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Ambulatory care and infectiousness in tuberculosis

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Ambulatory care and infectiousness in tuberculosis

One key aim of tuberculosis (TB) prevention and care is to render them more people-centred, which means further boosting and improving ambulatory care models across the countries of Eastern Europe and central Asia. This note is intended to remind interested parties of the evidence that shows that ambulatory care is both feasible and safe.

The World Health Organization (WHO) recommends that standard treatment for TB, whether drug-susceptible or drug-resistant, should be given as ambulatory care, with patients remaining within their community and continuing with normal life in so far as they feel well enough. Hospitalization need occur only if required for particular clinical reasons, as further explained in WHO's "blueprint" on people-centred TB care[1] and its policy on TB infection control.[2]

This recommendation provides the basis for development of all approaches to TB care that involve ambulatory care – that is to say, where treatment is provided through regular contact with the patient but without the person being required to remain within a hospital or sanatorium.

The recommendation itself is underpinned by our knowledge of the infectiousness of individuals affected by TB – in particular, our understanding that, once an effective treatment regimen has commenced, the bacteriological load is rapidly reduced and the patient becomes non-infectious within a few days.

Infectiousness is a different matter from treatment success. Smear conversion is an indicator of cure of the individual patient; it is not an indicator of infectiousness.

Patients under treatment represent no danger to other people once they are established on an effective treatment regimen. Furthermore, as TB transmission is not a matter of casual contact, even untreated individuals are of danger only to close contacts or in settings where there is contact over prolonged periods.

[1] A people-centred model of tuberculosis care: a blueprint for eastern European and central Asian countries, 1st edition. Copenhagen: WHO Regional Office for Europe; 2017 (www.euro.who.int/__data/assets/pdf_file/0004/342373/TB_Content_WHO_PRO_eng_final.pdf, accessed 5 July 2018).

[2] WHO policy on TB infection control in health-care facilities, congregate settings and households. Geneva: World Health Organization; 2009 (http://apps.who.int/iris/bitstream/handle/10665/44148/9789241598323_eng.pdf;jsessionid=28BBAED9EEBF7D7BB957407E88818914?sequence=1, accessed 5 July 2018).

As a precaution, it is normal practice in most national TB treatment guidelines to assume that the patient might remain infectious for at most 14 days and thus to advise the individual to minimize contact with other people over that period. (See the recommendations made by the United Kingdom's National Institute for Health and Care Excellence, following a review of the available evidence.[3])

Key studies supporting this understanding include:

- Gunnels JJ, Battles JH, Swindoll H. Infectivity of sputum-positive tuberculous patients on chemotherapy. Am Rev Respir Dis. 1974;109(3):323–30.
- Kamat SR, Dawson JJ, Devadatta S, Fox W, Janardhanam B, Radhakrishna S et al. A controlled study of the influence of segregation of tuberculous patients for one year on the attack rate of tuberculosis in a 5-year period in close family contacts in South India. Bull World Health Organ. 1966;34(4):517–32.[4]

A more recent study demonstrating that infectiousness is similarly ended in multidrug-resistant TB is:

- Dharmadhikari AS, Mphahlele M, Venter K, Stoltz A, Mathebula R, Masotla T et al. Rapid impact of effective treatment on transmission of multidrug-resistant tuberculosis. Int J Tuberc Lung Dis. 2014;18(9):1019–25.

Studies such as Kamat et al. (cited above) demonstrate that, as household contacts tend to have been exposed to the patient for months before diagnosis, susceptible contacts are already infected, making it unnecessary to segregate the patient from such contacts even during the 14 days when caution about general contacts is advised.

[3] Tuberculosis: prevention, diagnosis, management and service organisation. London: National Institute for Health and Care Excellence; 2016 (www.nice.org.uk/guidance/ng33/resources/tuberculosis-prevention-diagnosis-management-and-service-organisation-pdf-2910851744965, accessed 5 July 2018).

[4] Additional studies include:

Andrews RH, Devadatta S, Fox W, Radhakrishna S, Ramakrishnan CV, Velu S. Prevalence of tuberculosis among close family contacts of tuberculous patients in South India, and influence of segregation of the patient on early attack rate. Bull World Health Organ. 1960;23:463–510.

Brooks SM, Lassiter NL, Young EC. A pilot study concerning the infection risk of sputum positive tuberculosis patients on chemotherapy. Am Rev Respir Dis. 1973;108(4):799–804.

Riley RL, Moodie AS. Infectivity of patients with pulmonary tuberculosis in inner city homes. Am Rev Respir Dis. 1974;110(6):810–2.

Rouillon A, Perdrizet S, Parrot R. Transmission of tubercle bacilli: the effects of chemotherapy. Tubercle. 1976;57(4):275–99.

Such studies also indicate that treatment with an *effective* regimen for both drug-susceptible and drug-resistant cases is important. Infectiousness will not be rapidly reduced by a regimen that does not act on the particular bacteria by which the patient is infected. This in turn underlines the importance of access to and use of diagnostic tools that rapidly allow the clinician to distinguish between drug-susceptible, multidrug-resistant, and extensively drug-resistant strains. The rapid molecular-based tests endorsed by WHO can provide this information in a matter of a few hours or days if used as recommended.[5]

A number of countries and practitioners continue to base their practice on an assumption that patients may remain infectious until absence of bacteria is demonstrated by smear/culture conversion. This is unnecessarily cautious. Furthermore, there is a lack of evidence that the relatively lengthy hospitalization which results from this provides better outcomes, in terms of infectiousness and transmission, than ambulatory treatment.

There is, however, evidence that hospitalization is a serious risk factor for transmission of multidrug- and extensively drug-resistant TB to and among TB patients. Discovery of a large cluster of extensively drug-resistant patients in South Africa has led to a number of studies there. There has also been at least one useful study from Tomsk in the Russian Federation.

- Gandhi NR, Weissman D, Moodley P, Ramathal M, Elson I, Kreiswirth BN et al. Nosocomial transmission of extensively drug-resistant tuberculosis in a rural hospital in South Africa. J Infect Dis. 2013;207(1):9–17.
- Bantubani N, Kabera G, Connolly C, Rustomjee R, Reddy T, Cohen T et al. High rates of potentially infectious tuberculosis and multidrug-resistant tuberculosis (MDR-TB) among hospital inpatients in KwaZulu Natal, South Africa indicate risk of nosocomial transmission. PLoS One. 2014;9(3):e90868.
- Shenoi SV, Escombe AR, Friedland G. Transmission of drug-susceptible and drug-resistant tuberculosis and the critical importance of airborne infection control in the era of HIV infection and highly active antiretroviral therapy rollouts. Clin Infect Dis. 2010;50(Suppl3):S231–S237.
- Gelmanova IY, Keshavjee S, Golubchikova VT, Berezina VI, Strelis AK, Yanova GV et al. Barriers to successful tuberculosis treatment in Tomsk, Russian Federation: non-adherence, default and the acquisition of multidrug resistance. Bull World Health Organ. 2007;85(9):703–11. (TB occurred among adherent patients who had been hospitalized in the course of their therapy.)

[5] See Tuberculosis: policy statements. Geneva: World Health Organization (www.who.int/tb/areas-of-work/laboratory/policy_statements/en).

Conclusions

- A TB patient, once started on an effective TB drug regimen, becomes non-infectious well before the 14-day mark that has historically been used in many countries.
- As regards the infectiousness of TB patients, adequate ambulatory care is safe; when conducted correctly, it does not lead to infectious individuals passing on TB to others.
- Access to and use of diagnostic tools that rapidly indicate drug susceptibility or resistance are important to ensure that effective treatment is prescribed.
- Hospitalization is a risk factor for transmission of multidrug- and extensively drug-resistant TB.
- Hospitalization is normally required only when complications arise or if the patient has additional medical issues.[6]

[6] For further information on these issues, please refer to: Guiding principles to reduce tuberculosis transmission in the WHO European Region. Copenhagen: WHO Regional Office for Europe; 2018 (http://www.euro.who.int/en/health-topics/communicable-diseases/tuberculosis/publications/2018/guiding-principles-to-reduce-tuberculosis-transmission-in-the-who-european-region-2018).