Adolescent Women: A Vulnerable Population

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2014 Maryland STI Update
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Disclosure

• I have no relevant financial relationships with the manufacturer(s) of any commercial product(s) and/or provider(s) of commercial services discussed in this CME activity.

• I do not intend to discuss off-label use of products in this presentation.
Objective

• Use clinical scenarios, epidemiology, and public health outcomes data to understand sexual health vulnerability for young women

• To identify strategies for public health professionals to take a more active role in prevention
vul·ner·a·ble

- Susceptible to physical or emotional attack or harm
- (of a person) in need of special care, support, or protection because of age, disability, or risk of abuse or neglect
Civil Discourse Women’s Sexual Health Rights?
"Gonorrhea, syphilis, chlamydia, herpes, HIV positive, genital warts..."
Biological, Developmental & Ecological Issues

ANATOMY OF A TEENAGER'S BRAIN

THE BIRDS AND THE BEES LOBE

MEMORY FOR MUSIC

REBELLION CENTER

SUPER TURBO REBELLION CENTER

MERCY FOR PARENTS

LOVE FOR PARENTS

ALL THE ANSWERS

EATING HABITS

PEER PRESSURE RESISTANCE

SLANG DECODER

COOL" GAUGE

CENTER OF UNIVERSE CENTER

SELF IMAGE

FITTING IN GLAND

EVERY EPISODE OF THE SIMPSONS

INDESTRUCTIBILITY CORTEX

INTERNET ADDICTIONS

SLAM DOOR REFLEX

CAR KEYS CRAVING

ABILITY TO BE SEEN IN PUBLIC WITH PARENTS

Judgement Gland

Memory for chores, homework, etc.

MarkParisi@aol.com
Added Biological Vulnerability for Adolescent Girls

Cervix

Ectopy

Courtesy Dr. S. Jean Emans, Boston Children’s Hospital
Percentage of US High School Students Who Have Had Sex

YRBSS, 2011 (N=15,503)

<table>
<thead>
<tr>
<th></th>
<th>9th</th>
<th>10th</th>
<th>11th</th>
<th>12th</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>27.80%</td>
<td>43.00%</td>
<td>51.90%</td>
<td>63.60%</td>
</tr>
<tr>
<td>Male</td>
<td>37.80%</td>
<td>44.50%</td>
<td>54.50%</td>
<td>62.60%</td>
</tr>
<tr>
<td>Overall</td>
<td>32.90%</td>
<td>43.80%</td>
<td>53.20%</td>
<td>63.10%</td>
</tr>
</tbody>
</table>

 Overall Across Years=47.4%
Sexual Risk-Taking Baltimore, 2007

• Sexual Behavior
  – 67% HS students have had intercourse
    • 18.6% before age 13 years
    • 12% more than 4 lifetime partners
    • 26% did NOT use condoms at last sex
    • 12.2% drank alcohol or used drugs before last sex
    • 11% did NOT any method to prevent pregnancy
  – Baltimore adolescents engage in enhanced STI prevention behaviors compared with many jurisdictions around the country
  – STI health disparities remain

Source: Centers for Disease Control; http://www.cdc.gov/healthyyouth/yrbs/factsheets/index.htm#compare
Case 1

• 16 year old female presents for well PE
• HEADDS assessment reveals that she recently started having sex with first boyfriend w/ inconsistent condom use
• Parents unaware, though mother tries to talk with her
• LMP 1 week ago, no sex since that time
• PE completely benign. Tanner V female for breasts/pubic hair, no external genital lesions.
• Patient screened for STIs, anemia, cholesterol, had negative rapid HIV testing & decided to start the vaginal ring as she considers a LARC as a part of family planning counseling
Case 1 Continued

- Asymptomatic screening for Chlamydia trachomatis (CT) is positive
- Patient returns with her BF for treatment after you play phone tag for a week
- Now with abdominal pain and CMT on bimanual examination
- Requires treatment for PID
- Pt’s 17 year old BF (also your patient) requests to be screened and treated for a ‘drip’

Chlamydia—Rates by States, United States and Outlying Areas, 2011

What about Maryland?

Incidence Rates by Jurisdictions
15-19 Year Olds Only

Chlamydia, 2012 (15-19)
Cases/100,000 Populations

- 0 - 200
- 201 - 400
- 401 - 600
- 601 - 800
- More than 800

Maryland Department of Health & Mental Hygiene,
CT Screening is a HEDIS Measure

• Health Plan Employer Data and Information Set Measure  
  – Tool used by more than 90 percent of America's health plans to measure performance on important dimensions of care and service

• Women 16-25 should be screened for CT if she:
  – Suspects Pregnancy
  – Has a history of STIs
  – Seeking/needling contraceptives
  – Seeking gynecologic services
  – Indicates sexual assault
  – Indirectly indicates she has had sexual intercourse

CT Screening Among 16-25 year olds US Health Plans

<table>
<thead>
<tr>
<th>Region</th>
<th># Health Plans</th>
<th># SA Enrollees</th>
<th>2000</th>
<th>2007</th>
<th>Change 2000-2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>USA</td>
<td>583</td>
<td>2,809,100</td>
<td>25.3%</td>
<td>41.6%</td>
<td>64.4%</td>
</tr>
<tr>
<td>Midwest</td>
<td>158</td>
<td>567,400</td>
<td>23.0%</td>
<td>38.5%</td>
<td>67.4%</td>
</tr>
<tr>
<td>Northeast</td>
<td>116</td>
<td>711,500</td>
<td>22.5%</td>
<td>45.5%</td>
<td>102.2%</td>
</tr>
<tr>
<td>South</td>
<td>173</td>
<td>803,900</td>
<td>25.1%</td>
<td>37.3%</td>
<td>48.6%</td>
</tr>
<tr>
<td>West</td>
<td>136</td>
<td>726,300</td>
<td>30.8%</td>
<td>45.0%</td>
<td>46.1%</td>
</tr>
<tr>
<td>Maryland</td>
<td>19</td>
<td>88,700</td>
<td>36.9%</td>
<td>49.1%</td>
<td>33.1%</td>
</tr>
</tbody>
</table>

MMWR, 2009; 58 (22):623
Pelvic Inflammatory Disease

- Affects >800,000 women per year in the United States (20% Adolescents)
- Accounts for 300,000 hospitalizations annually
- Leads to more than 2 million outpatient visits annually
- Causes one or more long term sequelae in ¼ of patients
  - Infertility
  - Ectopic Pregnancy
  - Chronic Pelvic Pain
Understanding PID Risk

Risk Factors

- Adolescent Female (AGE!)
  - 1:8 for 15 y compared with 1:80 in 25y
- New Partner
- Multiple Sexual Partners
- Use of Intrauterine Device
  - First 3 weeks after insertion
- History of STD
- History of Previous PID
- Incomplete treatment, no partner therapy (bacteriospermia)
- Douching
- Bacterial Vaginosis

Protective Factors

- Barrier contraceptive use
- OCPs and progestin only contraceptives
PID Evaluation and Clinical Health Study (PEACH)

- Adolescents and Young Adults
  - Managing Care Alone
  - Medication Adherence Low
  - Risk Reduction Needs High
  - 72 Hour Follow Up Low
  - Risk for Recurrent Disease
  - Future Fertility at Risk

Misinterpretation of PID Evaluation & Clinical Health (PEACH) Trial Data?

PEACH OUTCOMES

- Recurrent PID: 21%
- Infertility: 19%
- Chronic Pelvic Pain: 43%
- Pregnancy: 57%
- Live Birth: 42%

National Provider Adherence to CDC Guidelines in US EDs

Provider Adherence to CDC Guidelines
National Hospital Ambulatory Medical Care Survey

- No subspecialty consultation 5x less likely to adhere
- Adolescents fared the worst (76% vs 68% for non-adherence)
- Medication regimens problematic
- 38% No antibiotics or pain management


Provider Ambivalence PID Management

Mean Response on VAS

Factors that make it difficult to successfully tolerate an outpatient regimen

Trent, et.al. STD, 2013
## Underestimating Impact on Adolescents

### Mean VAS and Median TTO Health Utility Valuations and Summary Results of Linear and Quantile Regression Analyses

<table>
<thead>
<tr>
<th>Health State</th>
<th>Mean VAS (SD)</th>
<th>β</th>
<th>p</th>
<th>Median TTO (IQR)</th>
<th>Coeff</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Adol</td>
<td>Parent</td>
<td></td>
</tr>
<tr>
<td>Outpatient Treatment</td>
<td>62</td>
<td>-13.9</td>
<td>&lt;.001</td>
<td>0.98</td>
<td>1.0</td>
<td>-0.18</td>
</tr>
<tr>
<td>Inpatient treatment</td>
<td>57</td>
<td>-18.1</td>
<td>&lt;.001*</td>
<td>0.96</td>
<td>1.0</td>
<td>0.037**</td>
</tr>
<tr>
<td>Ectopic</td>
<td>55</td>
<td>-19.3</td>
<td>&lt;.001*</td>
<td>0.98</td>
<td>1.0</td>
<td>-0.018</td>
</tr>
<tr>
<td>Infertility</td>
<td>59</td>
<td>-12.0</td>
<td>.001*</td>
<td>1.0</td>
<td>1.0</td>
<td>0</td>
</tr>
<tr>
<td>Chronic Pelvic Pain</td>
<td>48</td>
<td>-13.5</td>
<td>&lt;.001</td>
<td>0.98</td>
<td>0.98</td>
<td>0</td>
</tr>
</tbody>
</table>

*Controls for minority status, ** Controls for minority status and history of STI

Trent M, et.al., Sex Transmitted Infections (BMJ) [Epub Oct 14, 2011]
Technology Enhanced Community Health-Nursing RCT (R01 NR13507)

- SMS reminders (medication, appointments, adherence support)
- Community Health Nursing visits (72 hour clinical visit & STI Prevention Program)

RESPECT YOURSELF! PROTECT YOURSELF! BECAUSE YOU ARE WORTH IT!!!
Lab Tests Over Time

Lab results at Baseline, 30-days, & 90 days

Trent M, Preliminary data TECH- N Study, 2014
Case 2

• Patient is a 15 year old female who presents to SBHC for routine GYN care
• Patient has 1 sexual partner; boy from neighborhood
• 17 year old partner [also a patient] w/ recent incarceration—had MSM contact & multiple female contacts since released [girlfriend unaware]
• They have had sex 5 times without a condom over the last 6 months
• The last time was yesterday
• She receives Emergency Contraception, STI Screening, and HIV testing
• Her HIV test is positive
Among Baltimore girls who thought they were in a monogamous relationship, almost 40% were not.
Rates of Adolescents Aged 13–19 Years Living with Diagnosed HIV Infection, Year-end 2010—United States and 6 Dependent Areas

N = 8,631       Total Rate = 28.1

Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting.
Rates of Young Adults Aged 20–24 Years Living with Diagnosed HIV Infection, Year-end 2010—United States and 6 Dependent Areas

N = 30,404  Total Rate = 138.2

Note. Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting.
Living with HIV in United States

1.2 Million People

Know they are Infected 80%

Linked to HIV Care 62%

Stay in HIV Care 41%

Receive ART 36%

Undetectable Viral Load 28%

Counseling & Testing a Key Step!
Universal Testing Recommended in US (13-64, no special consent)

Provide Effective treatment
Keep People in Care

Source: CDC, http://www.cdc.gov/vitalsigns/HIVTesting
HIV Health Disparities

Target 1 = MSM

Target 2 = Young Women

http://www.cdc.gov/hiv/statistics/surveillance/incidence/
Challenge for Women of Reproductive Age

- Cross cultural value of motherhood
- Importance of future childbearing for teens & young adults
- HIV diagnoses do not diminish desire for children
- HIV does not prevent STI acquisition
- Important not to miss windows of opportunity for care seeking young women
- Perinatal infection could be eliminated with screening, prenatal care, use of ART

Childbearing Desires/Intentions HIV + Women

HIV Infected Women
15-44 years
N=181

Want a Child?
YES 59%
NO 41%

Intend to have Child?
YES 66%
YES 4%

Continued STI Acquisition after HIV

• 18-month longitudinal follow-up female adolescents/young adults in care (ATN)
• Many HIV-positive young women in care will be diagnosed with at least one STI
• Acquire STIs independent of the likelihood of HIV transmission based on VL status

Desire for Pregnancy Associated with Increased Risk Behavior Among Women with HIV

- Increased rates of intercourse
- Decreased condom use
- Increased partner concurrency
- Increased rates of unprotected sex with a non-concordant partner
- Higher number of previous sexually transmitted infections (STIs)

Screening & Treatment Works

Perinatal HIV Transmission Rates Based on Maternal Treatment

- No Treatment: 25%
- ART: 1-2%

HIV TESTING

Women are Often Screened Too Late

N = 374

- Before pregnancy: 36%
- During pregnancy: 23%
- At birth: 18%
- After birth: 13%
- Unknown: 10%

Note: Data include persons with a diagnosis of HIV infection regardless of stage of disease at diagnosis. All displayed data have been statistically adjusted to account for reporting delays, but not for incomplete reporting.

# Treatment is Available in the United States

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Brand Names</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Multi-Class Combinations</strong></td>
<td>Atripla, Complera</td>
</tr>
<tr>
<td><strong>Nucleoside Reverse Transcriptase Inhibitors (NRTIs)</strong></td>
<td>Combivir, Emtriva, Epivir, Epzicom, Hivid, Retrovir, Trizivir, Truvada, Videx, Videx EC, Viread, Zerit, Ziagen</td>
</tr>
<tr>
<td><strong>Nonnucleoside Reverse Transcriptase Inhibitors (NNRTIs)</strong></td>
<td>Edurant, Intolerance, Rescriptor, Sustiva, Viramune, Viramune XR</td>
</tr>
<tr>
<td><strong>Protease Inhibitors (PIs)</strong></td>
<td>Agenerase, Aptivus, Crixivan, Fortovase, Invirase, Kaletra, Lexiva, Norvir, Prezista, Rayatez, Prezista, Viracept</td>
</tr>
<tr>
<td><strong>Fusion Inhibitors</strong></td>
<td>Fuzeon</td>
</tr>
<tr>
<td><strong>Entry Inhibitors - CCR5 coreceptor antagonist</strong></td>
<td>Selzentry</td>
</tr>
<tr>
<td><strong>HIV integrase strand transfer inhibitors</strong></td>
<td>Isentress</td>
</tr>
</tbody>
</table>

- Affordable Care Act
- Testing
- Treatment for Children
- Insurers can’t exclude based on HIV status
- Many patients still rely on Medicaid or Ryan White Funded Programs

[http://www.fda.gov/forconsumers/byaudience/forpatientadvocates/hivandaidsactivities/ucm118915.htm](http://www.fda.gov/forconsumers/byaudience/forpatientadvocates/hivandaidsactivities/ucm118915.htm)

Think About Feasibility of CT Vaccination From Public Health Perspective Using HPV as a Model

CT Vaccine Ocular Trachoma Animal Model Caldwell, 2012 Research on Human Vaccine Underway
Human Papillomavirus (HPV)

DNA virus with >100 genotypes, including 15 oncogenic types

Worldwide prevalence of HPV ~630 million infected women

In U.S. current cost of HPV-associated disease

$8.0 billion each year!

Causes

- cervical cancer (necessary cause)
- genital warts
- anal cancer
- penile cancer
- vaginal cancer
- oropharyngeal (tonsillar) cancer
- recurrent respiratory papillomatosis (RRP)
Estimated Vaccine Coverage in the United States, CDC

HP2020 Goals

Survey year

% vaccinated

≥1 HPV
≥3 HPV
≥1 HPV
≥3 HPV

1CDC. 2011  2Reiter Vaccine 2011.
# Vaccine Efficacy Varies by HPV Exposure

## Table 14
Effectiveness of GARDASIL in Prevention of HPV 6, 11, 16, or 18-Related Genital Disease in Girls and Women 16 Through 26 Years of Age, Regardless of Current or Prior Exposure to Vaccine HPV Types

<table>
<thead>
<tr>
<th>Endpoint</th>
<th>Analysis</th>
<th>GARDASIL or HPV 16 L1 VLP Vaccine</th>
<th>AAHS Control</th>
<th>% Reduction (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>Cases</td>
<td>N</td>
</tr>
<tr>
<td>HPV 16- or 18-related CIN 2/3 or AIS</td>
<td>Prophylactic Efficacy*</td>
<td>9346</td>
<td>4</td>
<td>9407</td>
</tr>
<tr>
<td></td>
<td>HPV 16 and/or HPV 18 Positive at Day 1**</td>
<td>2870</td>
<td>142</td>
<td>2898</td>
</tr>
<tr>
<td></td>
<td>Girls and Women Regardless of Current or Prior Exposure to HPV 16 or 18‡</td>
<td>9836</td>
<td>146</td>
<td>9904</td>
</tr>
<tr>
<td>HPV 6-, 11-, 16-, or 18-related Genital Warts</td>
<td>Prophylactic Efficacy*</td>
<td>8761</td>
<td>10</td>
<td>8792</td>
</tr>
<tr>
<td></td>
<td>HPV 6, HPV 11, HPV 16, and/or HPV 18 Positive at Day 1**</td>
<td>2501</td>
<td>51§</td>
<td>2475</td>
</tr>
<tr>
<td></td>
<td>Girls and Women Regardless of Current or Prior Exposure to Vaccine HPV Types‡</td>
<td>8955</td>
<td>61</td>
<td>8968</td>
</tr>
<tr>
<td>HPV 6- or 11-related Genital Warts</td>
<td>Prophylactic Efficacy*</td>
<td>7769</td>
<td>9</td>
<td>7792</td>
</tr>
<tr>
<td></td>
<td>HPV 6 and/or HPV 11 Positive at Day 1**</td>
<td>1186</td>
<td>51</td>
<td>1176</td>
</tr>
<tr>
<td></td>
<td>Girls and Women Regardless of Current or Prior Exposure to Vaccine HPV Types‡</td>
<td>8955</td>
<td>60</td>
<td>8968</td>
</tr>
</tbody>
</table>
Parental Reasons for Refusal (Mother-Daughter Dyad Study)

<table>
<thead>
<tr>
<th>Reason for Non-Vaccination</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vaccine Side Effect</td>
<td>36%</td>
</tr>
<tr>
<td>Concern about danger to daughter</td>
<td>36%</td>
</tr>
<tr>
<td>Provider non-communication</td>
<td>34.4%</td>
</tr>
<tr>
<td>Long Lapse in Doctor’s Visit</td>
<td>11.6%</td>
</tr>
<tr>
<td>Increased Ease of daughter to have sex</td>
<td>7.6%</td>
</tr>
<tr>
<td>Doubt of Efficacy</td>
<td>6.6%</td>
</tr>
<tr>
<td>Lack Insurance</td>
<td>5.6%</td>
</tr>
<tr>
<td>Don’t know/non-response</td>
<td>6%</td>
</tr>
</tbody>
</table>

Kester. *Matern Child Health J.* 2012
## Side effects?

### Table 6

Common Systemic Adverse Reactions in Boys and Men 9 Through 26 Years of Age (GARDASIL ≥Control)*

<table>
<thead>
<tr>
<th>Adverse Reactions</th>
<th>GARDASIL (N = 3093) %</th>
<th>AAHS Control** or Saline Placebo (N = 2303) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headache</td>
<td>12.3</td>
<td>11.2</td>
</tr>
<tr>
<td>Pyrexia</td>
<td>8.3</td>
<td>6.5</td>
</tr>
<tr>
<td>Oropharyngeal pain</td>
<td>2.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>2.7</td>
<td>2.2</td>
</tr>
<tr>
<td>Nasopharyngitis</td>
<td>2.6</td>
<td>2.6</td>
</tr>
<tr>
<td>Nausea</td>
<td>2.0</td>
<td>1.0</td>
</tr>
<tr>
<td>Upper respiratory tract infection</td>
<td>1.5</td>
<td>1.0</td>
</tr>
<tr>
<td>Abdominal pain upper</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Myalgia</td>
<td>1.3</td>
<td>0.7</td>
</tr>
<tr>
<td>Dizziness</td>
<td>1.2</td>
<td>0.9</td>
</tr>
<tr>
<td>Vomiting</td>
<td>1.0</td>
<td>0.8</td>
</tr>
</tbody>
</table>

Responding to Parental Concerns about Age

Things Parents Say:  

- "We're going to wait on [Gardasil]...she's not even in high school yet...we're just going to wait and see...maybe when she's 16 or 17." Mother, age 44
- "I think I would wait until she's a little bit older, 15 or 16. I just don't think they need it right now, at 13...it's young." Mother, age 48
- "[The HPV vaccine] is appropriate for when girls start dating, and things along those lines." Mother, age 45

Educating Parents

- Early Age is the best time!
- Needs to be completely immunized before sexual debut for the vaccine to be most effective!
- Early Adolescents have better immune response to the vaccine! occurs in the early adolescence compared to later adolescence
- Vaccination does not move up the timeline for initiation of sexual behavior

---

We can’t do the Sex Talk, our 12 year old child is too young?

• Reality
  – Parents don’t have to do it today, BUT…..
  – This age is a good one to start talking about puberty
  – Cognitively capable of handling the basics
  – Girls are pubertal, many are almost done
  – External exposures
  – Parental perspectives matters & they can control the content
This vaccine IS all about SEX! Not Really…..

- Public Health Issue
- STI /Cancer outcomes
- Hepatitis B (HBV)--Infants immunized at DOL #2
  - Similar safety profile
  - Same adjuvant in HPV4 and HBV
  - Similar risk profile
- No one imagines this infant will need HBV
- No need to imagine your teen will need HPV to immunize them
Keep In Mind......

Vaccination is one of the Ten Great Public Health Achievements in the United States

Child [Adolescent] Heath Transformation 3.0 in Era of the Affordable Care Act

- Dismantling Public Health System
- Limiting Public Health Funds

Impact on Health Disparities?
How to use ACA for Adolescents?

Insurance Status of Adolescents <18 y Baltimore

Insured 95%
UBR, Funding, & Political Leadership

Changes in FPL methodology

Total Funding 1-Year Shift
Total Funding
Total Funding 2-Year Shift
UBR All 15-19 year olds

Source: Preheim, C, JHSPH, 2014

Unintended Birth Rate per 1000 Women

Total Program Funding (in 2012 Dollars)

Year


T0 → T1 → T2

Source: Preheim, C, JHSPH, 2014

President
Congress
Governor
Legislature

Democratic
Republican
Mixed Representation
What Can the Public Health Practitioners Can Do?

1. Promote sexual safety for all young women
2. Monitor treatment adherence to the CDC Guidelines
3. Develop effective vaccine implementation strategies for adolescents to prevent STIs and cancer-related complications
4. Creatively Re-build STI/HIV Public Health Screening & Treatment Programs in Accountable Care Organizations Post-ACA

"Gonorrhea, syphilis, chlamydia, herpes, HIV positive, genital warts..."