Recurrent Chlamydial Infections among Young Women in Rural and Urban Communities

Adelbert B. James, PhD, MPH

Emory University School of Medicine

Atlanta, Georgia

Objectives and Study Design

- To observe epidemiologic patterns of recurrent or persistent chlamydial infections in rural and urban communities.
- To determine predictors of recurrent chlamydial infections.
- Cross-sectional study involving 60,000 randomly selected women less than 25 years of age screened between January 1999 and December 2000 in Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina and Tennessee.

Recurrent or Persistent Chlamydia?

- Recurrent Chlamydia infections are common
- The immunity developed from initial chlamydia infection is type specific and may only provide partial protection.
- Chlamydia recurrence usually occurs at the same site.
- Recurrent infections may involve different chlamydia strains.
- An initial positive test may have been a recurrent or persistent infection for unspecified period.
- The mechanism for persistent chlamydial infection is not fully understood and persistence may be difficult to distinquish between recurrent infections.

Definition of Recurrent/Persistent Chlamydial Infection

A recurrent or persistent infection occurring at least 30 days after the first reported chlamydial infection.

Methods

- Screening occurred in family planning clinics, STD clinics, prenatal clinics and other health departments.
- Subjects were screened for *C. trachomatis* and *N. gonorrhoeae* using Gen Probe Pace 2 assay.
- Predictor variables included age, race, distance traveled to the clinic, pregnancy and a history of gonorrhea.
- Intervening variables were rural and urban areas.
- Both univariate and multivariate analyses were used to analyze the data.

Rural and Urban Information

- A commercial software "CensusCD" by Geolytics 2000 was used to obtain rural and urban information based upon zip codes.
- CensusCD provided several demographic information including percent of urban and rural populations, percent of transportation, levels of education and household incomes within a zip code.
- Zip code information from CensusCD was merged with the subject's zip code in database.

Definition of Rural and Urban Communities

- If a zip code had at least 55% urban population, then it was classified as an urban community.
- If a zip code had more than 45% rural population, then it was classified as a rural community.

Characteristics of Study Population

	No. Infected	% Infected	% Reinfected	Total
Females	6,640	11	12.6	60,000
Race				
Whites	1,764	6.7	9.2	26,456
A. Americans	3,859	18.7	15.7	20,620
Others	1,017	7.9	7.0	12,924
Age group*				
10-15 yrs	580	12.6	13.6	4,600
16-19 yrs	3,465	13.0	14.0	26,728
20-24 yrs	2,594	9.1	10.7	28,638

*Missing data

Chlamydia Recurrence in Rural Communities

	No. Infected	% Reinfected	Total
Females	2,776	13.6	28,109
Race			
Whites	944	8.2	14,691
A. Americans	1,452	18.6	7,639
Others	380	7.6	5,779
Age group*			
10-15 yrs	225	15.1	2,300
16-19 yrs	1,539	14.2	13,313
20-24 yrs	1,012	12.4	12,484

* Missing data

Chlamydia Recurrence in Urban Communities

	No. Infected	% Reinfected	Total
Females	3,864	12.0	31,891
Race			
Whites	820	10.3	11,765
A. Americans	2,407	14.0	12,981
Others	637	6.6	7,145
Age group*			
10-15 yrs	355	13.4	2,300
16-19 yrs	1,926	13.9	13,415
20-24 yrs	1,582	9.6	16,154

* Missing data

Geographic Location, Race and Chlamydia Recurrence

- In rural communities, African Americans were more likely to be reinfected than Whites (OR= 2.26, P<.001).
- In urban communities, African Americans were more likely to be reinfected than Whites (OR=1.35, P<.05).
- Rural African Americans were more likely to be reinfected than urban African Americans (OR =1.34, P < .001).
- There was no significant difference between rural Whites and urban Whites.

Geographic Location, Age group and Chlamydia Recurrence

- In urban communities, women between 16 -19 years old were more likely to be reinfected than women between 20 - 24 years old (OR =1.44, P <.001).

- In rural communities, there was no significant difference between 16 -19 years old and 20 -24 years old.

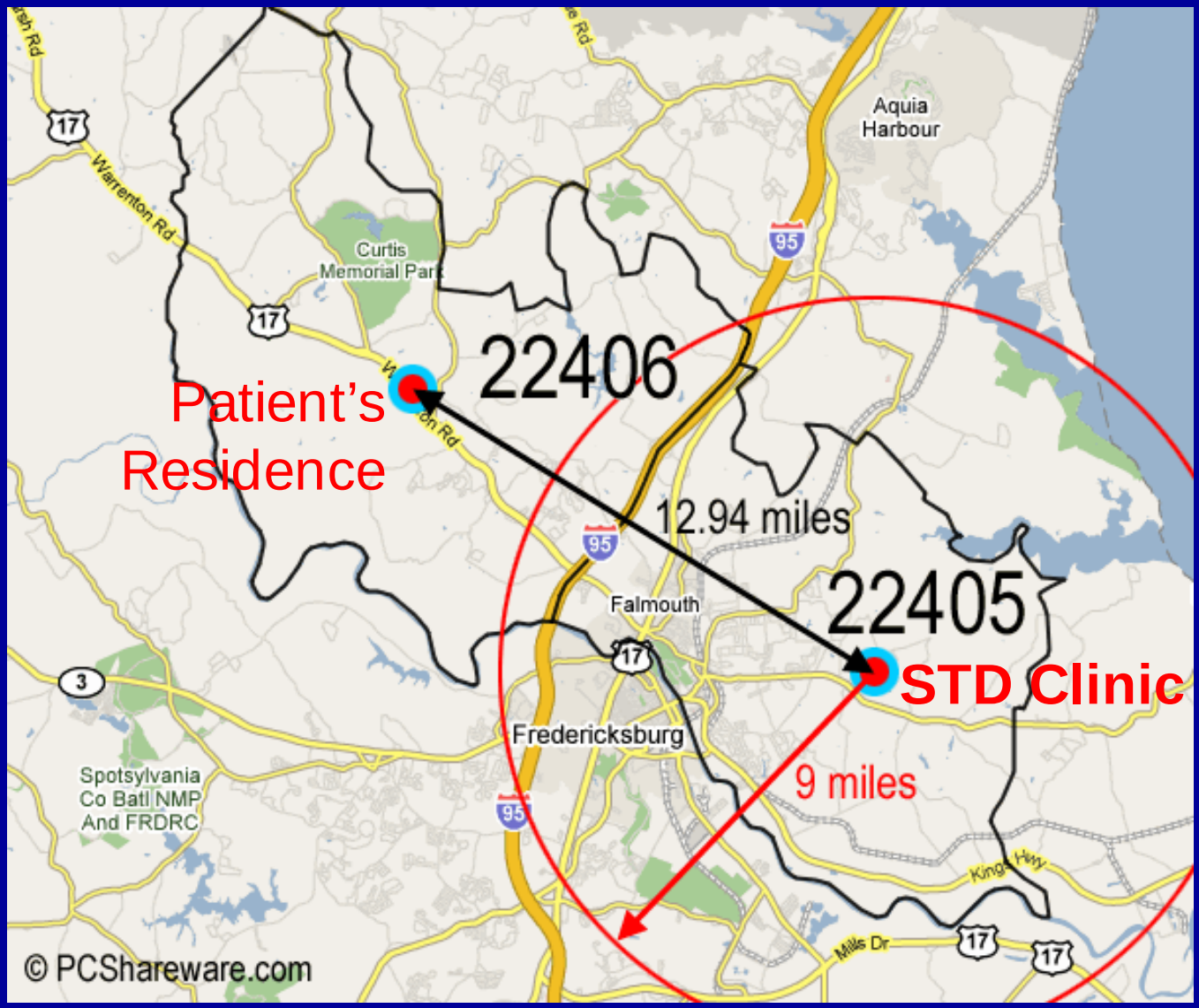
Patient Characteristics and CT Recurrence

Predictor	OR	P value	95% CI*
16-19 yrs	1.317	<.001	(1.119, 1.550)
20-24 yrs (ref)			
White	.566	<.001	(0.471, 0.680)
African American (ref)			
Rural	1.177	.036	(1.011, 13.699)
Urban (ref)			

* Adjusted for characteristics

Distance to Care

- Rural residents face several challenges in accessing health care facilities including longer waiting times, longer travel time, and greater transportation difficulties than their urban counterparts.
- One major issue is the distance to care - distance between the patient's residence and the clinic providing services.
- Using a commercial software- ZipFind 2002 we able to use zip codes to measure the mean distance in miles between the patient's residence and the clinic providing the service.



Distance to Care and CT Recurrence

- The median distance between the subject's residence and the clinic providing the services was:
  - Rural - 6.4 miles; Urban - 3.3 miles
- There was a correlation between the mean distance (miles) to the clinic and chlamydia recurrence in rural areas but not in urban areas.
- In rural areas, patients who lived further away from the clinic were 24.2% more likely to become reinfected (P <.001, 95% CI (1.065, 1.447).
- Infected women whose sex partners live further away from the clinic may not come in for treatment or willing to miss a day's work especially if they are asymptomatic.

Pregnancy and Chlamydia Recurrence

- 1085 women were pregnant during study period.
- Chlamydia recurrence among pregnant women
  - 15.0% of pregnant women in rural areas were reinfected.
  - 13.9% of pregnant women in urban areas were reinfected.
- Overall, pregnant females were 25.9% less likely to have a recurrent infection (P <.01); 95% CI (0.612, 0.897)
- The influence of living in a rural or urban setting did not have an apparent effect on chlamydia recurrence among pregnant women.

Comparison of Chlamydia Recurrence among Patients with Hx of GC Infection

Rural Communities (n=150)

- 14% of GC infected women had a reinfection.
- African Americans had the highest percent of chlamydia recurrence (19.6%)
- 20-24 yrs olds had the highest percent of chlamydia recurrence (23.9%).

Urban Communities (n=428)

- 13.1% of GC infected women had a chlamydia recurrence.
- African Americans had the highest percent of chlamydia recurrence (15.8%).
- 16-19 yrs old had the highest percent of chlamydia recurrence (15.6%).

History of GC and CT Recurrence

Predictor	OR	P value	95% CI*
GC Infection	1.44	<.001	(1.103, 1.900)
16-19 yrs	1.03	.199	(0.928, 1.431)
20-24 yrs (ref)			
White	0.57	<.001	(0.444, 0.734)
African American (ref)			
Rural	1.18	.114	(0.959, 1.473)

* Adjusted for characteristics

Summary

- Rural women have a higher prevalence of chlamydia recurrence.
- Younger age, race, residing in rural communities, distance traveled to clinic, and a history of gonorrhea were predictors for chlamydia recurrence.
- Racial and health disparities exists in both rural and urban communities.

Limitations

- Generalizability of findings to other areas and venues
- Lack of behavioral and clinical information
- Lack of treatment information

Implications

- Chlamydia recurrence in both rural and urban areas raises important issues of access to care, distance to care and utilization of STD services.
- Need to increase mobile health services in hard-to-reach areas
- Need to promote Expedited Partner Therapy (EPT) in rural communities.
- Need for interventions to increase chlamydia screening and reduce health disparities in rural communities.

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