavioral therapy (CBT)
    - Changing thinking patterns that trigger or sustain attacks
  - —Pharmacology
    - **Alprazolam or clonazepam**
      - Should be taken up to six months after last attack for prophylaxis
      - Monitor for abuse or dependency
      - Avoid if there is a history of substance abuse
    - Any SSRI
      - Avoids dependency issues
      - Can take up to eight weeks before effects are noticed
    - Carbon dioxide for reducing acute effects of attack

3.1.3 Phobic Disorders

- Specific Phobias
  - Intense fear over specific situations or things (spiders, heights, drowning, fire)
  - Most common psychiatric disorder (25% lifetime prevalence)
  - Reaction to phobic object must be:
    - —Consistent and persistent
    - —Immediate response when exposed to stimulus
    - —Patient recognizes response as excessive/unreasonable
    - —Leads to avoidance of stimulus
    - —Interference with day-to-day routine
- Social Phobias
  - Intense fear of humiliation or embarrassment in public or social settings.
  - Two subtypes:
    - —Discrete performance anxiety (stage fright): Intense, debilitating reaction in *certain social situations*
    - —Generalized social anxiety: Intense, debilitating reaction in *all social situations*
  - Patient recognizes response as excessive/unreasonable
  - Leads to avoidance of common social situations
  - Treatments:
    - —Cognitive-behavior therapy (CBT)
    - —Desensitization, exposure
    - —Pharmacology
      - *Discrete performance*

        Paroxetine (or any SSRI)

        Beta-blockers: Taken 30 to 40 minutes before situation

        Propranolol: Blocks the action of epinephrine and norepinephrine; both β1- and β2-receptor antagonist; passes blood-brain barrier

        Atenolol: Blocks the action of epinephrine and norepinephrine; β1-receptor antagonist only; does not pass blood-brain barrier

Important Concept

Specific Phobia

Panic-like response to identified object.

Important Concept

Social Phobia

Uncontrolable fear in social situations.

- *Generalized social anxiety*
  Paroxetine (or any SSRI)
  Phenelzine (MAOI)
  – Good efficacy
  – Must manage tyramine and drug interactions

- Agoraphobia
  - Fear of helplessness or humiliation when out and about.
    — When outside home
    — Being in a crowd
    — On a bridge
    — Traveling on highway or plane
  - Patient feels vulnerable and exposed when in unfamiliar or uncontrolled situations.
  - Panic-like symptoms
    — Agoraphobia can produce panic attacks
    — Panic attacks can induce agoraphobia
  - Travel restricted, life disrupted
  - Treatment:
    — Cognitive-behavior therapy (CBT)
    — Desensitization, exposure
    — Pharmacology
      - SSRIs
      - Tricyclics
      - Alprazolam, clonazepam

Important Concept

Agoraphobia
Helplessness and fear when out and about.

3.1.4 Obsessive-Compulsive Disorder

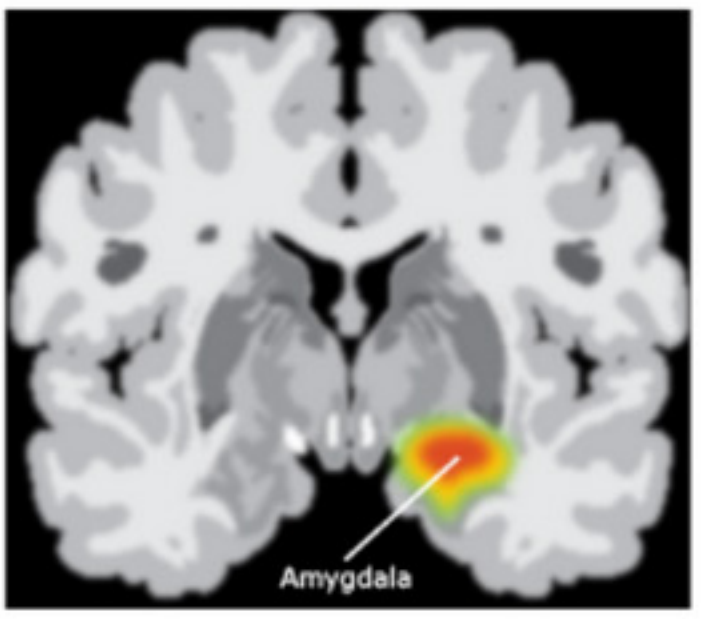
- Obsessions: Ideas you can't stop
  - Fears of contamination, being unsafe, aggression, sin, insecurity
- Compulsions: Actions you can't control
  - Hand-washing, lock-checking, counting, praying, rituals, etc.
- Often recognized by patient as absurd and attempts to resist.
- Obsessions and compulsions
  - Cause distress
  - Are time consuming (>1 hour/day)
  - Disrupt normal functioning
- Primary concern of patient is to not lose control
- 3% lifetime prevalence
- One half remain unmarried
- Found equally in both genders
- Unipolar occurs among two thirds over lifetime
- Brain activity:
  - Increased frontal lobe metabolism (opposite of schizophrenia)
  - Increased activity in the caudate nucleus
- Treatments:
  - Fluoxetine, fluvoxamine, or other SSRI
  - Clomipramine

Important Concept

Obsessive-Compulsive Anxiety Disorder
Ideas and actions the patient can't control

3.1.5 Post-Traumatic Stress Disorder (PTSD)

- A response to a stressful event "outside the realm of normal human experience."
  - Women who have been raped
  - Soldiers after battle
- Do not diagnose based on presence of event, but based on presence of symptoms.
- Prevalence
  - Men: 3.5%
  - Women: 9.8%
- Key symptoms
  - *Re-experience* of event as recurrent dreams or recollections
  - *Avoidance* of associated stimuli
  - Other symptoms:
    - —Diminished responsiveness to external world
    - —Emotional numbing
    - —Anxiety and vigilance
    - —Sleep disruption or excess
    - —Irritability, loss of control, impulsivity
    - —*Headaches,* inability to concentrate
    - —Repetition compulsion (usually focused on being safe)
  - *Symptoms for more than one month*
    - —*If less: Acute Stress Disorder (ASD)*
  - Can be long latency period
    - —Quicker onset = better prognosis
  - Patients more vulnerable to PTSD if:
    - —History of cocaine or opioid use
    - —Emotionally reactive to events
  - PTSD patients have enhanced amygdala activation when exposed to fearful stimuli.



▲ **Figure 10-3.1** Amygdala Activity

- Treatment
  - Group therapy:
    - —Patient is helped to work through reactions blocked by the disorder.
    - —Mentally returning to traumatic event and reemerging with a more integrated sense of the experience.
  - SSRIs can improve functioning level.
  - Beta-blocker just after event is being tested as a *preventive* measure.
  - Successful treatment associated with:
    - —Increased activity in the rostral anterior cingulate gyrus (rACC)
    - —Reduced amygdala activation when reacting to feared stimuli
  - MEG (magnetoencephalography) has been used for detecting PTSD
    - —Records brain activity in milliseconds (vs. seconds for PET)
    - —Detects information flow patterns
    - —97% sensitive, 14% false positives

3.1.6 Adjustment Disorder

- Residual category, *only* if no other Axis I applies
  - "If it can be something else, it is something else."
  - Presence of identifiable stressor within three months
  - Symptoms last under six months after end of stressor
  - Symptoms:
    - —Marked distress
    - —Academic, social, vocational impairment
  - *Not a grief response*

4 Eating Disorders

4.1 Bulimia Nervosa

- Rapid ingestion, then
  - Vomiting
  - Excessive laxatives
  - Excessive exercise
- "Binge and purge"
- Prevalence: 4% females and 0.5% males
- Presentation is usually during teenage years
- Body weight usually normal or above normal
- Sexual adjustment usually normal
- Clinical signs:
  - Scars on back of hand, callouses on fingers
  - Esophageal tears
  - Enlarged parotid gland
  - Cooking preoccupation
  - Minimal public eating
  - Often associated with taking on responsibility
- Dental cavities common
- Electrolyte imbalances possible
- Low baseline serotonin concentrations
- Treatment options:
  - Cognitive-behavior therapy
  - Group therapy
  - SSRIs
  - Imipramine

Important Concept

Both bulimia and anorexia can have purging.

4.2 Anorexia Nervosa

- Life-threatening
  - 10% to 15% mortality rate
- Criteria:
  - Failure to maintain body weight at >85% of ideal (BMI <18)
  - Preoccupation with and fear of gaining weight
  - Amenorrhea for three-plus cycles
  - Unrealistic influence of body weight on self-esteem
- Illusion: See self as fat even though very thin.
- Think: "Phobia of gaining weight."
- Prevalence rate of 0.5%, usually manifests in teenage years
  - Ten times more likely in women.
- >50% also have serious depression.

- Common presentation:
  - Patients may present as young women often engaged in vigorous athletic activities who obsess about food, but are rarely seen eating.
  - Sign on physical exam
  - Temporal wasting
  - BMI <18
  - Bradycardia
  - Electrolyte abnormalities
  - Lanugo: Baby-fine hair on face, arms, back
  - Hypotension
  - Amenorrhea
  - Anemia
- Treatment
  - Difficult; patient fights the entire intervention process
    - —Denial of illness
    - —Very resistant to treatment
  - Full treatment:
    - —Stabilize weight and restore to safe levels
    - —Family therapy
    - —Individual therapy
    - —**Mirtazapine**
      - To treat co-morbid unipolar
      - Drug of choice because of side effects: Stimulates NE and 5-HT release; increased appetite; weight gain.

5 Somatoform Disorders

5.1 Somatoform Disorders: First Differential

5.1.1 Somatization Disorder

- Onset before age 30
- More common in females
- Eight or more symptoms, at least:
  - Four pain symptoms
    - —Pain in joints, back, head, menstruation, while urinating
  - Two GI symptoms
    - —Vomiting, diarrhea, bloating, food intolerance
  - One sexual functioning symptom
    - —ED, retarded ejaculation, irregular menses
  - One pseudoneurological symptom
    - —Localized muscle weakness, paralysis, difficulty swallowing, deafness, blindness
- Symptoms not usually present all at once
- Symptoms cannot be explained by any medical condition
- Disruptive of day-to-day functioning

5.1.2 Conversion Disorder

- One or more symptoms:
  - "Altering of physical functioning suggesting a physical disorder."
  - Usually, loss of one primary sense or loss of the use of hand, arm, or limb.
  - Symptoms are real and unfeigned. Patient is truly disabled.
  - Keys to diagnosis:
    - —Map out exact specifics of symptoms.
    - —Watch for *la belle indifference.*

5.1.3 Pain Disorder

- Pain in one or more locations.
- Severe enough to disrupt functioning (secondary gain).
- No medical condition can be identified to account for pain.
  - For example, if patient has fibromyalgia, then he or she does *not* have somatoform pain disorder.
- Depression and pain can be related. Rule out unipolar disorder.

5.1.4 Hypochondriasis

- Preoccupation with fear of having a disease, or the conviction that one already has some disease.
- Belief persists in spite of contrary evidence or reassurance.
- Patient begins by assuming disease and collects evidence to support this preexisting belief.
- Constant scanning of body looking for what may be wrong. May also spend a long time on the Internet reading about diseases ("cybercondriasis").

Important Concept

Two differentials:

1. Among somatoform
2. Between somatoform, factitious and malingering.

- Impairs day-to-day functioning.
- At least six months' duration.
- Presentation often vague and nonspecific.
- Differentiate from somatization because here there are no actual symptoms, just the belief that one has a disease.
- Intervention
  - Palliative intervention (avoid placebos)
  - Foster relationship
    - —Get to know the patient and solve the underlying psychological issue.
  - Do not refer to a psychiatrist. Patient will not accept referral.

5.1.5 Body Dysmorphic Disorder

- Belief, usually to the point of obsession, that some part of the body is malformed or ugly.
- Preoccupied with imagined or greatly exaggerated abnormalities in appearance.
- Preoccupation disrupts daily life.
  - Avoids others, stays home.
  - Hides appearance behind sweaters or scarfs.
  - Frequently checks self in mirror.
  - Differentiate:
    - —Anorexia nervosa: "I'm too fat."
    - —Dysmorphia: "I'm too ugly."
  - May seek multiple plastic surgeries, but surgery never solves the problem. Problem is not how they are, but how they *perceive* themselves.
  - Intervention:
    - —Cognitive-behavioral psychotherapy
    - —Antidepressants are also helpful

▼ **Table 10-5.1A** Somatoform Disorders

Disorder	Presentation
Somatization disorder	• 8+ symptoms: 4 pain, 2GI, 1 sexual function, 1 pseudoneurological • Begins before 30 years of age
Conversion disorder	• Sudden loss of neurological function (e.g., blindness, paralysis) • Typically associated with major life stressor • *La belle indifference*
Pain disorder	• Persistent, intense pain, not explained physical condition • Must be disruptive • Typically begins in 30s and 40s
Hypochondriasis	• Preoccupation with illnesses lasting at least 6 months • Persists despite negative medical evidence • More common in middle and old age • Doctor shopping
Body dysmorphic disorder	• Preoccupation with minor real or imagined physical imperfection • Usually begins in late teenage years

5.1.6 Somatoform vs. Factitious and Malingering: Second Differential

- Key is patient awareness, *not* presentation.
- "It's not what they show, but what they know."

▼Table 10-5.1B Somatoform vs. Factitious and Malingering, Second Differential

Disorder	Production of Symptoms	Motivation for Symptoms
Somatoform disorders	No awareness	No awareness
Factitious disorders	Full awareness	No awareness
Malingering	Full awareness	Full awareness

Important Concept

Differentials based on patient awareness

- **Factitious Disorders (Formerly Munchausen Syndrome)**
  - Illness symptoms produced intentionally.
  - But, a compulsion; patient cannot stop, does not know why behavior is done.
  - The patient is often associated with the health care industry.
    - —Classic presentation of symptoms for a specific disease.
    - —Often, the patient has researched what symptoms should be.
    - —May take drugs to induce desired symptoms.
  - If symptoms induced in another (mother → child, doctor → patient), then it is called Munchausen syndrome by proxy.
  - Treatment:
    - —If confronted, patient simply will flee to a different medical setting.
      - Get to know the patient, figure out underlying motive, find a way to give the person the sought-after gain in an acceptable manner.
- **Malingering**
  - Presents with real, objective, but manufactured symptoms.
  - Everything is conscious.
    - —Patient knows what he did and why he did it.
    - —Fully under voluntary control. Patient can stop whenever he wants.
  - Symptoms are manufactured by the patient in order to get something (secondary gain).
  - A scam or fraud to qualify for disability, money from a lawsuit, get out of work, etc.
    - —May fake pain to get controlled substances.
    - —Not considered a mental illness.
      - Treatment not required.
      - If behavior is criminal, contact police.

6 Personality Disorders

- Different from other disorders.
- The issue is not biochemical, but an inability to change behavior to fit into a changing environment.
- "Sanity is when brain matches environment."
- Characteristics of personality disorders:
  - Inflexible, unable to adapt
  - One way of responding
  - Seek to change the world, not self
  - **Lifelong**
  - **All areas of life**
  - Symptoms are *ego-syntonic*
  - Patients really annoy other people
  - Stress accentuates maladaptive behavior
  - *But*, can thrive in the right situation
  - Estimated prevalence: 10% to 15% of population

Critical criteria

Important Concept

Unchanging behaviors in a changing environment

▼Table 10-6.0 Personality Clusters

Cluster A "The Weird" Odd & Eccentric	Cluster B "The Wild" Dramatic & Emotional	Cluster C "The Worrired" Anxious & Fearful
• Paranoid • Schizoid • Schizotypal	• Narcissistic • Histrionic • Borderline • Antisocial	• Avoidant • Dependent • Obsessive-compulsive
More common if schizophrenic relatives	Often with substance abuse or somatic disorders	Behavoirs linked to fear and anxiety

6.1 Cluster A: Odd and Eccentric

6.1.1 Paranoid Personality Disorder

- *Suspicious and disbelieving* of everyone and expect betrayal and harm in most situations.
- Patients will withhold information about themselves because *they don't trust you.*
- Hidden meanings perceived.
- Carry grudges forever.
- Misdemeanor arrests.
- A general orientation, no specific fixed delusion.
- Differentiate from:
  - Schizophrenia: No psychotic symptoms.
  - Delusional disorder: Lack of elaborated delusional story.

Important Concept

Paranoid Pesonality Disorder

Suspiciousness and mistrust of everyone in all situations

6.1.2 Schizoid Personality Disorder

- The "loner"; prefers isolation.
- "Alone and likes it that way."
- Rare to have any relationships outside of family members.
- Has difficulty expressing emotion/emotionally detached.
- Seen by others as eccentric.
- More likely male.
- 7.5% of population.

Important Concept

Schizoid Personality Disorder

Loner who loves isolation

6.1.3 Schizotypal Personality Disorder

- *Very weird.*
- Odd thought patterns, vocabulary, belief systems.
- Eccentric clothing choices.
- Altered perceptions of the world.
- Magical thinking.
- Lack close friends. People tend to avoid them.
- Odd life pursuits: collections.
- Any paranoia is due to unique perceptions/beliefs, not to basic mistrust.
- Many "street people" have this diagnosis.

Important Concept

Schizotypal Personality Disorder

Weird and strange

6.2 Cluster B: Dramatic and Emotional

6.2.1 Narcissistic Personality Disorder

- Arrogant and entitled behavior.
- Interrupts and treats others condescendingly.
- Lack of concern for others.
- Much more common in men.
- Present selves as grand, but actually have low self-esteem.
  - Push grandiosity to cover up their envy of others they feel are better or more able.
  - Prone to depression.
  - Think of such a person as a blown up balloon which looks big, but is just "hot air."
- Differentiate from manic phase by lack of physical manic symptoms.

Important Concept

Narcissistic Personality Disorder

Arrogant, grand, self-important

6.2.2 Histrionic Personality Disorder

- Colorful, extroverted, and dramatic.
- Great need to be the center of attention.
- May be emotionally dramatic and theatrical.
- Makes flirtatious gestures, seductive behavior common.
- May wear racy outfits, revealing clothing.
- More common in women.
- Difficulties with intimacy.
- Initially exciting, but actually very shallow.

Important Concept

Histrionic Personality Disorder

Colorful, dramatic, attention-seeking, seductive

6.2.3 Borderline Personality Disorder

- Two times more likely in women.
- Great difficulty with impulse control.
- Unstable interpersonal relationships (love-hate).
- Key defenses: Splitting, passive-aggressive.
- Fears abandonment or rejection.
- Can rapidly deteriorate into impulsive behaviors such as:
  - Promiscuity
  - Substance abuse
  - Overeating
  - Suicidal gestures
  - Self-injurious behavior (for example, superficial cutting, burning, or nonfatal overdoses)
- Increased rate of suicide (up to 10%), with frequent attempts.
- Often has problems with self-esteem.
- Runs in families.
- Alcohol problem or mood disorder are common co-morbidities.

Important Concept

Borderline Personality Disorder

Impulsive behavior, unstable relationshpis, splitting

6.2.4 Antisocial Personality Disorder (Old Term: Psychopath)

- Lifelong pattern of criminal behavior.
- Ignores rules and laws.
- Disregards social expectations/rules.
- Will lie, exploit, threaten.
- May be aggressive toward others.
- *No remorse, guilt, or shame* for actions.
- No long-term attachments. People are pawns.
- Runs in families.
- Substance abuse is common co-morbidity
- Increased rate of suicide (5%).
- Most of the prison population has this diagnosis.
- If under age 18, use the label: *Conduct disorder.*

Important Concept

Antisocial Personality Disorder

Acts beyond rules with no guilt or shame

6.3 Cluster C: Anxious and Fearful

6.3.1 Avoidant Personality Disorder

- Avoid relationships despite their desire to have them.
- "By themselves, but don't like it."
- Fear rejection and are very sensitive to criticism.
- Timid; socially withdrawn.
- Intense feelings of inadequacy/inferiority cause them to avoid interaction with others.
- Excessively shy.
- Stay in same job, relationship.

Important Concept

Avoidant Personality Disorder

Isolated with few friends but deep craving for relationships

6.3.2 Dependent Personality Disorder

- Want others to run their lives.
- Rely on others for all support.
- Very needy, low self-confidence.
- Cannot make decisions by themselves.
- Continually terrified they may be separated from those they depend on.
- Cannot express disagreement.
- May end up as abused spouses.

Important Concept

Dependent Personality Disorder

Gets others to run their lives

6.3.3 Obsessive-Compulsive Personality Disorder

- Perfectionists; must have absolute control and order.
- Need everything to be "just right."
- Miserly.
- Preoccupied with rules and discipline.
- Lack any sense of humor
- Rigid attention to detail, order, and rules often supersedes any interpersonal concerns or the larger picture.
- Can't stand change. Often find it hard to throw things out.
- Differentiate from obsessive-compulsive anxiety disorder:

Obsessive-Compulsive Personality Disorder	vs.	Obsessive-Compulsive Anxiety Disorder
Lifelong		Developed
All areas		Focal
No obsessions		Obsessions
No compulsions		Compulsions
Anxiety within		Anxiety apparent

Important Concept

Obsessive-Compulsive Personality Disorder

Perfectionist, loves rules and order, no sense of humor

6.3.4 Treatments for Personality Disorders

- Long-term psychotherapy (often 7 to 10 years)
- Personality does not change; instead, we try adding options to it in therapy.

7 Dissociative Disorders

- Dissociation involves the fragmentation of aspects of consciousness.
- Dissociation exists in a spectrum.
- Is relatively benign and very common.
- For example: Daydreaming and zoning out while driving.
- Can be pathologic if uncontrolled.

7.1 Dissociative Amnesia

- The inability to recall important memories; often the memories are very personal and emotionally charged.
- Thought to be triggered by severe stress (for example, battle or traumatic accidents).
  - Amnesia can be selective for a period of time or aspects of an experience.
  - Or can be generalized when it covers most of the patient's life span.
- Treatment: Psychotherapy is usually aimed at relieving the emotional stress.

7.2 Dissociative Fugue

- Sudden unexpected travel, confusion of one's identity, and an inability to remember one's past. Sometimes people assume a new identity.
- "Amnesia + Travel"
- Patients do not have other impairments and do not appear ill.
- Often is a reaction to severe, stressful life event, and gradually resolves on its own (lasting hours to months).

7.3 Dissociative Identity Disorder

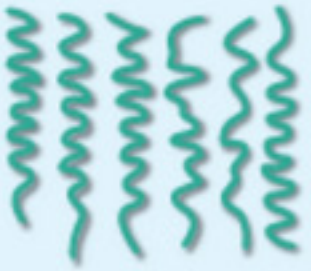
A controversial disorder.

- Patient has multiple (two or more) distinct personalities that control his or her behavior.
- Associated with amnestic periods when a patient doesn't remember when a different personality was in charge.
- One personality "in charge" usually remembers all.
- May be iatrogenic.

7.4 Depersonalization Disorder

- A repetitive, pervasive sense of being detached from one's being.
- "Out of body."
- Sense of watching self, floating, or flying.
- Seeing self as an outside observer, but reality testing remains intact.
- Depersonalization episode can be induced by substance abuse or to handle acute traumatic experiences.
- Psychotherapy is often used to resolve the tension created by the stressful stimulus.

8 Cognitive Disorders

Name	Localization	Original Drawing	Patient's Drawing
Perseveration	Frontal lobe		
Constructional apraxia	Non-dominant parietal lobe		
Hemineglect/ hemi-inattention	Right parietal lobe		

▲ **Figure 10-8.0** Neuropsychological Exam Results

8.1 Brain Lesions

8.1.1 Frontal Lobe Functions

- Speech, personality, abstract thought, higher-order mental functions
- Executive functions: Capacity to initiate and stop tasks
- Lesions
  - **Dorsal prefrontal cortex:**
    - —Decreased drive
    - —Apathy
    - —Lack of initiative
    - —Poor grooming
    - —Wandering attention
    - —Difficulty with abstract thinking
    - —(If dominant hemisphere) Broca aphasia
  - "For Broca, speech is broken."
    - —Summary: "Dorsal prefrontal lesion leaves the patient docile, dirty, and dim."
  - **Orbitomedial frontal cortex**
    - —Explosive moods
    - —Violent outburst
    - —Loss of inhibitions

- —Fearfulness
- —Withdraw
- —Summary: Remember as "You explode into Orbit."

8.1.2 Temporal Lobe

- Language (Wernicke area)
- Memory (medial temporal lobe links into hippocampus)
- Emotion
- Lesions
  - Bilateral lesions result in frank dementia.
  - Lesions of medial temporal lobe create difficulties in creating new memories.
  - **Dominant lobe lesions**
    - —Euphoria and excitement
    - —Psychotic symptoms:
      - Auditory hallucinations
      - Delusions
      - Thought disorders
    - —If Wernicke area is affected: Poor verbal comprehension
  - **Nondominant lobe lesions**
    - —Mild depression
    - —Irritability
    - —Decreased or loss of artistic (musical, visual) abilities

8.1.3 Parietal Lobe

- Intellectual processing of sensory information
  - Left: Verbal processing
  - Right: Associated with visual-spatial processing
- "Where sense gains sensibility."
- Lesions
  - **Dominant lobe**
    - —Gerstmann syndrome
      - Loss of ability to write (agraphia)
      - Loss of ability to do basic math (acalculia)
      - Cannot say which unseen finger is touched (finger agnosia)
      - Right-left disorientation and confusion
    - —Dysfunctions in this area are responsible for most of what we call "learning disabilities."
  - **Nondominant lobe**
    - —Denial of illness. Patient says that nothing is wrong (anosognosia).
    - —Difficulty outlining objects (constructional apraxia).
    - —Neglect of opposite side
      - Not washing or dressing the opposite side.
      - Not being able to locate things on or held by opposite side of the body.

8.1.4 Occipital Lobe Lesions

- Visual input
  - Active when we are looking
  - Also, when recalling scenes or images
  - Active for visual hallucinations
  - Lesion
    - —Destruction = cortical blindness
    - —More minor lesions disrupt the ability to detect camouflaged objects
    - —Bilateral blockage of posterior cerebral arteries produces Anton syndrome; cortical blindness; denial of blindness

8.2 Dementias

- Decline in memory *and* impairment of at least one of the following:
  - *Aphasia*: Impairment of power to use or comprehend words.
  - *Apraxia*: Volitional motor disorder.
  - *Agnosia*: Inability to recognize objects.
  - *Executive functioning*: Higher-order processing: Plan, sequence, initiate.
- Prevalence
  - 15% to 20% of people older than 65
  - 45% of people older than 80
- Facts
  - 15% of dementias are reversible
  - 60% of dementias are due to Alzheimer (most common) disease
  - 15% are due to cerebrovascular disease

8.3 Delirium

- Disturbance in consciousness
- Reduced ability to focus, sustain, or shift attention
- Relatively *sudden onset* and *fluctuates* during the course of the day
- Direct effect of a general medical condition
- Most common psychiatric illness in hospitalized patients (30% of ICU patients)
- Presentation
  - Delusions, hallucinations
  - Sleep-wake disturbances ("sundowning")
  - Autonomic dysfunction
  - Fluctuating states of arousal and confusion
- Reasons for delirium: Use the mnemonic, "I WATCH DEATH"
  - **I**nfection
  - **W**ithdrawal
  - **A**cute Metabolic
  - **T**rauma
  - **C**NS Pathology
  - **H**ypoxia

- **D**rugs/Medications
- **E**ndocrine
- **A**cute Vascular
- **T**oxins
- **H**eavy Metals

- Treatment:
  - Address underlying medical issue.
  - Orient patient to person, place, time.

▼Table 10-8.3 Delirium and Dementia

Delirium	vs.	Dementia
Acute, rapid onset		Chronic, insidious onset
Duration: Days to weeks		Duration: Months to years
Waxing and waning course		Progressive
Hallucinations not uncommon		Hallucinations less common
Reversible		Most not reversible
Often associated with prominent physiological changes: Vitals, metabolic abnormalities		Normal vital and physiology

8.4 Alzheimer Dementia

- Risk factors
  - Age
  - Slightly more in women than in men
  - Family history
  - ApoE4 allele
  - Down syndrome
  - Abnormalities on chromosomes 1 and 14 (early onset type)
- Pathology
  - Gross
    - —Diffuse atrophy on CT or MRI of brain
    - —Medial temporal lobes most severely affected
  - Microscopic
    - —Amyloid plaques
    - —Neurofibrillary tangles (contain tau protein)
  - Neurochemical
    - —Loss of cholinergic neurons in the amygdala, hippocampus, and temporal neocortex
    - —Reduction in brain levels of choline acetyltransferase (synthesizes ACh)
- Course of illness
  - Insidious, gradual deterioration
  - Cognitive symptoms precede behavioral symptoms
  - Death in 8 to 10 years

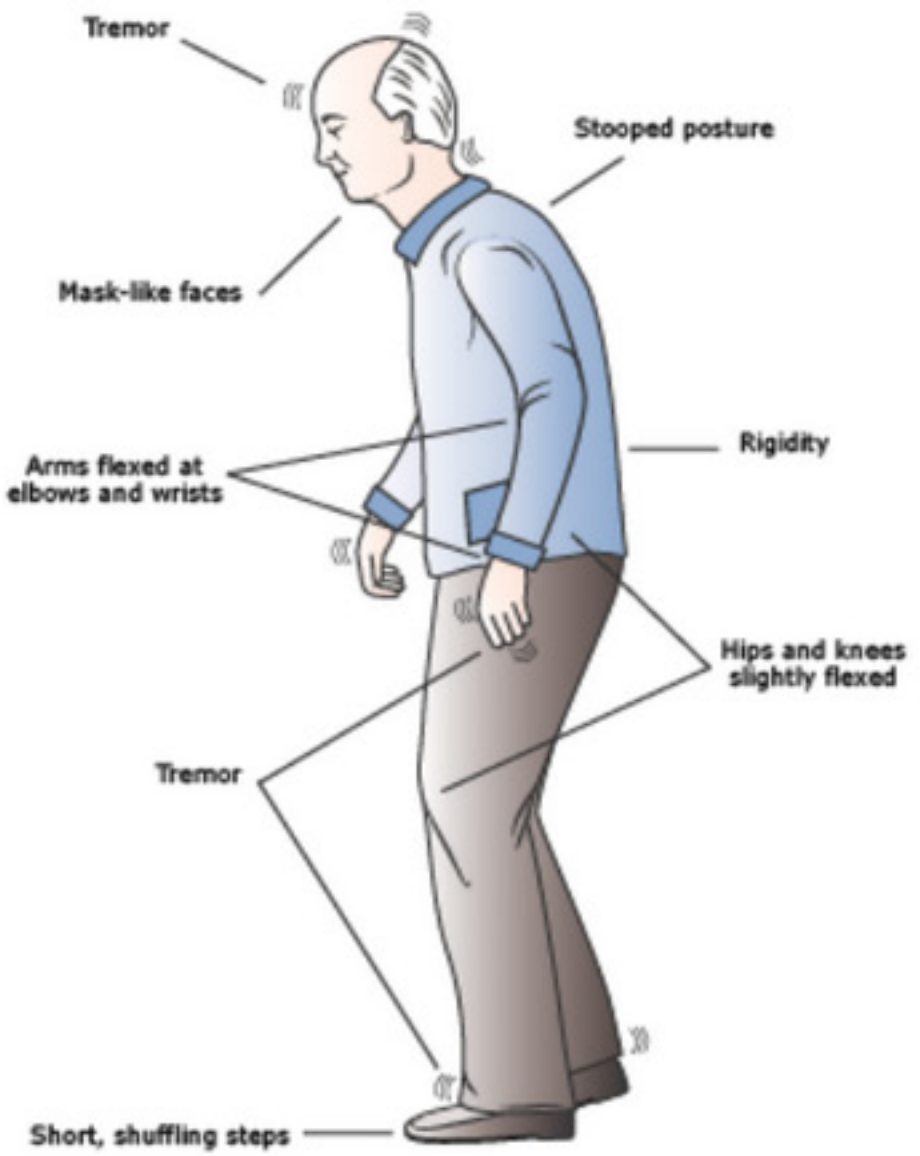
- Treatment
  - Education of family.
  - Supportive care: Food, hygiene, etc.
  - Labeling rooms and items.
  - *Keep in same environment* if at all possible. External structure support in internal organization. Changing setting usually results in rapid decline in function.
    - *If no longer competent,* arrange for power of attorney, guardianship.
    - Pharmacological treatment
    - Acetylcholinesterase inhibitors
    - Not a cure, but help slow the progression of the disease
    - Donepezil (Aricept), rivastigmine (Exelon), galantamine (Reminyl)
    - Antipsychotics can help with psychosis and agitation
    - Avoid benzodiazepines
    - NMDA receptor antagonist—memantine

8.5 Dementia: Vascular

- Epidemiology
  - Most prevalent between ages 60 and 70
  - Men more than women
  - 15% of all elderly
  - Hypertension is primary predisposing factor
- Characteristics:
  - Quick onset
  - *Stepwise* progression of cognitive deficits
  - Focal signs with deficits in motor or sensory
  - Look for lateralized neurological signs

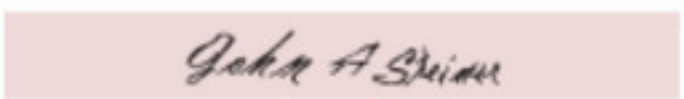
8.6 Parkinson Disease

- Epidemiology
  - Annual prevalence is 200 in 100,000.
  - Typical age of onset is ages 50 to 60.
  - More than 40% will eventually develop dementia.
- Pathology
  - Degeneration of neurons of the substantia nigra.
  - Brain loses the ability to convert tyrosine into L-dopa (and subsequently to dopamine).
- Symptoms
  - Tremor: Pill-rolling (back and forth, thumb and forefinger), resting
  - Cogwheel rigidity
  - Bradykinesia (decreased motor activity)
  - Masked facies (decreased expression)
  - Gait abnormalities: Shuffling, festinating (short accelerating)
  - Decreased arm swing
  - Micrographia
  - Depression is common

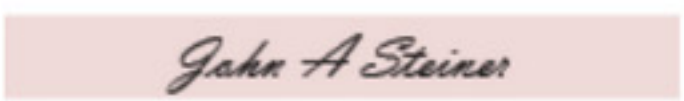


▲ **Figure 10-8.6A** Signs of Parkinson Disease

- Treatment
  - Tries to maintain normal dopamine activity
    - —Dopamine release facilitation and reuptake blockade: Amantadine (Symmetrel)
  - Dopamine precursor: Levodopa
    - —Given with peripheral dopa decarboxylase inhibitor (carbidopa, Sinemet), which is helpful in the first few years
    - —Late in disease, patients may require multiple doses at varying ratios/strengths
    - —Given together with carbidopa (helps L-dopa reach brain)
  - Dopamine agonists:
    - —Ergot derived—Bromocriptine (Parlodel), pergolide (Permax)(or generics)
    - —Non-ergot derived—Ropinirole (Requip), pramipexole (Mirapex)
  - Monoamine oxidase B inhibitor
    - —Selegiline
  - Catechol O-methyltransferase inhibitor
    - —Tolcapone (Tasmar)
    - —Entacapone (Comtan)



Unmedicated Patient



Medicated Patient

▲ **Figure 1-8.6B** Micrographia

8.7 Huntington Disease

- *Autosomal dominant*
- Due to unstable *trinucleotide repeat* (CAG) on chromosome 4; more repeats correlate with earlier age of onset
- Atrophy of caudate nucleus and putamen
- Onset between 30 and 40 years of age
- Males = females
- Progressive and leads to death in 10 to 15 years
- *Huntington Chorea*
  - *Choreoathetoid movements* (writhing)
  - Psychopathological changes are common: Depression, anxiety, personality changes, psychosis
  - Dementia occurs in most cases
- Suicide is common

8.8 Pick Disease

- Very rare
- Affects frontal and temporal lobes
- Prominent *personality changes* (disinhibition, emotional lability)
- Similar to Alzheimer in terms of cognitive deterioration
- Histopathology: intraneuronal inclusions, swollen neurons

8.9 Dementia With Lewy Bodies (LBD)

- Progressive dementia with Parkinsonian symptoms
- Prevalence unknown, but may be third most common (after AD and vascular)
- Fluctuation in level of attention and cognitive deficits
- May see *hallucinations*, psychotic symptoms

8.10 Creutzfeldt-Jakob Disease

- *Spongiform encephalopathy* caused by *prion* disease
- Rapidly progressive, fatal in two years or less
- Hypertonicity
- EEG changes: Slow, irregular, periodic complex discharge

8.11 AIDS Dementia

- Seen in patients with high viral load, advanced AIDS
- Prior to Highly Active Antiretroviral Therapy, seen in 60% of patients, now less than 10% of AIDS patients in the U.S.
- Cognitive decline and motor slowing

8.12 Normal Pressure Hydrocephalus (Too Much CSF)

- Symptom triad:
  - Dementia
  - Gait disturbance
  - Urinary incontinence
- Treat with shunt if LP therapeutic

8.13 Wilson Disease

- Autosomal recessive disorder (chromosome 13)
  - Affects one in 30,000
  - *Copper* accumulation
  - Treatment:
    - —Dietary restriction of copper
    - —Chelating agents (dimercaprol, penicillamine)
  - Signs and symptoms
    - —Tremor and rigidity
    - —Dystonia
    - —Hepatosplenomegaly
    - —Jaundice
    - —Hepatitis
    - —Kayser-Fleischer rings
    - —Depression
    - —Mania
    - —Disinhibition
    - —Personality changes
    - —Serum copper will be decreased

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