STIs: WHAT’S ON THE HORIZON

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Johns Hopkins University
School of Medicine

Conflicts -- None
STIs: WHAT’S ON THE HORIZON

Overview
Epidemiology
Gonorrhea
HIV/AIDS
Hepatitis C
Human Papilloma Virus
Conclusions
STIs: STATE OF THE STATE AND STATE OF THE DISEASE

- *Chlamydia trachomatis*
- *Neisseria gonorrhoeae*
- *Treponema pallidium*
- Human Immunodeficiency virus (HBV, HCV, HPV, CMV, HSV, HAV, MCV, Crabs, Scabies, Mycoplasma)
STIs: STATE OF THE STATE AND STATE OF THE DISEASE

- *Chlamydia trachomatis*
- *Neisseria gonorrhoeae*
- *Treponema pallidium*
- Human Immunodeficiency virus (HBV, HCV, HPV, CMV, HSV, HAV, MCV, Crabs, Scabies, Mycoplasma)
HOT TOPICS: STIs

**HIV/AIDS**
- Prevention
- Test → Engage care
- *N. gonorrhoeae*
- Resistance

**HPV**
- Vaccine
  (Hepatitis C)
- Test
- Treat
STIs: WHAT’S ON THE HORIZON

Overview

Epidemiology

Gonorrhea

HIV/AIDS

Hepatitis C

Human Papilloma Virus

Conclusions
STD RATES BY GEOGRAPHIC LOCATION – SYPHILIS 2009

Rate per 100,000 Population
- <=0.2
- 0.21-2.2
- >2.2
STD RATES BY GEOGRAPHIC LOCATION
-- GONORRHEA

Rate per 100,000 Population
- <=19.0
- 19.1-100.0
- >100.0
# STI RATES* AND RANKINGS: Maryland and US 2010

<table>
<thead>
<tr>
<th>Condition</th>
<th>US</th>
<th>MD</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS</td>
<td>10.8</td>
<td>22.1</td>
<td>#2</td>
</tr>
<tr>
<td>Syphilis congenital</td>
<td>8.7</td>
<td>28.7</td>
<td>#2</td>
</tr>
<tr>
<td>Syphilis 1 &amp; 2</td>
<td>4.5</td>
<td>5.8</td>
<td>#7</td>
</tr>
<tr>
<td>GC</td>
<td>101</td>
<td>130</td>
<td>#11</td>
</tr>
<tr>
<td>C. trachomatis</td>
<td>426</td>
<td>460</td>
<td>#14</td>
</tr>
</tbody>
</table>

*Rate, 100,000/pop.
### STD RATES: Maryland Trends*

<table>
<thead>
<tr>
<th></th>
<th>2002</th>
<th>2007</th>
<th>2011</th>
<th>Change (10 yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. trachomatis</td>
<td>314</td>
<td>412</td>
<td>489</td>
<td>+26%</td>
</tr>
<tr>
<td>N. gonorrhoea</td>
<td>174</td>
<td>121</td>
<td>111</td>
<td>-36%</td>
</tr>
<tr>
<td>T. pallidum</td>
<td>4.2</td>
<td>6.1</td>
<td>7.8</td>
<td>+86%**</td>
</tr>
</tbody>
</table>

*/100,000 population

**Baltimore increase 19 → 38

Source: Center for STD, DHMH & BCHD
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The Elephant in the Room: GC Resistance

Rates: 1976-96 ↓ 76%
1996-2009 Plateau
2010-2011 ↑ 2.8%

Demographics – AA:White = 18.7

Resistance
• Ceftriaxone: Only drug left
• Cefixime, azithro or quinolones resistance – MSM
Gonorrhea—Rates, United States, 1941–2010
Gonorrhea—Rates by Race/Ethnicity, United States, 2001–2010

Rate (per 100,000 population) vs. Year
Gonococcal Isolate Surveillance Project (GISP)—Percentage of *Neisseria gonorrhoeae* Isolates with Resistance or Intermediate Resistance to Ciprofloxacin, 1990–2010
EMERGING THREAT OF GONOCCAL INFECTION
(Bolan G. NEJM 2012;366:485)

**Surveillance:** Second most common reportable disease (600,000/yr)

**Risk:** “Marginalized” – AA, MSM

**Resistance:** “Always” develops
- Sulfanilamide – 1940’s
- Penicillin and tetra – 1980
- Fluoroquinolones – 2007
- Cephalosporins, 3rd generation – MIC increased 17 fold 2006-11

**Concerns:** 1) Must rebuild labs for sensitivity testing (and pay for it) and 2) Spectinomycin and 3) Vaccine?
RESISTANT *N. GONORRHOEAE* BY LOCATION, RISK AND YEAR
(Bolan G. NEJM 2012;366:485)
RESISTANCE: NEW THREATS

GNB – Carbapenems, etc
MRSA – Vancomycin
*N. gonorrhoea* – Cefixime, FQ
Influenza – Oseltamivir
*M. tuberculosis* – Rif, INH
Malaria – Artemisinin
Cholera – ESBL, FQ
“The future of humanity and microbes will likely evolve as...episodes of our wits versus their genes.”

Nobel Laureate
Joshua Lederberg
Science 2000;288:287
Discovery of highly resistant bacteria in Lechuguilla Cave indicating age >3.5 million years (Wright G. PLoS One – in press)
THE HISTORY OF INFECTIOUS DISEASE 2020

2000 BC: Eat this root – it heals
1000 AD: Roots are heathen – Say this prayer
1850 AD: Prayer is superstitious, Drink this potion
1940 AD: That potion is snake oil – Penicillin is the miracle
1985 AD: Penicillin no longer works – This new antibiotic is better
2020 AD: Those antibiotics don’t work anymore – eat this root
**N. gonorrhoeae: TREATMENT**

1937: Sulfonamides
1940: Penicillin
1972: Pen dose ↑ and probenecid
1987: Sentinel surveillance
1990 – 08: Resistance
   - Ceftriaxone
2006: Cefixime + Azithio/Doxy
   - Cipro/levo/Oflox
Current: Ceftriazone 250 mg IM + Azithro 1 gm or doxy 100 bid x 7 d
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Reported HIV Diagnosis Trends by Exposure Category

Year of HIV Diagnosis

- MSM
- IDU
- MSM/IDU
- HetSex
- Other

Using data as reported through 12/31/2010
HIV/AIDS: MARYLAND

Reported HIV Diagnosis Trends by Race/Ethnicity

Using data as reported through 12/31/2010
Reported HIV Diagnosis Trends by Age at Diagnosis
MSM Exposure

Using data as reported through 12/31/2010
HIV/AIDS: MARYLAND

Reported HIV Diagnosis Trends by Race/Ethnicity
MSM Exposure

Using data as reported through 12/31/2010

Maryland Infectious Disease and Environmental Health Administration
March 3, 2011
HIV/AIDS: MARYLAND

Reported HIV Diagnosis Trends by Race/Ethnicity
Heterosexual Exposure

Using data as reported through 12/31/2010
HIV/AIDS: MARYLAND

**Rank:** #2 state (2010)
**Rate:** 5 x national average

**Regional assets:**
- MADAP, DHMH, BCHD
- Clinical services

**State of HIV science:**
- Treatment (done-Fauci/2008)
- Priorities: Prevention and TLC

**Challenges:**
- Prevention
- Test → link → retain
WILL WE PREVENT HIV?

• Rate of new cases in US stable at 50,000-55,000/yr – 1990-present

• Prevention Methods:
  Condoms: Variable usage
  PrEP (40-90%): Cost/toxicity/adherence
  Circumcision (50%): Not US issue
  Needle exchange: ? Impact
  Vaccine (30%): Rebirth of interest
  ART (96%): Washington DC trial
HIV PREVENTION 2009-12

- Viral treatment for prevention in Africa, Asia, Americas
- Discordant couples, PrEP in Uganda, Kenya
- Heterosexual men and women, PrEP
- Male circumcision in Namibia, Rakai, Kisumu
- WSMs in several countries
- Transmitted diseases treatment in Tanzania
- PrEP in South Africa
- Microbicide
- Vaccine

Effect size (95% CI)
- Treatment: 96% (73-99)
- PrEP: 73% (49-85)
- Circumcision: 63% (21-84)
- PrEP: 54% (38-66)
- WSMs: 44% (15-63)
- Transmitted diseases: 42% (21-58)
- Microbide: 39% (6-60)
- Vaccine: 31% (1-51)

Prevention technologies shown to be effective in reducing HIV incidence in randomised controlled trials.
**Protocol**: Discordant couples, CD4 350-550: Randomized to ART vs. no ART until CD4 <250

**Results**: N=1,763 (M=890, F-873)

<table>
<thead>
<tr>
<th></th>
<th>ART</th>
<th>No Art</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>886</td>
<td>877</td>
</tr>
<tr>
<td>HIV transmission*</td>
<td>1**</td>
<td>27</td>
</tr>
</tbody>
</table>

*Linked cases
**Protection with ART = 96% -- Validity of single case is unclear
Effect of Increasing ART on Cases of New HIV: British Columbia

Figure 1: Number of active HAART participants and number of new HIV diagnoses per year in British Columbia, Canada, 1996-2009. P values are for trend and were obtained from the generalized additive model. IDU, injecting drug user.

Treatment as Prevention: Effect of ART Coverage on HIV Incidence in Rural South Africa  
(Tanser F. 2012 CROI; Abstr. 136LV)

- Annual population based HIV surveillance in rural KwaZulu-Natal
- 2004 – 2011: 1395 HIV seroconversions among 16,588 HIV negative adults ≥15 years of age

Spatial Estimates of Proportion of HIV Patients on ART

Adjusted HIV Infection Rate by ARV Coverage Category

- Adjusted Hazard Ratio
- Proportion of all HIV-infected people receiving ART

P=0.590
P=0.002
P<0.001
P=0.015
# Efficacy of Daily Oral FTC/TDF PrEP

<table>
<thead>
<tr>
<th>Trial</th>
<th>Pop.</th>
<th>Efficacy</th>
<th>95% CI</th>
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</thead>
<tbody>
<tr>
<td>iPrEx</td>
<td>MSM</td>
<td>42%</td>
<td>18 to 60%</td>
</tr>
<tr>
<td>Partners PrEP</td>
<td>Men</td>
<td>83%</td>
<td>49 to 94%</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>62%</td>
<td>19 to 82%</td>
</tr>
<tr>
<td>TDF2</td>
<td>Men</td>
<td>80%</td>
<td>25 to 97%</td>
</tr>
<tr>
<td>FemPrep*</td>
<td>Women</td>
<td>49%</td>
<td>-22 to 81%</td>
</tr>
<tr>
<td>VOICES*</td>
<td>women</td>
<td>TDF only arm discontinued</td>
<td></td>
</tr>
</tbody>
</table>

*DSMB recommended discontinuation for futility; drug level testing is in progress.

Drug Detection Related to HIV Risk in the Active Arm of iPrEx

- Detection of drug correlated with decreased HIV risk, after controlling for age, risk behavior, education, or BMI (OR 12.9, P<0.001)
- 92% reduction in HIV risk (95% CI: 71-99%)

Intracellular FTC-TP Level

- 3/34 Detectable (9%)
- 22/42 Detectable (52%)
CHALLENGES OF PrEP

Adherence: Huge Issue

Cost: TDFD/FTC AWP = $1391.45/mo

CDC recs (?): 4 medical visits/yr for ADR and HIV serology

Long term toxicity (?)

What will happen (?) : Selective use
Of all with HIV infection, 850,000 individuals do not have suppressed HIV RNA (72%)
CONSUMER AT KIOSK FOR SELF TEST

Do you know HIV status?
Do you want to test yourself?
Potential: GC, CT, Syphilis, trichomoniasis, HCV
Detection of *C. trachomatis*, *N. gonorrhoeae* and *T. vaginalis* in dry shipped self collected swabs. (Gaydos C. Diagn Microbiol Inf Dis 2012;73:16)

**Background:** New cases/yr US-CT: 3 million; GC – 0.7M, TV – 8M

**Method:** Self collected vaginal swabs → mailed to the lab (Baltimore to Birmingham) → NAAT test

**Detection:** 10 organisms
DETERMINE HIV 1/2 Ag/Ab Combo POC TEST
(Branson B. JID 2012;205:521)

Dectects HIV Ab and p24Ag

Advantages
- POC
- Requires no electricity, water or large equipment
- Sensitivity with acute HIV (10 days)
- Detects HIV-1 and HIV-2
WHY 30% of persons who test positive for HIV do not know it
Point-of-Care CD4 Technologies in the Pipeline*

- PointCare
- Partec Mini
- PIMA
- Daktari
- BD
- mBio
- Zyomyx
- Burnet

*Estimated; timeline and sequence may change.
**Practice**: Widespread and international

**Incentives**: Cash, groceries, lottery tickets, meal tickets.

**Conditions**: Chronic – smoking, obesity, BP control, diabetes, HIV

**HIV trial**: HPTN 65 – Controlled trial, (unblinded) HIV test – $25, Enroll in care – $70, NDV – $280/yr (1.7% of HIV care cost)

**Status**: Widely practiced, no one wants to talk about it.
A TEST OF FINANCIAL INCENTIVES TO IMPROVE WARFARIN ADHERENCE
(Volpp KG. BMC Health Sys Res 2008;8:272)
## RECOMMENDATIONS FOR WHEN TO START ART 
(DHHS Panel on ART 1996-2012)

<table>
<thead>
<tr>
<th>Year</th>
<th>WHO</th>
<th>CD4*</th>
</tr>
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<tbody>
<tr>
<td>1996</td>
<td>CD4</td>
<td>&lt;500</td>
</tr>
<tr>
<td>2000</td>
<td>CD4</td>
<td>&lt;200</td>
</tr>
<tr>
<td>2006</td>
<td>CD4</td>
<td>&lt;350</td>
</tr>
<tr>
<td>2009</td>
<td>CD4</td>
<td>&lt;500</td>
</tr>
<tr>
<td>2012</td>
<td>All pts</td>
<td>Any CD4 count</td>
</tr>
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</table>
COST OF CARE

Contemporary costs/yr. (AIDS 2010;24:2705)

- HAART – $12,000
- Meds – other – $2,100
- In-patient – $600
- Out-patient – $400

Total (Meds) – $16,600 (72%)

Growth: New infections – 50,000/yr
Deaths – 10,000/yr = 40,000/yr added

Guidelines: Treat all with HIV
Budget: $16K/yr = $16B/yr
Surveyed heterosexual adults
23 U.S. urban centers

Annual Household Income (in U.S. Dollars)

Source: Denning at el., AIDS 2010 Conference, Vienna Austria, July 2010, Abstract WEPDD101
NHBS – National HIV Behavioral Surveillance System

HIV Priorities and Plan

Healthcare Reform

HIV Funding
HIV/AIDS IN THE US: 2015 GOALS

Reduce new infections
• Increase known HIV status from 79% to 90%
• Increase testing

Improve access to care
• Link 85% of newly diagnosed patients to care within 3 months
• Increase number in continuous care under Ryan White Care Act

Reduce HIV-related health disparities
• Increase proportion of patients with undetectable VL by 20% in minorities (blacks, Latinos, MSM)
• “Community viral load”

Improve coordinated response

HEALTHCARE OUTCOMES IN HIV: REDUCING DISPARITIES
(Moore R. CID; in press)

**Issue:** Major issue in HIV care is retention in care and adherence

**Method:** Moore Clinic data 1995-2010
N=6,366 Pt/yrs 27,941
Demographics: B – 77%, F – 34%
Risk: IDU-45%; MSM – 30%
Insurance: Private – 15%

**Results:** Calculated life expectancy at age 28 yrs = 73.4 yrs for all groups – race, gender and risk
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VL FOR 3 HIV RISK CATEGORIES OVER TIME
(Moore RD. CID 2012; in press)

HIV Viral Load
(Median)
COST OF CARE

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- HAART – $12,000
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- Out-patient – $400

Total (Meds) – $16,600 (85%)

Growth: New infections – 50,000/yr
Deaths – 10,000/yr = 40,000/yr

Guidelines: Treat all with HIV

Budget: $16K/yr = $16B/yr
### Total: $3.8 trillion for HIV

<table>
<thead>
<tr>
<th>Content</th>
<th>Current (FY12)</th>
<th>CHANGE</th>
</tr>
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<tbody>
<tr>
<td>RWCA-ADAP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Part C: Primary Care</td>
<td>$211M</td>
<td>+$20M (+10%)</td>
</tr>
<tr>
<td>• Part D: Youth/Families</td>
<td>$78M</td>
<td>-$8M (-10%)</td>
</tr>
<tr>
<td>CDC – disparities</td>
<td>?</td>
<td>+ $40M</td>
</tr>
<tr>
<td>HOPWA</td>
<td>$330M</td>
<td>-$2M (-1%)</td>
</tr>
<tr>
<td>PEPFAR</td>
<td>$7.1B</td>
<td>-$900M (-13%)</td>
</tr>
<tr>
<td>Research</td>
<td>$3.1B</td>
<td>-$100M (-1%)</td>
</tr>
</tbody>
</table>
# WHEN DO CONTEMPORARY (FAVORED) ART AGENTS BECOME GENERIC

FDA approval + 16 years

<table>
<thead>
<tr>
<th>Years + 16</th>
<th>Agents</th>
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</thead>
<tbody>
<tr>
<td>2011-</td>
<td>3TC</td>
</tr>
<tr>
<td>2012-15</td>
<td>EFV, LPV/r, NVP</td>
</tr>
<tr>
<td>2016-18</td>
<td>TDF, FTC, ABC,ATV/r</td>
</tr>
<tr>
<td>2019-22</td>
<td>DRV, RAL</td>
</tr>
</tbody>
</table>
HIV PLAN

1. Increase testing
   • Enhance access to testing
   • Screen positive → directly to care
   • Retention: Requires multiple services (P4P4P)

2. ART → reduce community viral load

3. PrEP: Selective use
STIs:
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MORTALITY RATES DUE TO HIV, HCV AND HBV IN US 1999-2007
HEPATITIS C

Number infected in Maryland: 95,400 (?)

Number who know it: 40-50%

Morbidity: Major cause – cirrhosis, liver cancer, liver transplant (21 deaths/hr)

Why now? Pipeline loaded
CELEBRITIES WITH HCV

Evil Knievel: Motorcycle daredevil
Billy Graham: WWF wrestling champ
Jack Kevorkian: Physician
Laurie Bembenek: Playboy bunny
Rolf Benirschke: San Diego Charger
Mickey Mantle: Yankee player
James Earle Ray: Assassin
Benito Mussolini: Dictator
Linda Lovelace: Actress
HOW WILL HCV TREATMENT CHANGE?

HCV Treatment
1991: Interferon
1995: PegINF/rib
2011: PegINF/rib/PI (TPV, BOC) + 57 drugs in development
2012: Pipeline – 37 agents
2014: No INF/r, all oral, high cure rates, high cost
Telaprevir + Peg-IFN and RBV:
Sustained Virologic Response (SVR12)
(Dietrich D. 2012 CROI; Abstr. 46)

![Bar graph showing patients with SVR (Percentage).](image-url)
Boceprevir + Peg-IFN and RBV: Sustained Virologic Response (SVR12) (Sulkowski M. 2012 CROI; Abstr. 47)

Percent with Virologic Response

- P/R
- BOC + P/R

Treatment Week

- 4: 8.8%
- 8: 4.7%
- 12: 23.5%
- 24: 32.4%
- EOT: 29.4%
- SVR12: 26.5%
- Overall: 60.7%
HCV DRUG TREATMENT COST (Maryland ADAP data)

BOC -- $51,116/course (HCV only)
TVP -- $51,957/course (HCV only)
$77,936 with EFV
GS 7977 (NS5B inhibitor) + Daclatasvir (NS5B inhibitor in 44 patients with HCV GT1) (Sulkowski M. 47th EASL, Barcelona 4/18/12)
Oral combination GS 7977 + Daclatasvir + ribavirin in patients with HCV GT1 (n=44) (Sulkowski M. EASL, Barcelona, 4/18/12)
HEPATITIS C

Testing:

- Screening: All at risk and all born 1946-64 (CDC)
- HCV-Ab → VL, genotype, LFT → Refer

Treatment: Now or later?

Decision – Fibrosis score and cost/trials
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HPV VACCINE: CDC recs 2012

Vaccines: Cervarix (HPV2) 16/18
Gardasil (HPV4) 6/8/16/18

Recommendations
• Females: HPV2 or HPV4; 3 doses at age 11-12, catch-up 13-26
• Males: HPV4; 3 doses at age 11-12, catch-up 13-26
• Immunocompromised: To age 26
• MSM: HPV4 to age 26
Issue: Australia – quadravalent HPV vaccine for women 12-26 yrs 2007-09
– ? Impact
Method: Cervical cytology Registry data for 2003-09 vs. 2007-09
Results: Significant decrease in incidence of high grade cervical abnormalities in girls <18 years
## TRENDS IN INCIDENCE: HGCA

<table>
<thead>
<tr>
<th>Age</th>
<th>Pre-vaccine</th>
<th>Post vaccine</th>
<th>Before vs. after</th>
<th>Incidence</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18</td>
<td>0.99</td>
<td>0.87</td>
<td></td>
<td>0.99</td>
<td>1.00</td>
</tr>
<tr>
<td>18-20</td>
<td></td>
<td></td>
<td></td>
<td>0.99</td>
<td>NS</td>
</tr>
</tbody>
</table>

**Note** the importance of early vaccine

**Potential:** Cervical cancer – 529,000/yr – 85% in developing countries
HPV VACCINE AGAINST ANAL HPV INFECTION AND ANAL INTRAEPITHELIAL NEOPLASIA
(Palefsky JM. NEJM 2011;365:1576)

**Issue:** 1) HPV 16/18 are highly associated with anal cancer; 2) anal cancer rates increasing and 3) MSM are at high risk

**Method:** Double blind randomized trial HPV vaccine for 608 MSM (ages 16-26). Efficacy based on anal intraepithelial neoplasia (AIN) and anal cancer

**Results:** Rate of grade 2/3 AIN reduced 75%; rate of infection reduced 49%
INCIDENCE OF HPV-6, 11, 16, OR 18 RELATED AIN.
(Palefsky. NEJM Year; 268;365:1576)

B  HPV-6, 11, 16, or 18–Related AIN in the ITT Population

<table>
<thead>
<tr>
<th>Months since Randomization</th>
<th>qHPV vaccine</th>
<th>Placebo</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>275</td>
<td>276</td>
</tr>
<tr>
<td>6</td>
<td>264</td>
<td>263</td>
</tr>
<tr>
<td>12</td>
<td>225</td>
<td>236</td>
</tr>
<tr>
<td>18</td>
<td>208</td>
<td>218</td>
</tr>
<tr>
<td>24</td>
<td>191</td>
<td>192</td>
</tr>
<tr>
<td>30</td>
<td>148</td>
<td>146</td>
</tr>
<tr>
<td>36</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Palefsky: Answers and Comments

Why HPV 6 & 11?
May cause some low grade AIN but “Cervirax should be just as good”*
*Note: Survey of teenagers – far greater concern for genital warts

Age limit of 26 in MSM?
Agree with CDC but “reasonable to individualize”
<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Cost Single dose</th>
<th>Vaccine Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPV Gardasil</td>
<td>$155 (x3)</td>
<td>21% (F)</td>
</tr>
<tr>
<td>Cervarix</td>
<td>$134 (x3)</td>
<td></td>
</tr>
<tr>
<td>Influenza</td>
<td>$  32</td>
<td>44%</td>
</tr>
<tr>
<td>Pneumococcal Pneumovax</td>
<td>$  74</td>
<td>60% (&gt;65 yrs)</td>
</tr>
<tr>
<td>Prevnar 13</td>
<td>$145</td>
<td></td>
</tr>
<tr>
<td>Zoster</td>
<td>$192</td>
<td>14%</td>
</tr>
<tr>
<td>Tdap</td>
<td>$  47</td>
<td></td>
</tr>
</tbody>
</table>
STI’S:
WHAT’S ON THE HORIZON

Overview
Epidemiology
Gonorrhea
HIV/AIDS
Hepatitis C
Human Papilloma Virus

Conclusions
STIs: CURRENT STATUS

**Strengths:** Commitment and resources – STIs, HIV, HCV

**Issues:**
- STI rates: Race/MSM/City
- Antibiotic-resistant GC
- HIV: Test, TLC & Retain + Community VL
- Resources: CDC, AETC

**Eureka:** Public health led effort via statewide public health/ID services
Thank You

Patrick Chaulk
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