targeted interventions OBJECTIVES/GOALS: The emergence of multidrug-resistant tuberculosis (MDR-TB) poses serious challenges for the global eradication of tuberculosis. Recent research has shown that transmission is now the dominant driver of MDR-TB. However, our limited understanding of where and among whom MDR-TB is transmitted hampers efforts to control person-to-person spread.

METHODS/STUDY POPULATION: We used several analytic approaches to characterize the dynamics of MDR-TB transmission in Shanghai, China. We identified all culture-confirmed MDR cases between 2009-2016 in the city and 1) estimated individual-level risk factors for MDR disease; 2) mapped the TB cases by their home addresses and used a Bayesian spatial disease mapping method to identify regions with an elevated risk of MDR-TB; and 3) we sequenced all MDR isolates to understand whether transmission explained variance in risk that was not attributable to the distribution of individual or location-specific risk variates.

RESULTS/ANTICIPATED RESULTS: There were 1034 MDR-TB cases among 16,315 culture-confirmed TB cases during the study period. Bayesian disease mapping identified spatial heterogeneity of MDR-TB and determined four hotspots with an elevated risk of MDR-TB, none of which were fully explained by individual or regional-covariates (Figure 1). Sequencing revealed that more than 40% of the MDR-TB strains were in genomic clusters, indicating recent MDR-TB transmission. Most importantly, MDR-TB cases in three of the four large clades (>8 isolates) were spatially concentrated in three strain-specific hotspots (Figure 2).

DISCUSSION/SIGNIFICANCE OF FINDINGS: With the combination of traditional epidemiological tools, geographical, and genomic methods, this study revealed multiple loci of transmission of specific MDR-TB clades within a single city. Identification of where and among whom MDR-TB is transmitted can inform the design of targeted interventions.

Evaluation

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Pressure-pain thresholds at baseline and in response to isometric exercise in Achilles tendinopathy
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ABSTRACT IMPACT: Baseline presentation in AT (higher upper trapezius PPT with no difference at calf or tendon) may suggest a mechanism for persistent symptoms: with more advantageous central pain processing and no tradeoff peripherally, they may choose to continue their usual activities without regard for further damage to the affected tendon. OBJECTIVES/GOALS: Exercise-induced hypoalgesia, a reduction in pain with exercise, is often observed in healthy populations but is not well established in Achilles tendinopathy (AT). The aim was to compare pressure-pain threshold (PPT) at baseline and after fatiguing isometric exercise in AT and healthy controls. METHODS/STUDY POPULATION: 21 participants were recruited for the study: 7 AT (26.5 ± 8.8 yrs), 14 control (22.1 ± 3.2 yrs). After a familiarization session, participants completed an experimental session that involved performance of intermittent maximal voluntary isometric contractions (MVICs) (2x2s duty cycle) in a Biodex3 dynamometer (Biodex Medical, Shirley, NY) for 4 minutes. PPT was measured at the medial gastrocnemius (calf), Achilles tendon, and upper trapezius at baseline and immediately following the fatiguing isometric task using a Somedic Algometer (Somedic AB, Sweden). Data are expressed as Mean(SD). Change in PPT is expressed as a percentage of baseline PPT. Units for PPT are kPa. A priori alpha was set to 0.05.

RESULTS/ANTICIPATED RESULTS: There was no change in tendon or calf PPT following isometric exercise in AT (tendon: p = 0.78; calf: p = 0.76), while both increased (i.e., exercise-induced hypoalgesia) in controls (tendon: 9.5(17.8), p = 0.03; calf: 21.3(22.7), p < 0.01). Neither group experienced a post-exercise change in upper trapezius PPT (AT: p = 0.35; control: p = 0.37). There was no between-group difference in baseline calf (p = 0.14) or tendon (p = 0.19) PPT. However, baseline and post-exercise upper trapezius PPT were significantly higher in AT (baseline: 335.6(194.8); post-exercise: 321.2(170.1)) than in controls (baseline: 193.7(75.1), p < 0.01; post-exercise: 198.1(79.1), p < 0.01). DISCUSSION/SIGNIFICANCE OF FINDINGS: These findings suggest: (1) in persons with AT, central pain processing is altered at baseline, but unaffected in response to isometric fatiguing exercise; and (2) in persons with AT, peripheral pain processing is unaffected at baseline, but is altered in response to this mode and dosage of fatiguing isometric exercise.