Morbidity and Mortality in Adolescents

LEARNING OBJECTIVE:

DESCRIBE THE IMPORTANT HEALTH AND MEDICAL PROBLEMS COMMONLY SEEN IN ADOLESCENTS
Morbidity and Mortality in Adolescents

- Generally a healthy group
  - Low incidence of serious medical problems, especially those not already present in childhood
  - Mortality ---leading cause is injury
  - Morbidities ---behaviorally determined
Leading Causes of Mortality, Ages 13-18 years

- Unintentional Injury (39.3%)
- Homicide (14.9%)
- Suicide (14.3%)
- Malignant Neoplasm (6.9%)
- Heart Disease (3.2%)
- Congenital Abnormality (2.6%)
- Influenza and Pneumonia (1.9%)
- Other (17%)

Source: CDC: WISQARS 2009
Causes of Unintentional Injury, Ages 15-19

Source: MMWR April 20, 2012 / 61(15):270-276
| RANK | Infants Under 1yo | Toddlers 1-3yo | Young Children 4-7yo | Children 8-15yo | Teens 16-20yo | Young Adults 21-24yo | Older Adults 55+ | All Ages | Years of Life Lost)* |
|------|------------------|---------------|----------------------|----------------|--------------|---------------------|----------------|——|-----------------|
| 1    | Perinatal Period | Congenital Anomalies | MV Traffic Crashes | MV Traffic Crashes | MV Traffic Crashes | MV Traffic Crashes | Malignant Neoplasms | Malignant Neoplasms | Heart Disease | Heart Disease | Heart Disease | Malignant Neoplasms | 25%(6,672,709) |
| 2    | Congenital Anomalies | Accidental Drowning | Malignant Neoplasms | Malignant Neoplasms | Homicide | Homicide | Suicide | Heart Disease | Heart Disease | Malignant Neoplasms | Malignant Neoplasms | Heart Disease | 21%(6,627,857) |
| 3    | Heart Disease | MV Traffic Crashes | Congenital Anomalies | Suicide | Suicide | Homicide | MV Traffic Crashes | Diabetes | Stroke | Stroke | MV Traffic Crashes | 5%(725,970) |
| 6    | Septicemia | Exposure to Smoke/Fire | Homicide | Heart Disease | Heart Disease | Heart Disease | Heart Disease | HIV | Chronic Liver Disease | Influenza/ Pneumonia | Influenza/ Pneumonia | Perinatal Period | 3%(118,464) |
| 7    | Nephritis/ Nephrosis | Heart Disease | Heart Disease | Accidental Drowning | Accidental Drowning | Accidental Drowning | Malignant Neoplasms | Homicide | Suicide | Diabetes | Nephritis/ Nephrosis | Diabetes | 3%(1,104,339) |
| 8    | MV Traffic Crashes | Influenza/ Pneumonia | Exposure to Smoke/Fire | Congenital Anomalies | Congenital Anomalies | Congenital Anomalies | Chronic Liver Disease | 0 | MV Traffic Crashes | MV Traffic Crashes | 3%(1,067,000) |
| 9    | Stroke | MV Nontrafic Crashes | MV Nontrafic Crashes | Malignant Neoplasms | Stroke | Stroke | Accidental Poisoning | Septicemia | Nephritis/ Nephrosis | Homicide | Nephritis/ Nephrosis | Nephritis/ Nephrosis | 2%(827,103) |
Morbidity and Adolescents:

- Mental Health Problems
  - Depression, suicide, anxiety, stress-related problems, family dysfunction, ADHD, substance use/abuse; behavior problems

- Obesity
  - Poor nutrition, sedentary lifestyles
  - Medical consequences occurring earlier

- Sexuality-related
  - STD’s, pregnancy

- Injuries – intentional and unintentional

- Dental problems
Most health problems directly or indirectly caused by behavioral, environmental or social issues
- Driven by developmental changes occurring during this time and social/environmental contexts surrounding adolescents
- Many patterns established that also determine adult health
- Thus, adolescent is a key time for health promotion and disease prevention
- Access to appropriate care often key obstacle
Tasks of Adolescence

- Puberty
- Psychosocial Development
  - Autonomy
  - Identity
- Cognitive Development
  - Concrete to Abstract Thinking
Adolescent Autonomy

- Limit-testing (challenging rules)
- Experimental behavior (smoking, alcohol, marijuana)
- Risk-taking (D.U.I., Ø contraception)
- Need for control (resisting authority)
Approach to Adolescents in the Clinical Setting

Learning Objective:

To understand how to approach teens in clinical setting and the specific components of preventive care
Creating a Conducive Environment

- Encourage discussion and disclosure by ensuring privacy, minimizing interruptions
- Establish limits of confidentiality with teen and parent at outset
- Obtain initial history, PMH, FH with parent present; remainder privately and directly from teen
  - Screening for health risk behaviors an integral part of visit
- Include parents at the end as part of summary
Consent and Confidentiality

- Exceptions to consent limits for <18 years
  - Emergencies
  - Mature minors
  - Emancipated minors
  - Specific situations
    - Reproductive care
    - Mental health/substance use treatment in outpatient setting

- Confidentiality generally follows from consent, but more difficult to insure
  - Mandated reporting limits; for <13 year olds
Psychosocial Assessment

- **HEEADSSS acronym**
  - **Home** – family configuration and relationships
  - **Education** – school/work, future plans, performance
  - **Eating** – nutrition history, concerns, behaviors
  - **Activities** – peers, recreational activities, dating
  - **Drugs** - personal, peer and family substance use
  - **Sexuality** – orientation, sexual activity, abuse
  - **Suicide** - mental health concerns
  - **Safety** – risk of unintentional and intentional injury
CRAFFT Screening Tool

3 Opening Questions:

During the PAST 12 MONTHS, did you:

1. Drink any **alcohol** (more than a few sips)?
2. Smoke any **marijuana** or hashish?
3. Use **anything else** to get high?

If NO – Ask the “**Car**” question and counsel.

Any positive responses, ask full **CRAFFT**

Score 1 for each positive answer, >2 indicates positive screen
CRAFFT Screening Tool

Have you ever ridden in a **CAR** by someone (including yourself) who was high or was using alcohol or drugs?

Do you ever use alcohol or drugs to **RELAX**, feel better about yourself or fit in?

Do you ever use alcohol or drugs while you are by yourself? (**ALONE**)

Do your family or **FRIENDS** ever tell you that you should cut down on your drinking or drug use?

Do you ever **FORGET** things that you did while using alcohol or drugs?

Have you gotten in **TROUBLE** while you were using alcohol or drugs?

Knight, J. et.al. 2002: alpha - .68; sensitivity .80; specificity .86; to predict any problem- PP+ .83; PP-.91.
Physical Examination

- Vital signs – BP, HT and Wt. – BMI, %ile
- Assess growth and development
  - Sexual maturity rating (Tanner stages)
  - Pubic hair/ genitals – pubic hair/breasts
- Vision/Hearing – 25% teens have less than 20/40
- Teeth – dental caries and gum disease
- Skin – acne
- Musculoskeletal – scoliosis, athletics, injuries
- Detect unnoticed disease; monitor chronic
### Current Immunizations

**FIGURE 2: Recommended immunization schedule for persons aged 7 through 18 years—United States, 2012**

(For those who fall behind or start late, see the schedule below and the catch-up schedule [Figure 3]).

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>7–10 years</th>
<th>11–12 years</th>
<th>13–18 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tetanus, diphtheria, pertussis¹</td>
<td>1 dose (if indicated)</td>
<td>1 dose</td>
<td>1 dose (if indicated)</td>
</tr>
<tr>
<td>Human papillomavirus²</td>
<td>see footnote²</td>
<td>3 doses</td>
<td>Complete 3-dose series</td>
</tr>
<tr>
<td>Meningococcal³</td>
<td>See footnote³</td>
<td>Dose 1</td>
<td>Booster at 16 years old</td>
</tr>
<tr>
<td>Influenza⁴</td>
<td>Influenza (yearly)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pneumococcal⁵</td>
<td>See footnote 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis A⁶</td>
<td>Complete 2-dose series</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hepatitis B⁷</td>
<td>Complete 3-dose series</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inactivated poliovirus⁸</td>
<td>Complete 3-dose series</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measles, mumps, rubella⁹</td>
<td>Complete 2-dose series</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Varicella¹⁰</td>
<td>Complete 2-dose series</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Current Immunizations

- **Tdap**
  - Provides acellular pertussis booster
  - Age 11-12
- **Varicella**
  - Two shot series
- **Meningococcal vaccine – Menactra**
  - At age 11-12 years with booster at age 16
- **Gardasil – HPV vaccine**
  - 3 shot series for 11-26 year old females and males
- **Hepatitis A**
  - Two shot series
Reproductive Health

- Screening for all sexually active teens
  - GC, CT, - urine based tests
  - HIV recommended by CDC
  - VDRL, with STDs and MSM
- Encourage postponement, responsible behaviors
  - Condoms, Birth control
- New recommendations for pap smears
  - >21 yrs
Lab Tests

- In asymptomatic teen, keep to a minimum
  - Hemoglobin/hematocrit – Fe deficiency
    - At initial visit; at end of pubertal growth; heavy menses
  - Urinalysis
    - Once during adolescence?
  - Targeted cholesterol/triglyceride screening
    - Fasting lipids, glucose, LFT’s with obesity
    - Positive family history
- Evidence for effectiveness of any of these is very limited.
Learning Objective:

To understand the evaluation and management of specific clinical issues among adolescents and young adults.
Specific Clinical Issues

- Reproductive Concerns
  - Contraception
  - STI screening and treatment
  - Pregnancy

- Disordered eating
  - Unexplained weight loss – mental health vs. eating disorder
  - Bulimia/Binge eating disorders

- Obesity – secondary complications
  - OSA, PCOS, lipid abnormalities, Type 2 diabetes, hypertension

- Mental Health
  - Mood disorders, Anxiety, Family issues, abuse, substance abuse, behavioral
Adolescent Sexual Experience

Percent of males and females ages 15–19 who have ever had sexual intercourse

- Males 15-17
- Females 15-17
- Males 18-19
- Females 18-19

Year:
- 1988
- 1995
- 2002

Percentages from 0% to 100%
Ever Had Sexual Intercourse, 2005 YRBS

By The End of High School, The Majority of Students Will Have Had Sexual Intercourse
Reproductive Issues - Females

- Routine pap test recommended to start at age 21
- Contraception
  - OCPs,
  - Depopovera
  - LARC – Nexplanon, IUDs
  - Condoms
- Reproductive preventive care
  - Screening/treatment for STIs
    - GC, CT, HIV
  - HPV immunization
  - Emergency contraception
- STI – screening and treatment
Reproductive Issues: Males

- Screening and treatment for STIs
  - Condom use
- GU issues
  - Testicular abnormalities
  - Varicocele
- HPV immunization
  - Gardasil 4 – 11-26 years
  - Gardasil 9 – 11-15 years
- STI – screening and treatment
Chlamydia: Age and Sex-Specific Rates: United States, 2004

Rate (per 100,000 population)
Eating issues

- Weight loss
  - Anorexia nervosa, ARFID
  - Secondary to mental health concerns – anxiety, depression
  - Secondary to medical condition
- Binge eating disorder
- Bulimia
- Obesity
Eating Disorders: Epidemiology

- **Age of onset:** Bimodal 14 and 18 years
- **Sex ratio:** Female to male ratio 3:1
- **Prevalence:**
  - Anorexia nervosa: lifetime - .9% females; .05% males
  - Bulimia nervosa: lifetime prevalence – 1-3% females; 0.5% males
  - ED – NOS : lifetime – ~5% all adolescents
  - BED: 3.5% females; 2% males
- **Familial pattern:** More common in sisters and mothers of those with disorder
- **Complications:** Mortality rates between 5 and 15%

Disordered eating is third most common chronic illness among adolescent girls after obesity and asthma.
## DSM-IV and V - Anorexia Nervosa

<table>
<thead>
<tr>
<th>Criterion</th>
<th>DSM-IV</th>
<th>DSM-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Refusal to maintain body weight at or above 85% of expected OR</td>
<td>Restriction of energy intake relative to requirements → markedly low body weight for age and height (=less than minimally expected weight)</td>
</tr>
<tr>
<td></td>
<td>Failure to make expected weight gain during a period of growth leading to body weight less than 85% of expected weight</td>
<td>Intense fear of gaining weight and/or becoming fat, persistent behavior that interferes with weight gain</td>
</tr>
<tr>
<td>B</td>
<td>Intense fear of gaining weight and/or becoming fat</td>
<td>Body image distortion</td>
</tr>
<tr>
<td>C</td>
<td>Body image distortion</td>
<td>REMOVED</td>
</tr>
<tr>
<td>D</td>
<td>Amenorrhea, defined as absence of menstruation for at least 3 consecutive cycles)</td>
<td>Body image distortion</td>
</tr>
</tbody>
</table>
## DSM-IV and V - Anorexia Nervosa

<table>
<thead>
<tr>
<th>Subtype</th>
<th>DSM-IV</th>
<th>DSM-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restricting</td>
<td>During the current AN episode, person has not regularly engaged in binge-eating or purging behavior</td>
<td>During the last 3 months, the individual has <strong>not</strong> engaged in recurrent episodes of binge-eating or purging behavior</td>
</tr>
<tr>
<td>Binge/purge</td>
<td>During the current AN episode, the person has regularly engaged in binge-eating or purging behavior</td>
<td>During the last 3 months, the individual <strong>has</strong> engaged in recurrent episodes of binge-eating or purging behavior</td>
</tr>
</tbody>
</table>
## DSM-V - Avoidant-Restrictive Food Intake Disorder

<table>
<thead>
<tr>
<th>Criterion</th>
<th>DSM-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Inadequate intake; restricted range of food or calories → weight loss; sensory.</td>
</tr>
<tr>
<td>B</td>
<td>Reduced food intake due to emotional disturbance related to eating without concern for body image. Major meal conflicts.</td>
</tr>
<tr>
<td>C</td>
<td>Fear of eating related to an actual adverse event (choking, gagging, vomiting)</td>
</tr>
</tbody>
</table>
### DSM-IV and V – Bulimia Nervosa

<table>
<thead>
<tr>
<th>Criterion</th>
<th>DSM-IV</th>
<th>DSM-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Recurrent episodes of binge eating</td>
<td>UNCHANGED</td>
</tr>
<tr>
<td>B</td>
<td>Recurrent inappropriate compensatory behaviors to prevent weight gain</td>
<td>UNCHANGED</td>
</tr>
<tr>
<td>C</td>
<td>The binge and “purge” both occur, on average, at least twice per week for 3 months</td>
<td>The binge-eating and compensatory behaviors both occur, on average, at least once per week for 3 months</td>
</tr>
<tr>
<td>D</td>
<td>Self-evaluation is unduly influenced by body shape and weight</td>
<td>UNCHANGED</td>
</tr>
<tr>
<td>E</td>
<td>This disturbance does not occur exclusively during episodes of AN</td>
<td>UNCHANGED</td>
</tr>
</tbody>
</table>
### DSM-IV and V – Bulimia Nervosa

<table>
<thead>
<tr>
<th>Subtype</th>
<th>DSM-IV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purging</td>
<td>During the current episode of BN, the person has regularly engaged in self-induced vomiting or the misuse of laxatives, diuretics or enemas</td>
</tr>
<tr>
<td>Non-purging</td>
<td>During the current episode of BN, the person has used other compensatory behaviors such as fasting or excessive exercise</td>
</tr>
</tbody>
</table>

### DSM-V

- **REMOVED**
- **REMOVED**

| Criterion B | Recurrent inappropriate compensatory behaviors to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, or other medications, fasting; or excessive exercise |
Eating Disorders: Evaluation and Management

- Comprehensive medical and mental health assessment
  - Rule out other medical or mental health causes
    - Thyroid disease, Addison’s, IBD, Infections (HIV, TB), Celiac/GI, cancer
    - Depression, Anxiety, PTSD, Family chaos/conflict
  - Screening labs to rule out medical –
    - CBC, ESR, CMP, divalents, TSH, TTG/IgA, HIV, EKG
  - Screening tests for mental health disorders
- Outpatient treatment team – medical, counseling (CBT), nutrition
- Inpatient treatment team – protocol driven multidisciplinary team management – nutritional rehab, possibly mental health/ED specific
- Psychotropics only for co-morbid conditions; SSRIs for binge eating
Eating Disorders: Diagnosis and Assessment

- **Laboratory Assessment**
  - CBC and platelets, ESR, BUN, CR, electrolytes, LFTs, Ca, phosphate, Mg, albumin, T4, TSH, ECG
  - Consider bone mineral density if amenorrheic for > 6 months

- **Nutritional Assessment**
  - 24 hour recall,
  - %IBW – utilize BMI 50%ile for age (~BMI <16)
  - Recent losses or gains
    - Can determine degree of malnutrition
When to Admit?
Indications for Hospitalization

- Hypovolemia/ hypotension
- Severe malnutrition - <75% IBW
- Cardiac dysfunction, arrhythmias, prolonged QT interval
- Bradycardia <45 beats/minute
- Electrolyte disturbance – hypokalemia, hypoglycemia
- Rapid weight loss despite interventions
- Intractable binge-purge episodes
- Suicidal thoughts or gestures
- Highly dysfunctional or abusive family
- Failure of outpatient therapy
Obesity

- Medical consequences
  - Type 2 Diabetes
  - Hypertension
  - Metabolic syndrome
  - OSA
  - Orthopedic issues
  - PCOS

- Screening tests
  - Fasting lipid panels, Fasting glucose, Hgb A1C, 2-hour OGTT; androgen panel
  - Sleep studies, EKG

- Treatment
  - Nutrition education; counseling, Metformin, CPAC, antihypertensives
### DSM-IV and V – Binge Eating Disorder

<table>
<thead>
<tr>
<th>Criterion</th>
<th>DSM-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Recurrent episodes of binge-eating, characterized by both of the following: 1) Eating, in a discrete period of time (e.g. any 2 hr period), an amount of food that is definitely larger than most people would eat in the same situation 2) A sense of lack of control over eating during the episode</td>
</tr>
<tr>
<td>B</td>
<td>The binge-eating episodes are associated with 3+ of the following: 1) Eating much more rapidly than usual 2) Eating until feeling uncomfortably full 3) Eating large amounts of food when not physically hungry 4) Eating alone because of being embarrassed by how much one is eating 5) Feeling disgusted with oneself, depressed, or very guilty after overeating</td>
</tr>
</tbody>
</table>
## DSM-IV and V - BED

<table>
<thead>
<tr>
<th>Criterion</th>
<th>DSM-V</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>Marked distress regarding binge-eating is present</td>
</tr>
<tr>
<td>D</td>
<td>The binge-eating occurs, on average, at least 1x/week for 3 months</td>
</tr>
<tr>
<td>E</td>
<td>The binge is not associated with the regular use of compensatory behaviors and does not occur exclusively during the course of AN or BN</td>
</tr>
</tbody>
</table>
Mental Health Disorders

- Depression
- Anxiety
  - PTSD
  - OCD
- ADHD
- Substance Use Disorders
- Behavioral issues
  - ODD, Conduct disorder, impulse control disorder
- Thought disorders – schizophrenia
- Bipolar Disorder
Screening Tools

- Depression
  - Beck depression inventory
  - PHQ-9
- Anxiety Screening Tools
  - GAD – 7 (Generalized Anxiety Disorder)
Transition to Adult Care

- Main focus of Federal government
  - www.gottransition.org
- 6 components
  - Transition Policy
  - Tracking and monitoring
  - Transition readiness
  - Transition planning
  - Transfer of care/Initial IM visit
  - Transfer completion
Mental Health Disorders: Treatment

- Mood Disorders
  - Counseling plus SSRIs – best results
- ADHD/ADD
  - Stimulants
  - Non-stimulants
- Substance Abuse
  - Marijuana
  - Alcohol
  - Opioids – suboxone
- ODD/Conduct – behavioral modification
Prevalence Data – Lifetime use by 16-17 year olds

- Alcohol 32.4%
- Cigarettes 21.5%
- Any illicit substance 38.5%
- Marijuana 32.4%
- Stimulants 3.7%
  - Methamphetamines 1.0%
- Inhalants 6.8%
- Tranquilizers 5.4%
- Hallucinogens 6.6%
- Cocaine 2.3%
- Sedatives 0.9%
- Heroin 0.4%
- Narcotics (other than heroin) 15.6%
  - Pain Relievers 3.1%
  - Oxycontin 2.6%

National Survey of Drug Use and Health, 2012 data
### Drugs of Choice for Teens

<table>
<thead>
<tr>
<th>Substance</th>
<th>Used in Past 30 Days</th>
<th>Used in Past Year</th>
<th>Used in Lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>19.1%</td>
<td>31.8%</td>
<td>37.3%</td>
</tr>
<tr>
<td>Cigarettes</td>
<td>18.2%</td>
<td>23.8%</td>
<td>35.8%</td>
</tr>
<tr>
<td>Marijuana/Hashish</td>
<td>8.3%</td>
<td>14.1%</td>
<td>17%</td>
</tr>
<tr>
<td>Hallucinogens</td>
<td>1.8%</td>
<td>3.8%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Analgesics (Painkillers)</td>
<td>1.2%</td>
<td>3.7%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Smokeless Tobacco</td>
<td>1.2%</td>
<td>3.7%</td>
<td>8.9%</td>
</tr>
<tr>
<td>Inhalants</td>
<td>1.1%</td>
<td>2.9%</td>
<td>6.1%</td>
</tr>
<tr>
<td>Cocaine and Crack</td>
<td>1.0%</td>
<td>2.2%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Stimulants</td>
<td>0.6%</td>
<td>1.2%</td>
<td>1.7%</td>
</tr>
<tr>
<td>Depressants</td>
<td>0.5%</td>
<td>1.7%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Heroin</td>
<td>0.2%</td>
<td>0.3%</td>
<td>0.4%</td>
</tr>
</tbody>
</table>