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## Project Information?

5R01ES019624-05

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Project 102 of 2071

[DESCRIPTION](#) [DETAILS](#) [RESULTS](#) [HISTORY](#) [SUBPROJECTS](#) [SIMILAR PROJECTS](#) [NEARBY PROJECTS](#) [BETA](#) [LINKS](#) [NEWS AND MORE](#)**Project Number:** 5R01ES019624-05**Title:** INVESTIGATION OF INDOOR SOLID FUEL AND KEROSENE USE AS TUBERCULOSIS RISK FACTORS**Contact PI / Project Leader:** [BATES, MICHAEL N](#)**Awardee Organization:** UNIVERSITY OF CALIFORNIA BERKELEY**Abstract Text:**

DESCRIPTION (provided by applicant): Among infectious diseases, tuberculosis (TB) is second only to HIV/AIDS in causing mortality. About one-third of the world's population have TB infection. Most infected people never develop active TB, but form a reservoir of latent infections that can progress to become active disease. Therefore, modifiable risk factors for TB infection or for progress from infection to active TB need to be identified. The most common fuel for heating and cooking in developing countries is biomass (wood, cow dung and agricultural waste), often burnt without any chimney or ventilation. Houses fill with smoke. Whether biomass smoke increases TB risk is uncertain. Our previous work, a TB case-control study in Nepal, found indoor biomass burning as a heating fuel, and use of kerosene, for cooking or lighting, to be likely strong risk factors for TB disease. Whether kerosene use is a TB risk factor has not been investigated before. However, there is the possibility that selection bias was responsible for our results. Therefore, we propose a further case-control study of TB using a more rigorous control selection methodology, while collecting more extensive exposure data for indoor fuel use. We will also identify the controls with latent TB infection, using T-cell-based interferon- $\gamma$  release assays and use the latent TB-positive controls in a separate set of data analyses. Over 3.25 years, we will recruit 650 newly diagnosed TB cases from the Pokhara Regional TB Center, Nepal, and 1300 frequency-matched controls selected from the village areas in which the cases live. Each participant will be administered a questionnaire on fuel use for cooking, heating and lighting, as well as seeking information on other potential TB risk factors. All the controls will be tested for latent TB infection. Measurements of air exchange rates (AER) and CO and particulate matter emissions will be obtained from nearly one-quarter of the study households (n=450). We will use the measurement data to model AERs and emission levels in the households where actual measurements are not made. In addition to the data analyses using all controls, we will carry out a parallel set of analyses using only the controls who are positive for TB infection. Division of the odds ratio (OR) obtained using all controls by the corresponding OR obtained using just latently infected controls will provide an estimate of the relative risk for TB infection. Data analysis will focus on identifying whether kerosene or biomass, as heating, lighting or cooking fuels, are risk factors for TB disease or infection. Findings showing either biomass or kerosene fuel to be risk factors, will have major implications for health policy and interventions. If kerosene is a risk factor, then this will provide justification for not treating it as a clean fuel alternative to biomass, as is currently the policy of some international agencies.

**Public Health Relevance Statement:**

Tuberculosis remains a major problem in the world, with 2 billion people infected, mainly in developing countries, but at any one time only a small fraction of these infected people show signs of TB disease. The most common fuel for heating and cooking in developing countries is biomass (wood, cow dung and agricultural waste), often burnt without any chimney or ventilation, so that houses fill with smoke. This project will investigate whether use in houses in Nepal of biomass or kerosene fuel use for heating, cooking or lighting increases the risk of TB infection or TB disease.

**NIH Spending Category:**

Biodefense; Clinical Research; Emerging Infectious Diseases; Health Effects of Household Energy Combustion; Health Effects of Indoor Air Pollution; Infectious Diseases; Prevention; Rare Diseases; Tuberculosis

**Project Terms:**

Affect; Agriculture; AIDS/HIV problem; Air; Alcohol consumption; Area; Asia; base; Biological Assay; Biomass; biomass fuel; biomass smoke; Budgets; Burn injury; Case-Control Studies; Cattle; combustion product; Communicable Diseases; Complex; cooking; Cost-Benefit Analysis; Country; Crowding; Data; Data Analyses; Developed Countries; Developing Countries; Development; Disease; disorder risk; Drug resistance in tuberculosis; Environmental air flow; Exposure to; Extreme drug resistant tuberculosis; Family history of; Fossil Fuels; Frequencies; Government; Health Policy; Heating; HIV Infections; Home heating; Hospitals; Household; Housing; Immune system; Impairment; In-Migration; Indoor Air Pollution; indoor exposure; Infection; interest; Interferons; International; International Agencies; Intervention; Investigation; Kerosene; latent infection; Life; Lighting; Lung diseases; Malnutrition; Measurement; Methodology; Modeling; modifiable risk; mortality; Mycobacterium tuberculosis; Nepal; Newly Diagnosed; Odds Ratio; Participant; Particulate Matter; Petroleum; Policies; policy implication; Population; Predisposition; Prevalence; Questionnaires; Recruitment Activity; Relative Risks; Risk; Risk Factors; Selection Bias; Smoke; solid fuel; systematic review; T-Lymphocyte; Testing; Time; Tobacco smoking; Tobacco use; Travel; Tuberculin Test; Tuberculosis; wasting; Wood material; Work

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