

Responding to a Community Tuberculosis Outbreak: Public Health Nursing Interventions

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Disclosure

During the past 12 months I have had no financial, professional or personal relationships that might potentially bias and/or impact content of this educational session.

Presentation Objectives

At the end of the presentation, the learner will be able to:

- Describe social determinants that contribute to tuberculosis (TB).
- Identify public health interventions utilized by public health nurses to manage a local TB outbreak in the context of the Public Health Intervention Wheel.
- Discuss challenges to the successful treatment of TB in specific populations.

TB Disease/ Active TB

- Mycobacteria multiply causing signs and symptoms of illness.
- Symptoms include night sweats, fever, weight loss, prolonged cough, and hemoptysis.
- Transmission potential varies greatly among individuals with active disease.
- Diagnostic tools include chest x-ray, blood testing, sputum tests, CT, bronchoscopy, lung biopsy.
- Treated with four front line medications and daily observed therapy (DOT).

Latent TB Infection (LTBI)

- The individual's immune system is able to suppress the mycobacteria and small numbers become dormant.
- Activation of latent infection for most cases occurs within the first two years following exposure.
- Activation is impacted by other health factors
- Detected most often by TB skin test (TST).
- Treated with preventive therapy.

Treatment for TB and LTBI

- TB disease - Treatment with four drug regimen – isoniazid, (INH), rifampin (RIF), pyrazinamide (PZA) and ethambutol (EMB)
- Length of treatment may vary depending on clinical situation
- Latent TB infection treated with INH and B6
- Current outbreak strain has low level resistance to INH so rifampin is indicated for LTBI
- Unexpected challenges – nationwide shortage of medications and Tubersol used for testing
- Patients need frequent monitoring for side effects of medication and therapeutic effect

Social Risk Factors and TB Transmission

- Transmission is affected by:
 - Infectiousness of patient
 - Environmental conditions
 - Duration of exposure
- Exposure risks include:
 - Low-income, medically underserved groups
 - Children under age 5 exposed to high risk adults
 - Congregate settings, correctional institutions
 - Immunosuppression

TB Outbreak Timeline 2010 – 2013

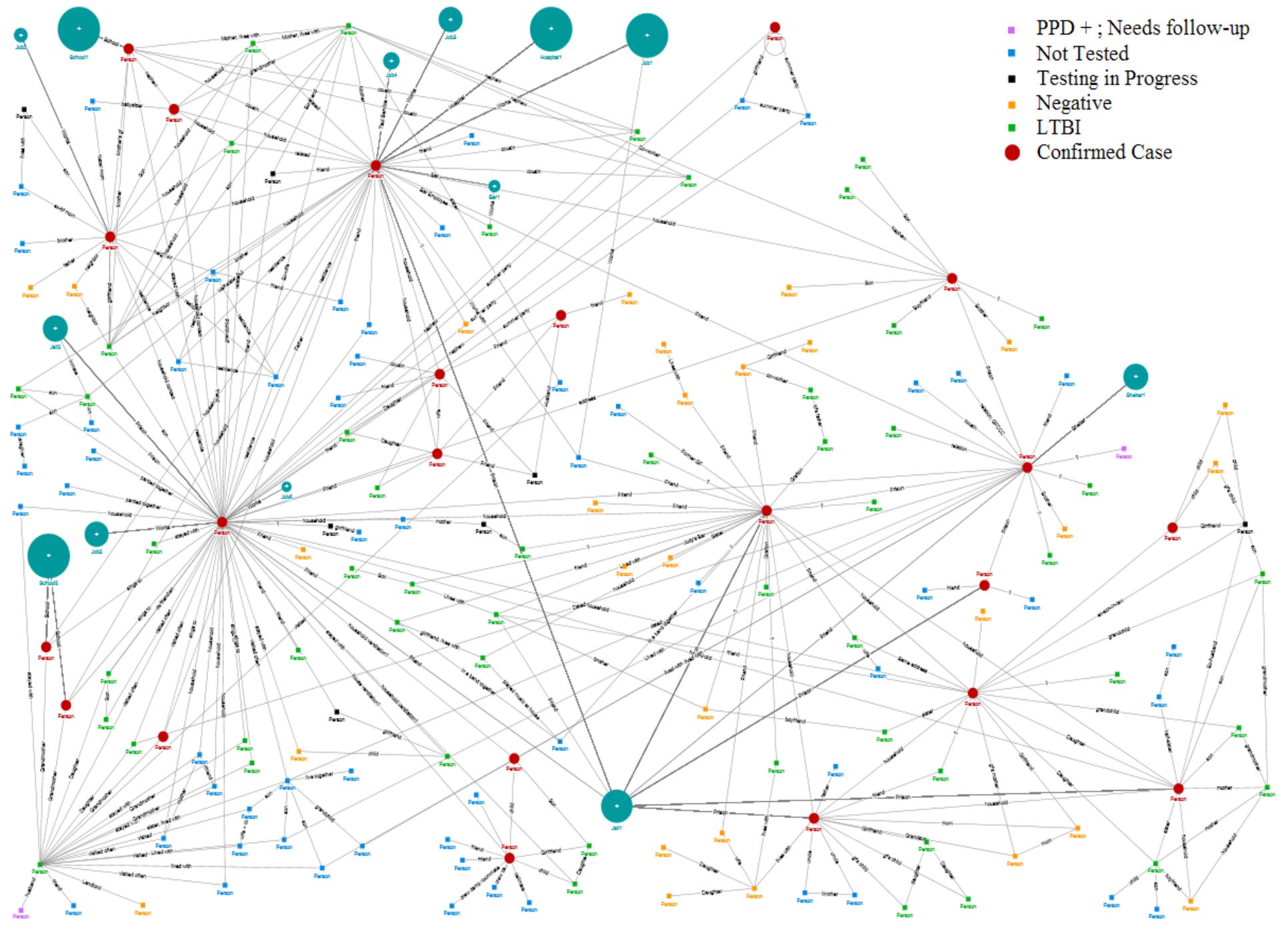
- 2010: two cases confirmed in Grand Forks in homeless individuals not living in a shelter.
- Early 2012: three confirmed cases identified and successfully treated with directly observed therapy.
- October – November 2012: investigation identified more cases and the ND Dept. of Health requested visit from CDC Epi Aid Team.
- December 2012: CDC Epi Aid team arrives and spends three weeks on investigation.
- January – April, 2013: total case count increases to 25, contact investigation continues, more visits by CDC advisors.

TB Outbreak Timeline

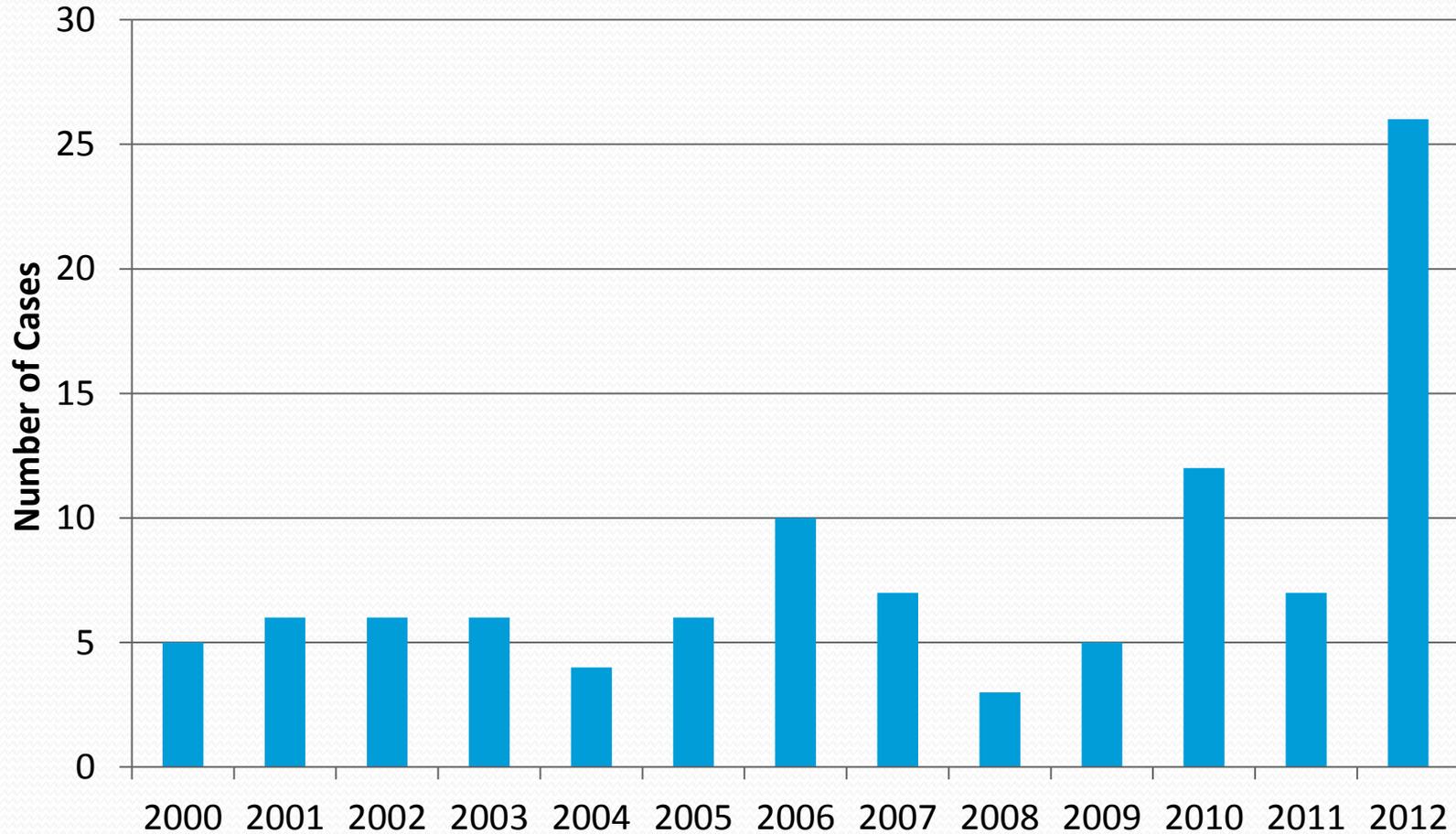
- March, 2013: therapeutic drug monitoring begun on outpatients.
- April – September, 2013: one additional pediatric case identified, emphasis on case management and treatment of TB cases and LTBI cases.
- September, 2013: third CDC public health associate arrived to provide technical assistance and expertise.
- October, 2013: continuing to locate contacts needing testing and conducting follow up with LTBI cases.

TB by the Numbers

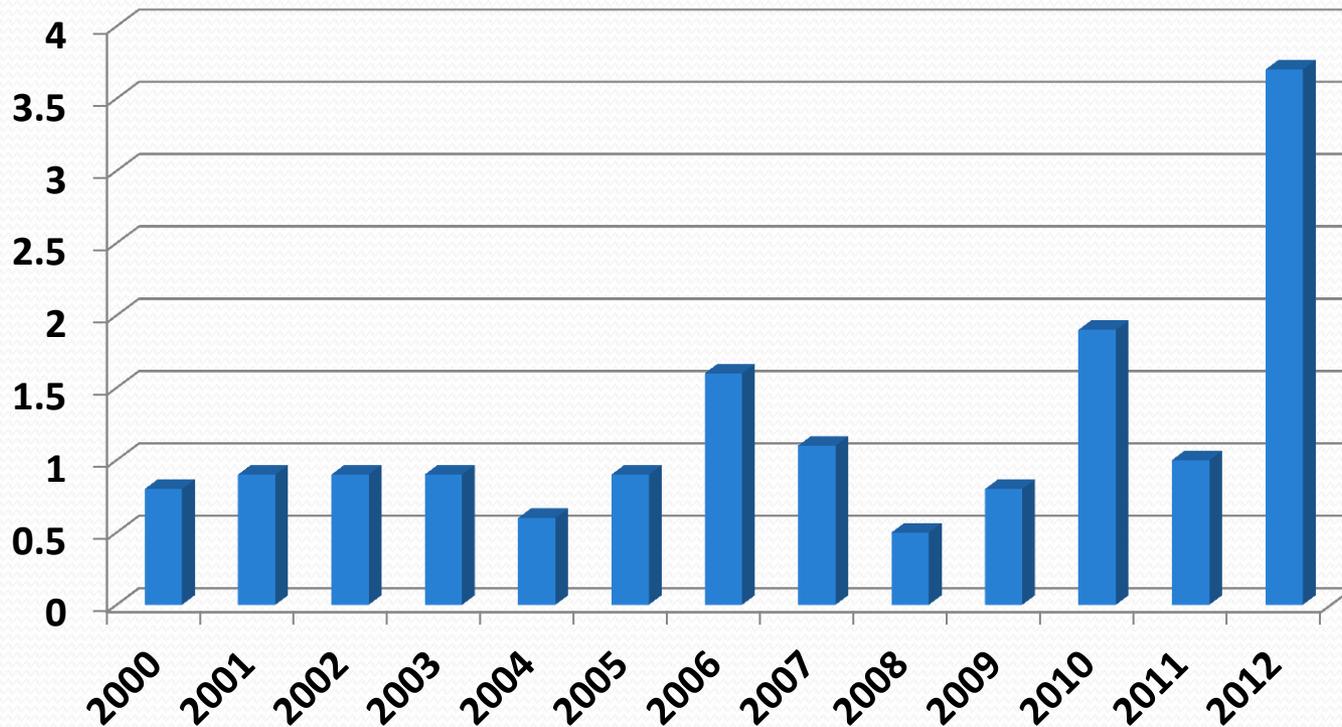
- 26 TB cases
 - includes both culture confirmed and clinical cases
 - 8 pediatric cases ranging from 5 months – 13 years at time of diagnosis
 - 56 % male 44 % female
 - 84% American Indian, 12 % White, 4% Hispanic
 - 9 cases completed treatment as of 10/15/2013
- 70 latent TB infections (LTBI) identified
- 1,800 individuals screened with TB skin testing

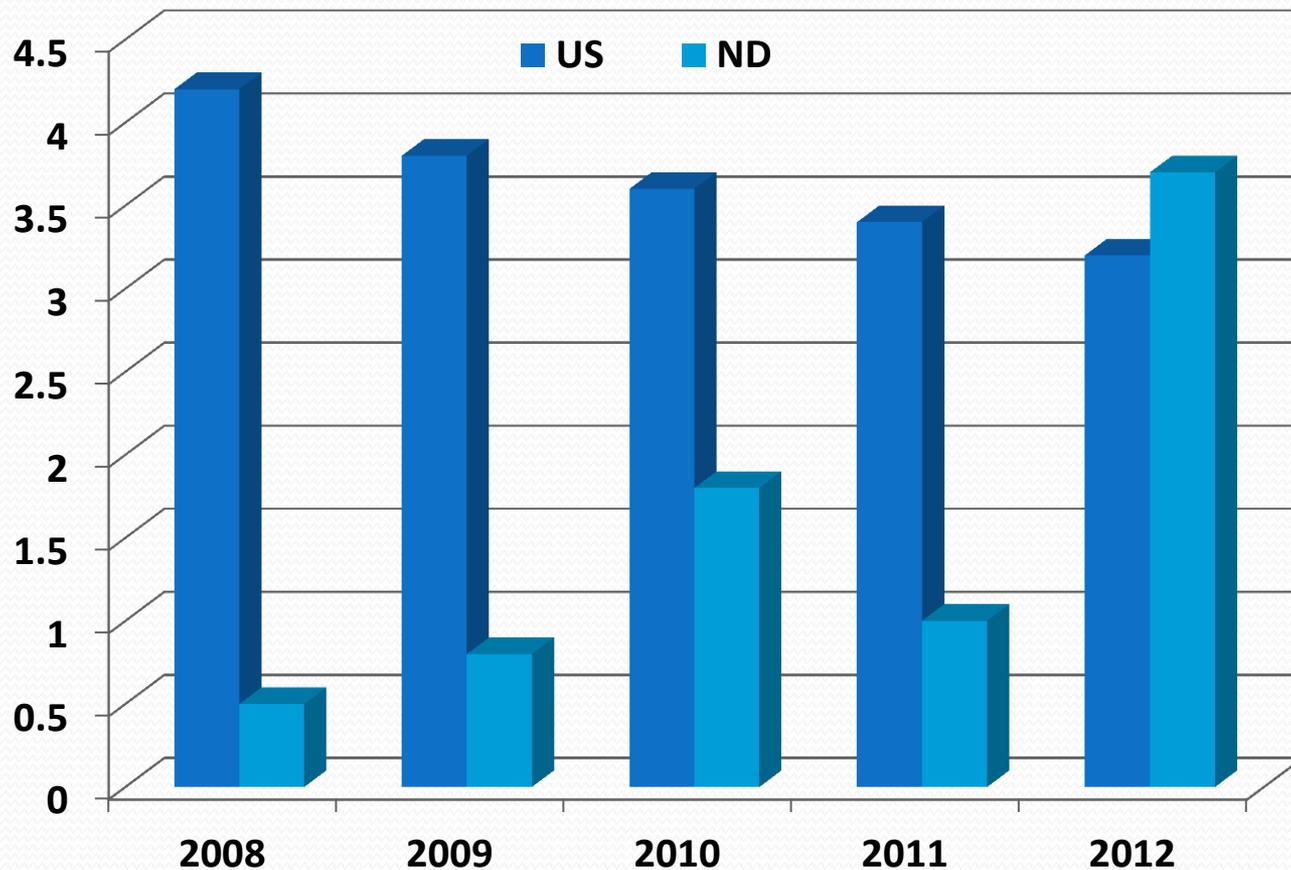


North Dakota TB cases 2000 – 2012



North Dakota TB Cases/100,000 2000-2012





**North Dakota TB Rates per 100,000
Compared to United States TB Rates per 100,000**

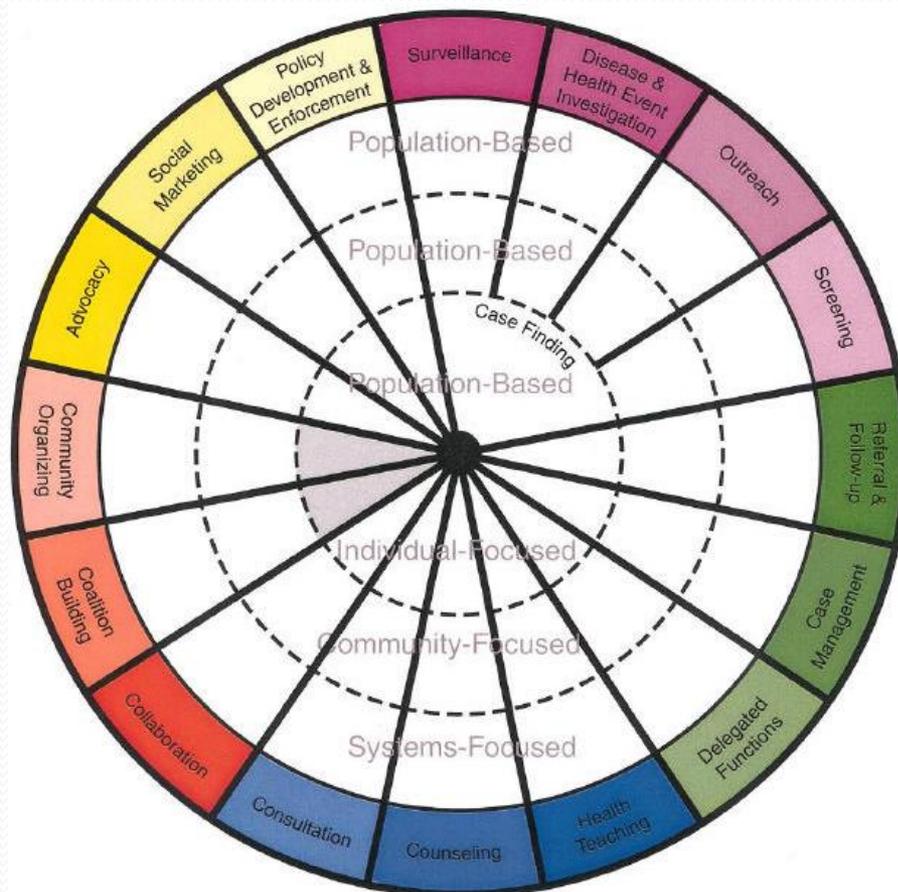
TB Case Rates,* United States, 2012



*Cases per 100,000.



Public Health Intervention Wheel





Interventions are actions that public health nurses take on behalf of individuals, families, systems, and communities to improve or protect health status.

Minnesota Dept. of Health, 2001

Public Health Intervention Wheel

Application in TB Outbreak

- Very few articles describe public health nursing interventions during a TB outbreak in relationship to the Public Health Intervention Wheel.
- TB control most commonly described from medical and epidemiological models.
- Most common roles for PHN's described in literature are: screening and referral, nurse case management and contact investigation.

Public Health Intervention Wheel

Application in TB Outbreak

- Surveillance
- Disease investigation
- Outreach
- Screening
- Referral and follow up
- Case management
- Delegated functions
- Health teaching
- Counseling
- Consultation
- Collaboration
- Coalition building
- Policy development and enforcement

Examples of Public Health Interventions and PHN Roles

- Surveillance and disease event investigation
 - TB lab reports, contact investigation, communication with health systems
 - Utilized photos and social media as investigative tools
- Outreach
 - Targeted testing in three schools, seven worksites, and named contacts
 - “Flagging” electronic health records

Examples of Public Health Interventions and PHN Roles

- Screening
 - TB skin testing in the community, homes, public health office
 - Increased screening in shelter population and correctional center
 - Recommended blood testing for named contacts presenting in ER or urgent care



Examples of Public Health Interventions and PHN Roles

- Referral and follow up
 - Referred clients for evaluation, follow up by phone or home visit to complete treatment
 - Referred for other public health and primary care services
- Case management
 - Appointment scheduling, transportation, incentives
 - Housing supported for length of treatment
 - Enrollment in health care coverage

Examples of Public Health Interventions and PHN Roles

- Delegated functions
 - Medication compliance through DOT and DOPT
 - Monitoring for medication side effects, and therapeutic drug levels



Examples of Public Health Interventions and PHN Roles

- Health teaching
 - TB disease education for clients and community
 - Medication compliance
 - Utilized electronic health record
- Counseling
 - Four drug regimens resulted in side effects for clients
 - Motivational interviewing skills are necessary
- Collaboration
 - Weekly TB case management meetings
 - Bi-monthly case review meetings at local hospital
 - Agencies providing support services

Examples of Public Health Interventions and PHN Roles

- Coalition Building
 - Initiated TB task force
 - Developed media messages and talking points
- Consultation
 - Correctional center nurses – negative air pressure cells
 - CDC – full genotyping linked cases from 2010 – 2013
- Policy development and enforcement
 - New recommendations for TB testing at shelter, correctional center, and health care organizations
 - Legal action related to isolation and treatment non-compliance

Ongoing Response to Outbreak

- Continued surveillance
- Populating a new TB database
- Robust case management for LTBI cases
- Increasing staff training on TB
- Provider education on TB
- Administrative tasks including increasing personnel, revising budgets, paying expenses, and communication activities
- Providing support to maintain morale
- Highlight the contributions of public health nurses

Partners

The response activities and dissemination of findings would not have been possible without the extraordinary efforts by professionals from these organizations.



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Questions?

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