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Tuberculosis - the family disease?

Tuberculosis (TB) cases have been long been noted to cluster within households. In 1820, when the famous English poet John Keats died of TB, he was the third in his family to do so: two years earlier, his brother died of TB, and eight years before that, their mother had also died of TB. Years later in 1841, a third brother developed and died of TB.

It is unclear whether clustering of cases represents household transmission or shared household risk factors. TB is a chronic disease and the long timescales between infection and disease mean that the transmission processes can be difficult to untangle. In this presentation, I examine cross-sectional TB data from households in Lima, Peru, to estimate the importance of household transmission, the average time between cases, and the immunity afforded by a previous TB infection. Using probabilistic and SIR-type models with household structure, we investigate how the distribution of cases changes during the course of an epidemic. The framework lends itself for investigating the role of multiple reinfections and immunity in transmission. In this population, we estimate that protective immunity conferred up to 35% reduction in the risk of disease. Like the Keats family, we find that household cases can occur decades apart, although the average time between cases within households is 3.8 years.

References

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