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Assignment Title: An Analysis of Tuberculosis:

Monitoring, Control and Community Impact

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## **Introduction**

Tuberculosis is an infectious disease caused by the bacterium *Mycobacterium tuberculosis* which primarily affects the lungs but can also affect the kidneys, bones, and brain (WHO, 2023). TB spreads through airborne droplets when an infected person coughs or sneezes and has become an issue of public health concern. Common symptoms are a persistent cough lasting more than three weeks, chest pain, fever, night sweats, fatigue, and unexplained weight loss (NHS, 2024). Without timely treatment, TB can become life-threatening. People experiencing TB need a combination of health and social care services. Health services provide diagnostic tests, medication, monitoring, and public health interventions such as contact tracing. Social care services provide housing, financial assistance, safeguarding, and access to benefits for vulnerable individuals (UKHSA, 2023). Community nurses, social workers, and public health teams work together to promote treatment adherence and prevent transmission. Community-based support is essential for reducing TB transmission and promoting recovery.

## **Monitoring:**

The methods used to measure and monitor Tuberculosis are clinical assessment, laboratory tests, and public health surveillance. Diagnostics of TB are done clinically, including the diagnosis and monitoring of TB by clinical examination and public health surveillance. Diagnostic tests are performed in the clinic for symptoms like chronic cough and weight loss, and the most common diagnostic method is sputum smear microscopy, which detects TB bacteria under a microscope, and culture testing, which allows bacteria to grow in a laboratory for confirmation (CDC, 2023). While culture testing is very accurate, it can take several weeks to produce results. Nucleic acid amplification tests (NAATs) provide rapid and sensitive detection of TB DNA, making them valuable for early diagnosis (WHO, 2023). Chest X-rays are used to identify abnormalities consistent with pulmonary TB. For extrapulmonary TB, additional imaging such as CT or MRI scans may be required. Blood tests, including interferon-gamma release assays (IGRAs), help identify latent TB infection, where individuals carry the bacteria without symptoms (NICE, 2022).

TB is monitored at the population level through national surveillance systems. The UK Health Security Agency (UKHSA) collects data on TB incidence, treatment outcomes, drug resistance, and demographic patterns (UKHSA, 2023). This information helps identify high-risk groups, track outbreaks, and evaluate public health interventions. Contact tracing is a crucial monitoring strategy, enabling health professionals to identify and test individuals exposed to an infectious case (NHS, 2024). Monitoring also includes assessing treatment adherence. TB treatment typically lasts at least six months, and incomplete treatment

increases the risk of drug-resistant TB. Directly Observed Therapy (DOT) is used in some cases, where healthcare workers supervise medication intake to ensure adherence (WHO, 2023). Community nurses and outreach workers play a vital role in monitoring symptoms, supporting individuals with complex needs, and ensuring continuity of care. Effective TB monitoring increasingly relies on rapid molecular diagnostics and integrated surveillance systems, which improve early detection but remain limited by cost and access inequalities (World Health Organization, 2023). While tools such as NAATs enhance diagnostic accuracy, delayed presentation and underreporting still hinder timely intervention. Similarly, TB control is challenged by poor treatment adherence and rising drug resistance, particularly among vulnerable populations and under developed nations. Although strategies like DOT and contact tracing are effective, their success depends on sustained funding and community engagement (National Institute for Health and Care Excellence, 2022; UK Health Security Agency, 2023).

**Control:**

Controlling TB requires medical, social, and public health strategies. The primary method of control is early detection and effective treatment. Standard TB treatment involves a combination of antibiotics taken over a minimum of six months, including isoniazid, rifampicin, pyrazinamide, and ethambutol (NICE, 2022). Completing the full course of treatment is essential to prevent relapse and reduce the risk of drug-resistant TB. Public health teams play a central role in TB control. Once a case is confirmed, contact tracing is initiated to identify individuals who may have been exposed. These contacts are tested and, if necessary, treated for latent or active TB. This approach helps break the chain of transmission within the community (UKHSA, 2023). Vaccination also contributes to TB control. The BCG vaccine provides protection against severe forms of TB, particularly in children (NHS, 2024). Although it does not prevent all forms of TB, it remains an important preventative measure in high-risk groups. Social support is another key component of TB control. Many individuals affected by TB face challenges such as homelessness, poverty, or immigration-related barriers. These factors can make it difficult to access healthcare or adhere to treatment. Social care services may provide housing support, financial assistance, and help accessing benefits (WHO, 2023). Nutritional support is also important, as malnutrition can weaken the immune system and worsen TB outcomes.

Public health education campaigns raise awareness about TB symptoms, transmission, and the importance of completing treatment. These campaigns help reduce stigma, encourage early diagnosis, and promote community engagement in TB prevention efforts (UKHSA, 2023).

TB can cause significant physical health problems. Pulmonary TB may lead to chronic lung damage, breathlessness, fatigue, and reduced physical capacity (NHS, 2024). Individuals may struggle with daily activities, work, or exercise. Extrapulmonary TB can affect organs such as the spine, kidneys, or brain, leading to long-term disability if not treated promptly. A TB diagnosis can have a major psychological impact. Individuals may experience anxiety, fear, or depression due to the seriousness of the illness. The long duration of treatment can be emotionally draining, especially when combined with social isolation. Stigma associated with TB may lead to feelings of shame or embarrassment (WHO, 2023).

### **Impact on Community**

Stigma and discrimination – people with TB may be isolated or judged due to misconceptions about the disease. This discourages testing and treatment. TB can also have impact on vulnerable groups and disproportionately affects socially excluded populations such as:

- Homeless individuals
- People with substance misuse issues
- Migrants and asylum seekers
- People in the criminal justice system

These groups face barriers to accessing care, thus worsening community transmission.

Family disruption – Long treatment periods and hospital visits can affect childcare, schooling, and family stability. Individuals may be required to isolate during the early stages of treatment, leading to loneliness and reduced social contact. Families may experience stress due to caregiving responsibilities or fear of transmission (UKHSA, 2023).

Economic consequences on individuals – TB has significant financial implications. Individuals may not be able to work during treatment, and therefore, they face income loss. Travel, nutrition, or childcare costs for families may also go up. TB generates demand for health services at a community level, such as hospital care and public health services (NICE, 2022). TB puts significant pressure on health and social care services. Healthcare professionals need to coordinate diagnosis, treatment, and follow-up care. When medication adherence is needed, community nurses will help with housing and safeguarding. Public health teams are responsible for contact tracing and surveillance (UKHSA, 2023). TB spreads easily in overcrowded housing, prisons, shelters, and low-income areas, increasing community vulnerability.

Economic consequences on the nation – also, it can significantly affect the national economy. Countries spend billions on TB treatment, prevention, and public health interventions. Underfunding remains a major issue, with only **2.1% of TB budgets** in some countries allocated to community engagement.

Increased workload for health workers – TB requires contact tracing, follow-up, and monitoring, stretching already limited resources.

- Need for community health workers (CHWs) — CHWs play a crucial role in:
  - Early detection
  - Treatment support
  - Reducing stigma
  - Educating communities

Their involvement improves treatment success rates and case finding.

- Disruption during crises — Events like COVID-19 reduced TB service access, causing delayed diagnoses and increased community spread.

Co-infection with HIV – In communities with high HIV prevalence, TB spreads more rapidly because immunocompromised individuals are more vulnerable. This increases the overall disease burden and complicates treatment.

Reduced Educational Outcomes – Children may miss school due to illness or caregiving responsibilities. This affects long-term community development. Weakened Community Trust in Health Systems – delays, stigma, or poor-quality care reduce trust. This leads to lower health-seeking behaviour and more undetected cases. High Transmission Rates – TB spreads through airborne droplets, making it easy to transmit in: overcrowded housing, public transport, schools, prisons, homeless shelters. Communities with poor ventilation or high population density experience **faster and wider outbreaks**.

## **Conclusion**

Tuberculosis is still a global and national health problem due to its contagious nature, long treatment duration, and the risk of serious complications. TB is reported to affect around 10 million people worldwide in a year and has caused more than 1 million deaths, making it one of the leading infectious causes of death. Drug-resistant TB is still a major threat to global health and is prevalent in the UK, with an average of 4,000 cases reported annually; this is especially true in urban areas and among vulnerable populations. These statistics show the serious nature of TB and the need for continued public health interventions. Effective control is based on early diagnosis, access to treatment, well-organized community support, and targeted prevention. The impact of TB is also felt in psychological well-being, social relationships, and economic stability. Continued investment in health and social care services is needed to prevent transmissions and safety.

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