National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention

Chlamydia: An Overview
Why, what, and how?

Elizabeth Torrone, MSPH, PhD

Surveillance & Data Management, Division of STD Prevention

Improving Chlamydia Screening Rates: Engaging Providers, Patients, and Payers
Washington DC
June 21, 2016

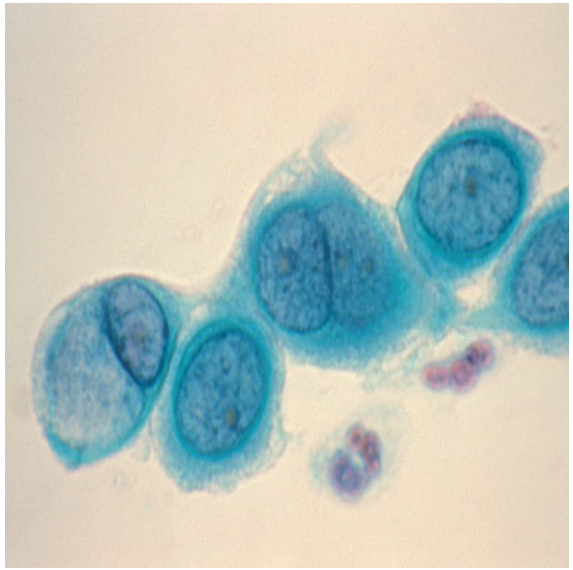
Outline

- Why do we care about chlamydia?
- Why do we screen young women for chlamydia?
- What proportion of young women are screened? (spoiler: not enough)
- How can we improve screening coverage?

Why do we care about chlamydia?

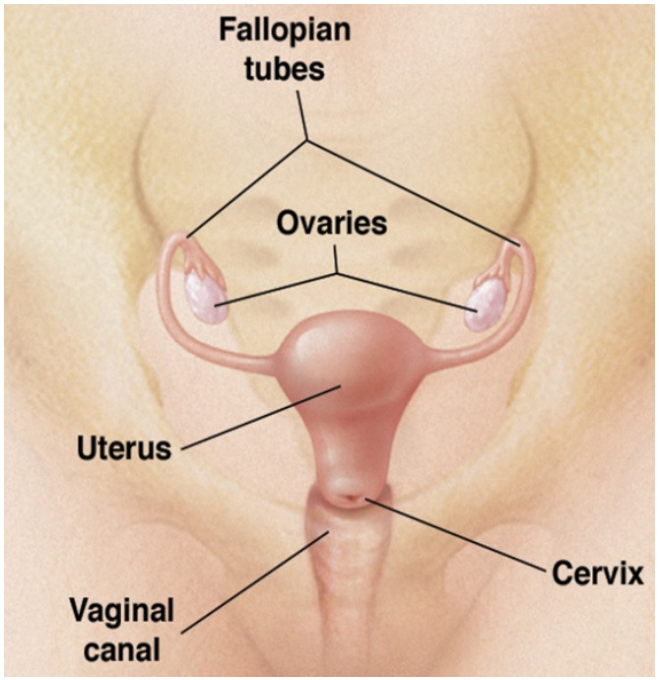
Chlamydia trachomatis

- Gram-negative bacteria
- Sexually transmitted genital, oropharyngeal, and rectal infections
- Limited data on natural history
  - Infections can clear on their own
  - Partial immunity after infection
  - Re-infection is common



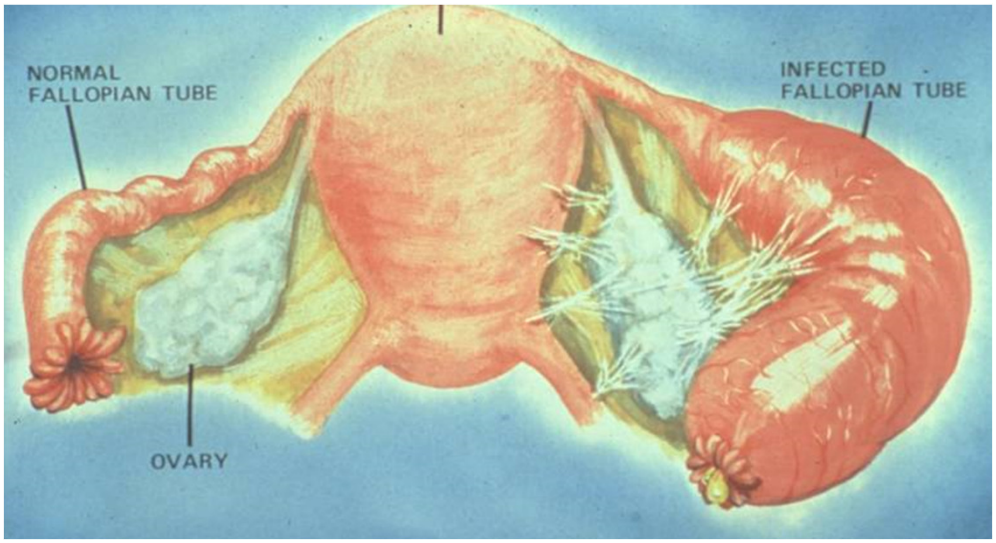
Clinical Manifestations

- Vast majority of infections are asymptomatic
- Lower genital tract infection
  - Cervicitis – discharge, cervical friability
  - Urethritis – dysuria, discharge
- Can ascend to the upper genital tract
  - Men – epididymitis
  - Women – pelvic inflammatory disease (PID)



Pelvic Inflammatory Disease (PID)

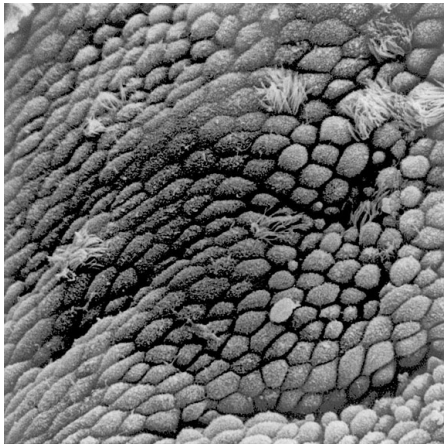
- Infection/inflammation of uterus, fallopian tubes, ovaries
- Clinical diagnosis imprecise
- Multiple etiologies, including:
  - *Chlamydia trachomatis*
  - *Neisseria gonorrhoeae*
  - Bacterial vaginosis
- Symptoms can be mild; subclinical tubal infection and inflammation occur



Long Term Reproductive Complications

- Tubal inflammation can result in scarring, loss of function
- Long-term sequelae
  - Chronic pelvic pain
  - Ectopic pregnancy
  - Tubal factor infertility

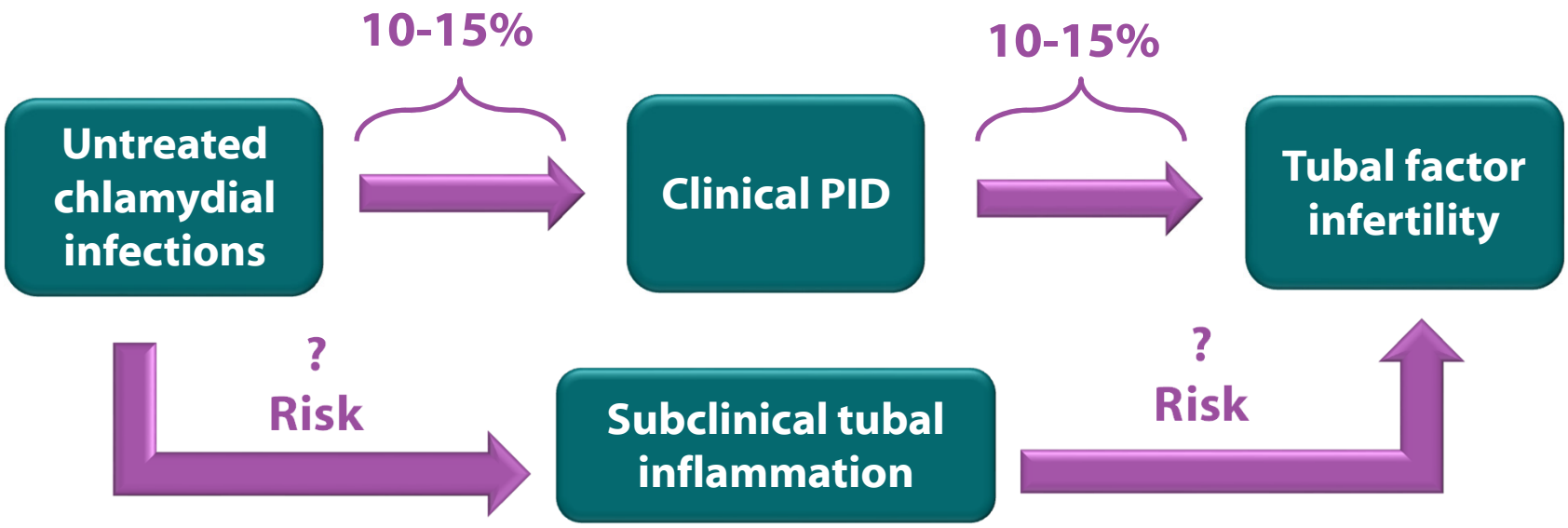
Normal tubal tissue, 1200x



Post-PID, 1200x

Scanning electron microscopy photos courtesy of Dorothy L Patton, University of Washington

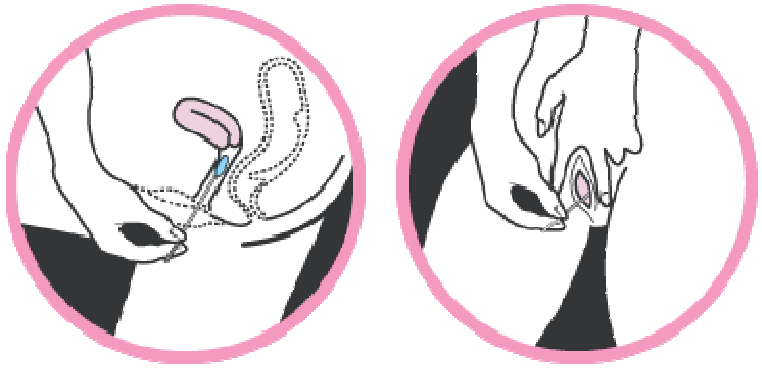
Risk for Sequelae in Women



Chlamydia is the leading preventable cause of tubal factor infertility.

Diagnosis

- Nucleic acid amplification tests (NAATs)
  - Sensitivity ~96%, specificity >98%
  - Vaginal swabs are the specimen of choice (self- or provider-collected)
  - Urine and cervical or urethral swabs



Centers for Disease Control and Prevention
MMWR
Morbidity and Mortality Weekly Report
Recommendations and Reports / Vol. 63 / No. 2
March 14, 2014

Recommendations for the Laboratory-Based Detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae* — 2014

Chlamydia Treatment

- Simple and efficacious
  - Single-dose oral azithromycin, 1g
  - 7-day regime of doxycline, 100 mg 2x day
  - Few side effects

- Lifecycle is about 72 hours
  - Recommend that patients abstain from sex for 7 days after treatment
  - Patient counseling and education materials

Risk Factors for Chlamydial Infection

- Biological
  - Cervical ectopy increases acquisition
    - Adolescence
    - Hormonal birth control (maybe!)
- Epidemiological
  - Young age
  - Partner who has other partners
  - Inconsistent condom use with multiple partners
  - High prevalence of disease in sexual network
  - Re-infection from untreated partner

Why do we care about chlamydia?

Why do we care about chlamydia?

If untreated, can lead to serious reproductive complications.

Why do we care about chlamydia?

If untreated, can lead to serious reproductive complications.

Why do we screen young women for chlamydia?

Control Strategy for Chlamydia

- Treating infection at any stage prevents ongoing transmission (**primary prevention**)
- Identifying and treating infection before progression can reduce adverse outcomes (**secondary prevention**)
  - Data from three clinical trials suggest that screening can reduce PID

Evidence for Chlamydia Screening

PREVENTION OF PELVIC INFLAMMATORY DISEASE BY SCREENING FOR CERVICAL CHLAMYDIAL INFECTION

DELIA SCHOLES, PH.D., ANDY STERGACHIS, PH.D., FRED E. HEIDRICH, M.D., M.P.H., HOLLY ANDRILLA, M.S., KING K. HOLMES, M.D., PH.D., AND WALTER E. STAMM, M.D.

Abstract *Background.* *Chlamydia trachomatis* is a frequent cause of pelvic inflammatory disease. However, there is little information from clinical studies about whether screening women for cervical chlamydial infection can reduce the incidence of this serious illness.

Methods. We conducted a randomized, controlled trial to determine whether selective testing for cervical chlamydial infection prevented pelvic inflammatory disease. Women who were at high risk for disease were identified by means of a questionnaire mailed to all women enrollees in a health maintenance organization who were 18 to 34 years of age. Eligible respondents were randomly assigned to undergo testing for *C. trachomatis* or to receive usual care; both groups were followed for one year. Possible cases of pelvic inflamma-

ysis to compare the incidence of pelvic inflammatory disease in the two groups of women.

Results. Of the 2607 eligible women, 1009 were randomly assigned to screening and 1598 to usual care. A total of 645 women in the screening group (64 percent) were tested for chlamydia; 7 percent tested positive and were treated. At the end of the follow-up period, there had been 9 verified cases of pelvic inflammatory disease among the women in the screening group and 33 cases among the women receiving usual care (relative risk, 0.44; 95 percent confidence interval, 0.20 to 0.90). We found similar results when we used logistic-regression analysis to control for potentially confounding variables.

Conclusions. A strategy of identifying, testing, and treating women at increased risk for cervical chlamydial in-

- Screening was associated with reduced incidence of PID (RR: 0.44, 95% CI: 0.20-0.90).
- Study limitations
  - Differential follow-up
- “Good quality” evidence

Evidence for Chlamydia Screening

Home Sampling versus Conventional Swab Sampling for Screening of *Chlamydia trachomatis* in Women: A Cluster-Randomized 1-Year Follow-up Study

Lars Østergaard,[1] Berit Andersen,[3] Jens K. Møller,[2] and Frede Olesen[3]

Departments of [1]Infectious Diseases and [2]Clinical Microbiology, Aarhus University Hospital, and [3]Research Unit and Department of General Practice, University of Aarhus, Aarhus, Denmark

We compared the efficacy of a screening program for urogenital *Chlamydia trachomatis* infections based on home sampling with that of a screening program based on conventional swab sampling performed at a physician's office. Female subjects, comprising students at 17 high schools in the county of Aarhus, Denmark, were divided into a study group (tested by home sampling) and a control group (tested in a physician's office). We assessed the number of new infections and the number of subjects who reported being treated for pelvic inflammatory disease (PID) at 1 year of follow-up; 443 (51.1%) of 867 women in the intervention group and 487 (58.5%) of 833 women in the control group were available for follow-up. Thirteen (2.9%) and 32 (6.6%) new infections were identified in the intervention group and the control group, respectively (Wilcoxon exact value, $P = .026$). Nine (2.1%) women in the intervention group and 20 (4.2%) in the control group reported being treated for PID ($P = .045$), indicating that a screening strategy involving home sampling is associated with a lower prevalence of *C. trachomatis* and a lower proportion of reported cases of PID.

- Home-based screening associated with a reduction in PID (RR: 0.50, 95% CI: 0.23-1.08) compared with opportunistic screening
- Study limitations
  - Significant loss to follow-up
- "Poor quality" evidence

Evidence for Chlamydia Screening

BMJ

RESEARCH

Randomised controlled trial of screening for *Chlamydia trachomatis* to prevent pelvic inflammatory disease: the POPI (prevention of pelvic infection) trial

Pippa Oakeshott, reader in general practice,[1] Sally Kerry, senior lecturer in medical statistics,[1] Adamma Aghaizu, research assistant,[1] Helen Atherton, doctoral student,[2] Sima Hay, lecturer in midwifery,[3] David Taylor-Robinson, professor emeritus,[4] Ian Simms, epidemiologist,[5] Phillip Hay, reader in genitourinary medicine[6]

[1]Division of Community Health

ABSTRACT

INTRODUCTION

- Among asymptomatic women, 0.6% in the screening group versus 1.6% in the deferred group developed PID during follow-up (RR: 0.39, 95% CI: 0.14-1.08).
- Study limitations
  - Underpowered
- "Good quality" evidence

USPSTF screening recommendations for women

Recommendation	Grade
Sexually active women age 24 and younger and older women who are at increased risk for infection	B

- What does a B recommendation mean?

  There is high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial.
  Offer or provide this service.

LeFevre, *Annals of Internal Medicine*, 2014

USPSTF screening recommendations for women

Recommendation	Grade
Sexually active women age 24 and younger and older women who are at increased risk for infection	B

- What about pregnant women?

  Recommendations apply to both pregnant and non-pregnant women.

LeFevre, *Annals of Internal Medicine*, 2014

USPSTF screening recommendations for women

Recommendation	Grade
Sexually active women age 24 and younger and older women who are at increased risk for infection	B

- What is "at increased risk"?

  Sexual risk for infection (e.g., previous STI; exchanging sex for money or drugs).

  Clinicians should consider the communities they serve and consult local public health for guidance on identifying groups at increased risk.

LeFevre, *Annals of Internal Medicine*, 2014

USPSTF screening recommendations for women

Recommendation	Grade
Sexually active women age 24 and younger and older women who are at increased risk for infection	B

- What about gonorrhea?

  Recommendations apply to both chlamydia and gonorrhea.

LeFevre, *Annals of Internal Medicine*, 2014

CDC screening recommendations for women

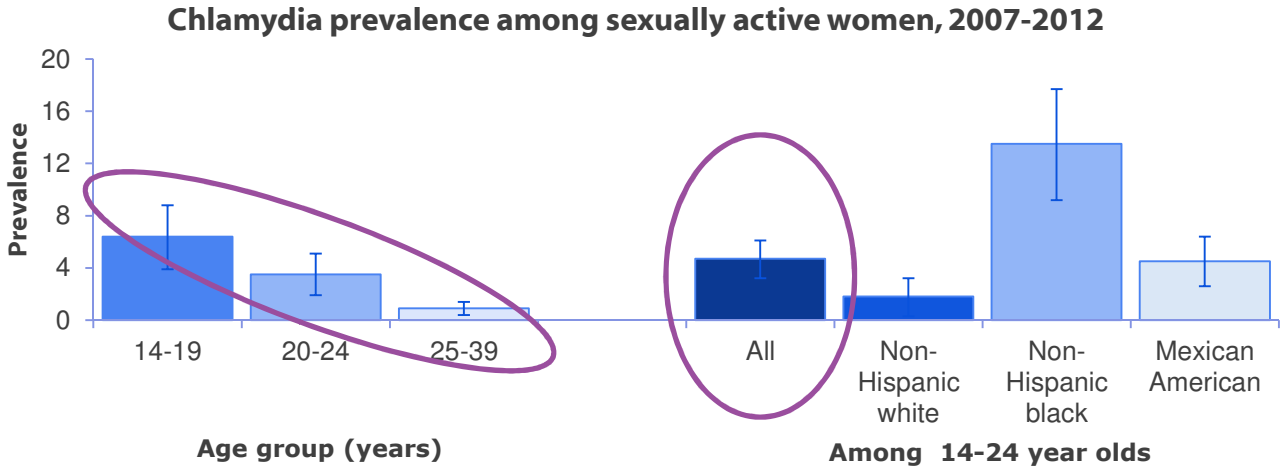
- All sexually-active females aged <25 years should be screened annually
- All females 25 and older with risk factors should be screened annually

- Additionally, recommend
  - Screen females ≤35 years entering correctional facilities
  - Re-screen pregnant women at increased risk in 3rd trimester
  - **Re-screen all persons diagnosed with chlamydia**

CDC. STD Treatment Guidelines, 2015

Why young women?

- Vulnerable population for adverse reproductive complications
- High prevalence



1 in 20 sexually active young women have a prevalent infection

Torrone et al. *MMWR*, 2014

What about heterosexual men?

- No documented substantial secondary prevention evidence
- Cost and feasibility challenges
- Focus on partners of chlamydia-infected females

Recommendation	Grade
Current evidence is insufficient to assess the balance of benefits and harms of screening	I

CDC screening recommendations for men

- Consider in venues with high prevalence: corrections, STD clinics, teen clinics, *when resources allow*

- For gay, bisexual, and other men who have sex with men (MSM)
  - for urethral infection in MSM who had insertive intercourse
  - for rectal infection in MSM who had receptive anal intercourse
  - screening for pharyngeal infection is not recommended

CDC. STD Treatment Guidelines, 2015

Economic Burden of Chlamydia

- Untreated infection results in direct medical costs of over $1.5 million annually
- Chlamydia screening is ranked in the top beneficial and cost-effective prevention services
  - Among the most underutilized

Owusu-Edusei et al, *STD* 2013; Macaluso et al, *Fertil Steril* , 2010

Control Strategy for Chlamydia

- Treating infection at any stage prevents ongoing transmission (**primary prevention**)
- Identifying and treating infection before progression can reduce adverse outcomes (**secondary prevention**)
  - Data from three clinical trials suggest that screening can reduce PID

Why do we care about chlamydia?

If untreated, can lead to serious reproductive complications.

Why do we screen young women for chlamydia?

Why do we care about chlamydia?

If untreated, can lead to serious reproductive complications.

Why do we screen young women for chlamydia?

High prevalence of undiagnosed infection & screening can prevent sequelae

Why do we care about chlamydia?

If untreated, can lead to serious reproductive complications.

Why do we screen young women for chlamydia?

High prevalence of undiagnosed infection & screening can prevent sequelae

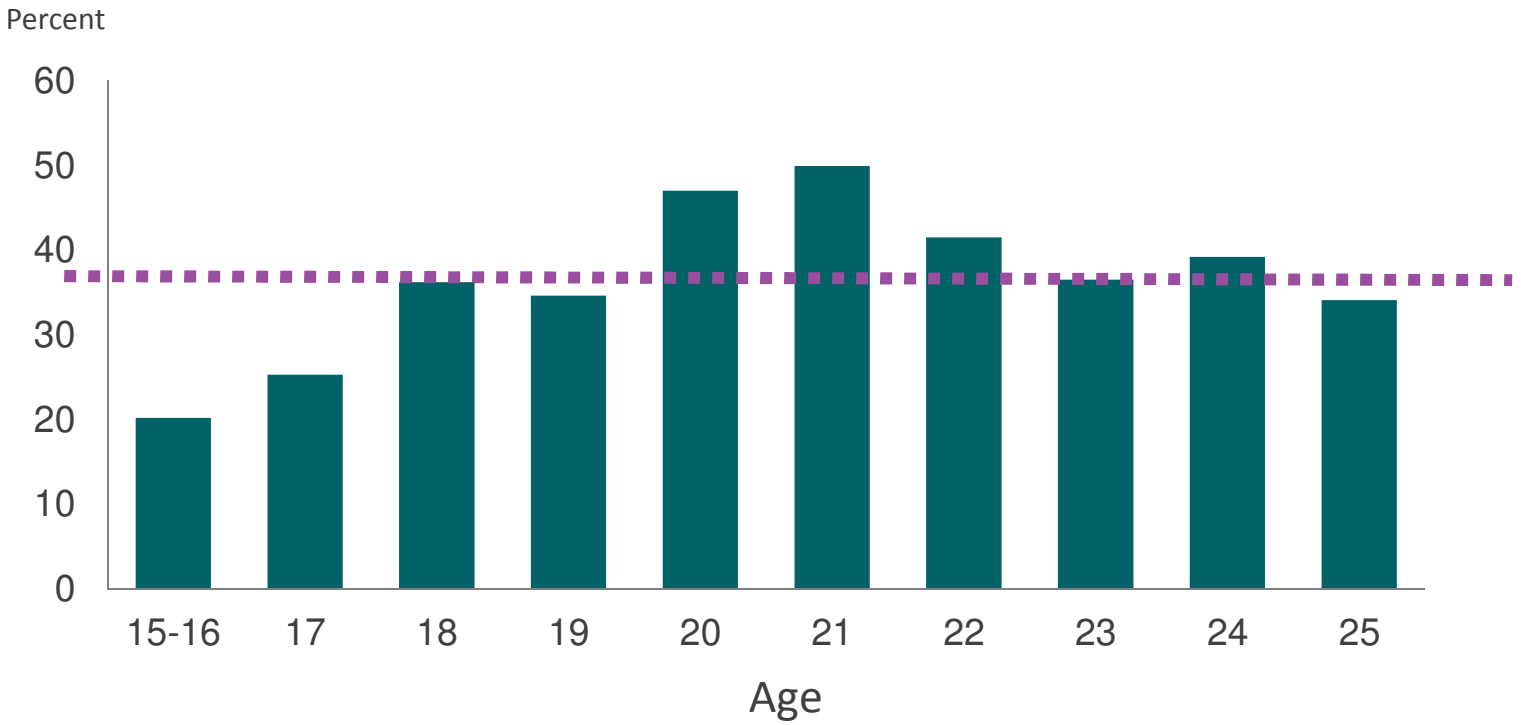
What proportion of young women are screened?

Measuring Chlamydia Screening

What we want to measure
(**screening coverage**)

$$\frac{\text{\# of females tested}}{\text{\# of sexually-active females}}$$

Proportion of sexually-active young women who report having a chlamydia test in the past 12 months by age, 2006–08



37.9% among 15-25 year olds

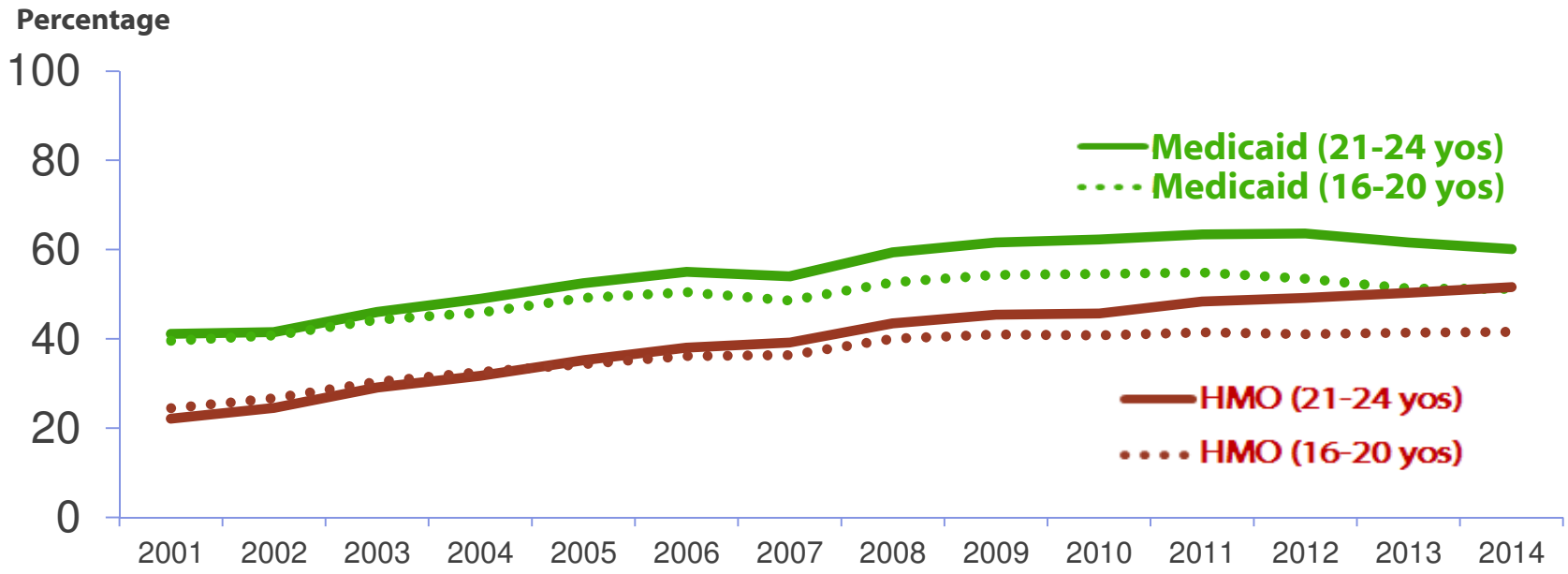
Adapted from Tao et al, *STD*, 2012

Measuring Chlamydia Screening

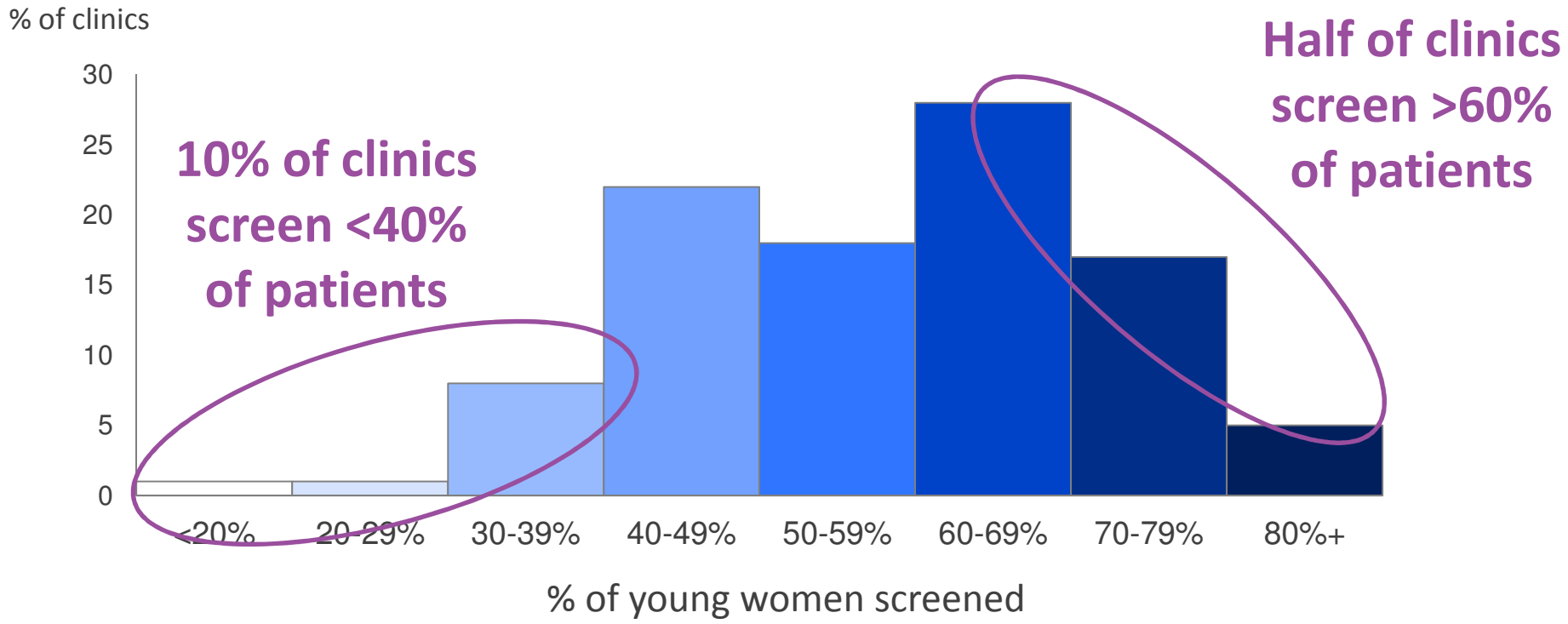
What we usually measure
(**screening uptake**)

$$\frac{\text{\# of females tested}}{\text{\# of sexually-active females } \textit{who saw a provider}}$$

Chlamydia Screening Trends Among Sexually-Active Women*, by Age and Plan, HEDIS, 2001–2014



Within states/plans, coverage varies…



Adapted from Goldenkranz et al, Region X IPP meeting, 2012

Why do we care about chlamydia?

If untreated, can lead to serious reproductive complications.

Why do we screen young women for chlamydia?

High prevalence of undiagnosed infection & screening can prevent sequelae

What proportion of young women are screened?

Why do we care about chlamydia?

If untreated, can lead to serious reproductive complications.

Why do we screen young women for chlamydia?

High prevalence of undiagnosed infection & screening can prevent sequelae

What proportion of young women are screened?

Not enough.

Why do we care about chlamydia?

If untreated, can lead to serious reproductive complications.

Why do we screen young women for chlamydia?

High prevalence of undiagnosed infection & screening can prevent sequelae

What proportion of young women are screened?

Not enough.

How can we improve screening coverage?

Examples of what CDC is doing…

- **Monitoring morbidity**
  - Comprehensive surveillance strategies
  - Modeling incidence
  - Biomarker research
- **Monitoring screening**
  - HP2020 objective
  - AAPPS measure
- **Preventing infection**
  - Program support
  - Clinical guidance and training
  - Modeling transmission dynamics
- **Improving screening coverage**
  - Evaluation projects
  - Clinical decision support
  - Partnerships with NPTCs, NCC, & NCQA

Evaluation Project: Improving screening among young women in primary care settings

- Competitive supplement to STD AAPPS to support enhanced evaluation of high priority topics.
  - Funding awarded to four jurisdictions: CA, NY, Baltimore, Philadelphia

- Efforts focus on:
  - Providers who provide primary care services in primary care settings
  - Successful interventions

California

- Two pronged approach
  - Focus on one county with high-volume providers
    - QI resources, training, educational events, public health detailing
  - State-wide
    - QI approach targeting state-wide and regional health plans
- Outcomes
  - HEDIS rates
  - Cost-effectiveness evaluation

National Quality Improvement Center (NQIC)

- Collaboration with the California Prevention Training Center
- Improve access to preventive health services for adolescents, including chlamydia screening
- Activities
  - Establish QI capacity building program
  - Establish QI fellowship program and curriculum
  - Pursue policy issues related to ensuring quality of care for adolescent sexual health services

ncc

national chlamydia coalition

- Mission
  - Address the high burden of chlamydia in adolescents and young adults by promoting equal access to comprehensive and quality health services
- Comprised of national non-profit organizations, health care professional associations, advocacy groups, health insurers, and local, state, and federal government representatives

ncc.prevent.org

- Provider resources
- Clinical education
- Research briefs

WHY SCREEN FOR CHLAMYDI

An Implementation Guide for Healthcare Providers

Early identification and treatment:

Reduces pelvic inflammatory disease (PID)

Reduces infertility, ectopic pregnancy, and chronic pelvic pain

Prevents complications in newborns

4 Diagnosis and Treatment Path

UNCOMPLICATED SYMPTOMATIC, NON-PREGNANT FEMALE OR MALE

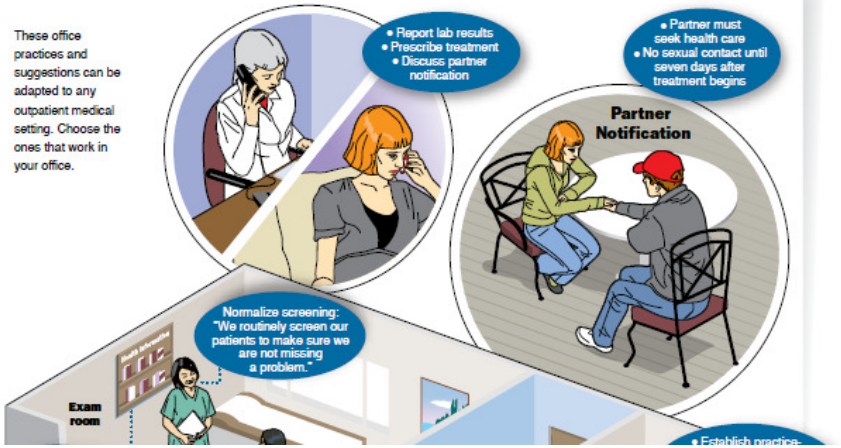
Take sexual and medical history;
Conduct genital/pelvic exam;
Test for chlamydia

\– Repeat sexual history;
Screen annuall
until 26th birthd

\+ Test for other STDs;
Follow CDC's STD

5 Teen Friendly Office Tips

These office practices and suggestions can be adapted to any outpatient medical setting. Choose the ones that work in your office.



Case Study:

Michigan Department of Community Health

ncc

PROJECT OVERVIEW

The Michigan Department of Community Health partnered with Molina Healthcare of Michigan, tl Medicaid managed care provider in the state, to a award-winning, culturally specific intervention tc chlamydia screening among female members age

Designed to reach low-income, primarily African American members living in Southeastern Michigan, the Chlamydia Practice Improvement Project (CPIP), utilized a public/private partnership to address the disproportionate

Based on qualitative research with the two primary audienc and providers—the project wa solid understanding of their k attitudes, along with perceive

Chlamydia Practice Improvement Project (CPIP)
On-Site Provider Meeting
Pre-Visit Assessments

1. Which screening test(s) do you use?

Please check all that apply.
Nucleic Acid Amplification Technology (NAATs) (Urine)
Nucleic Acid Amplification Technology (NAATs) (Cervical Sv
Cell Culture
Direct Florescent Antibody (DFA)
Enzyme Immunoassay (EIA)
Nucleic Acid Probe (DNA Probe)
Other (*specify*):

2. What are your screening practices?

Please indicate whether or not you do each of the fo
Regularly offer chlamydia screening to eligible patients (wo

ncc national chlamydia coalition

RESOLUTION

On behalf of the National Chlamydia Coalition,
Dawn Custer, M.A., Morang-Chester Clinic, P.C.
is hereby recognized as the

Chlamydia Practice Improvement Project (CPIP) Champion

Whereas, Chlamydia is the most common reportable disease in Michigan with 47,146 cases reported in 2010; and,

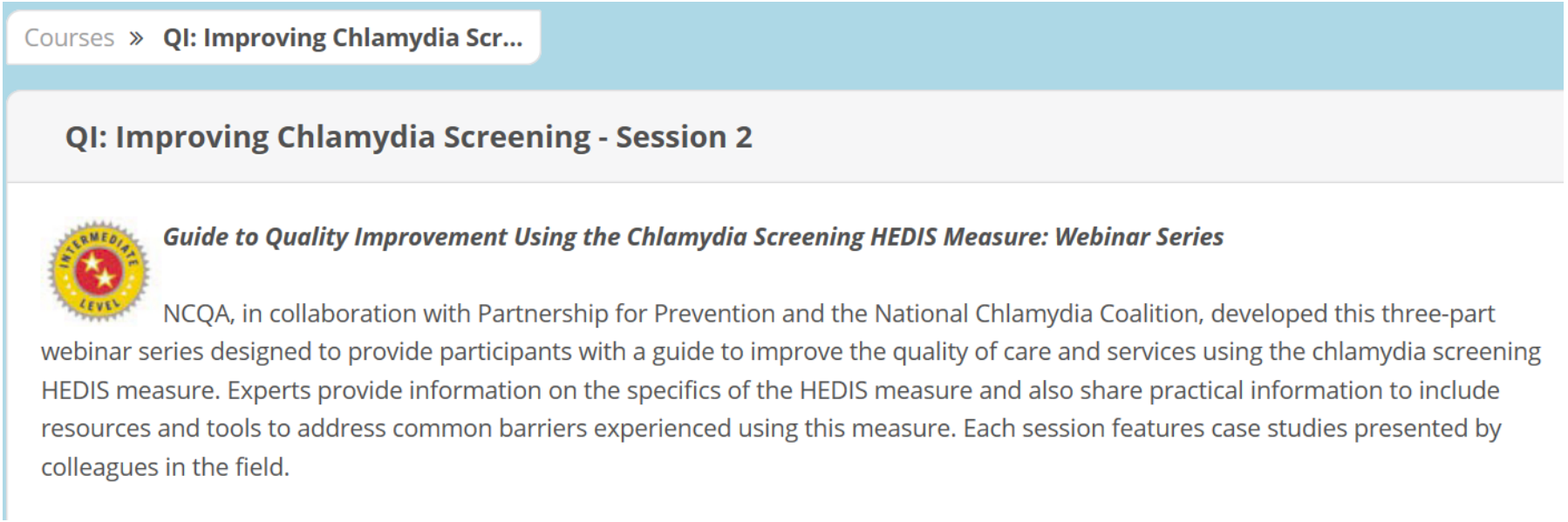
Whereas, Screening and treatment of chlamydia prevent complications including pelvic inflammatory disease, ectopic pregnancy, and chronic pelvic pain; and,

Whereas, The National Commission on Prevention Priorities ranks chlamydia screening as one of the ten high value clinical preventive services; and,

Whereas, The health of Michigan citizens is enhanced by local health care providers' efforts to implement the National Center on Quality Assurance (NCQA) standard to screen all females age 16-24 for chlamydia; and,

Whereas, Dawn Custer, M.A., showed exemplary commitment to improving chlamydia

Partnership with NCQA:
Chlamydia screening webinar series



Why do we care about chlamydia?

If untreated, can lead to serious reproductive complications.

Why do we screen young women for chlamydia?

High prevalence of undiagnosed infection & screening can prevent sequelae

What proportion of young women are screened?

Not enough.

How can we improve screening coverage?

Why do we care about chlamydia?

If untreated, can lead to serious reproductive complications.

Why do we screen young women for chlamydia?

High prevalence of undiagnosed infection & screening can prevent sequelae

What proportion of young women are screened?

Not enough.

How can we improve screening coverage?

Together.

Thank you!

Etorrone@cdc.gov

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.