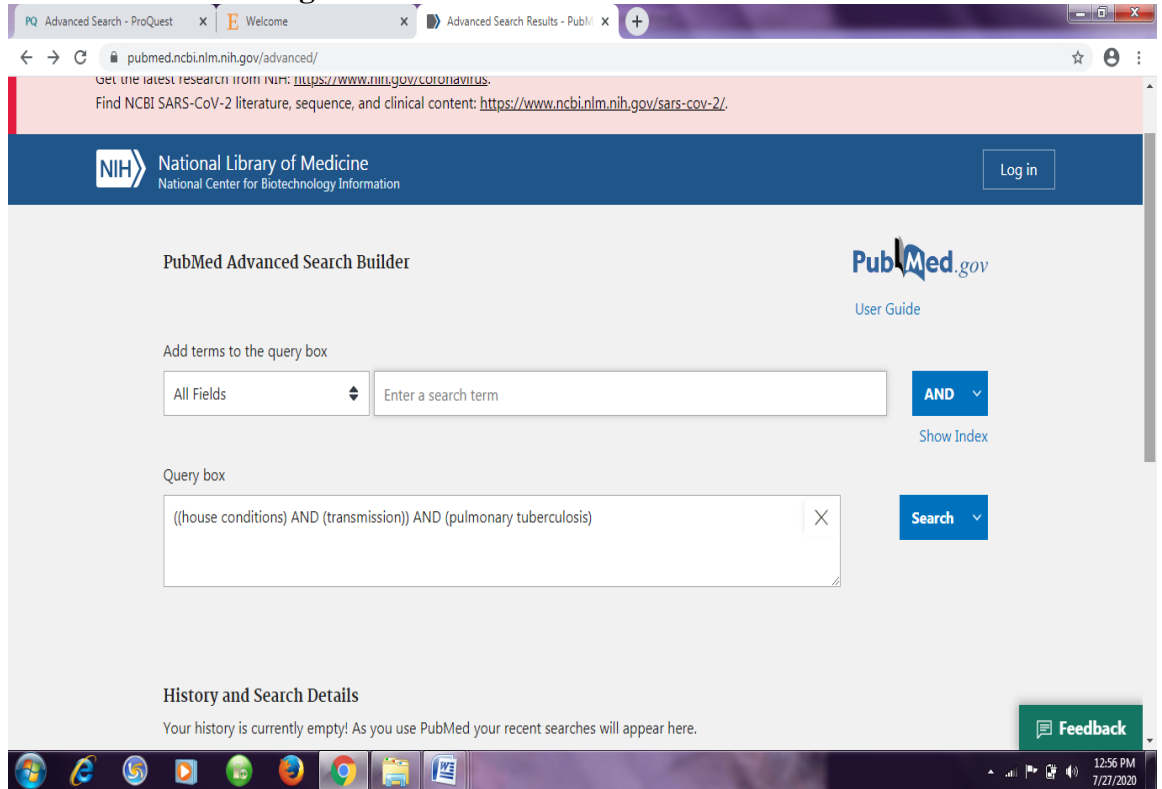
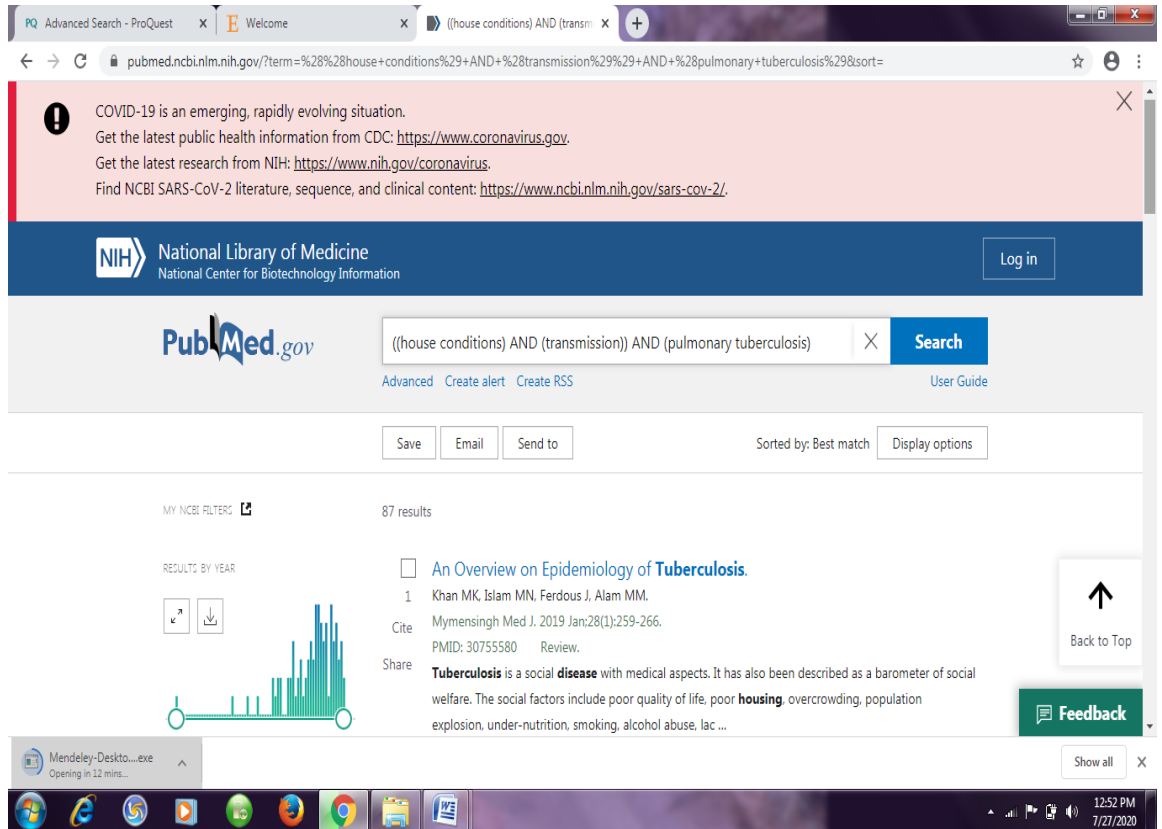


# Lampiran: Pencarian Database PubMed

## 1. Pencarian artikel dengan database PubMed



## 2. No Filter



### 3. Filter Text Availability, Article Type

#### Text Availability : Full Text

The screenshot shows a web browser window with the PubMed website. The search bar contains the query: ((house conditions) AND (transmission)) AND (pulmonary tuberculosis). The search results page displays 38 results. A bar chart titled 'RESULTS BY YEAR' shows the distribution of results from 1992 to 2020. The top result is a journal article titled 'Working conditions and tuberculosis mortality in England and Wales, 1890-1912: a retrospective analysis of routinely collected data.' The article is by Jackson C, Mostowy JH, Stagg HR, Abubakar I, Andrews N, Yates TA. It was published in BMC Infect Dis. 2016 May 20;16:215. The article is available as a 'Free PMC article'. The background of the article preview mentions 'Modelling studies suggest that workplaces may be important sites of Mycobacterium tuberculosis transmission in high burden countries today...METHODS: The Registrar General's'.

#### Article Type : Journal Article

The screenshot shows the same PubMed search results page as above, but with the 'Article Type' filter set to 'Journal Article'. The search results are filtered to show only journal articles. The top result is the same article as in the previous screenshot: 'Working conditions and tuberculosis mortality in England and Wales, 1890-1912: a retrospective analysis of routinely collected data.' The article is by Jackson C, Mostowy JH, Stagg HR, Abubakar I, Andrews N, Yates TA. It was published in BMC Infect Dis. 2016 May 20;16:215. The article is available as a 'Free PMC article'. The background of the article preview mentions 'Modelling studies suggest that workplaces may be important sites of Mycobacterium tuberculosis transmission in high burden countries today...METHODS: The Registrar General's'.

### 3. Filter : *Publication Date : 10 years*

The screenshot shows the PubMed website interface. The search bar contains the query: `((house conditions) AND (transmission)) AND (pulmonary tuberculosis)`. The search results are sorted by 'Best match' and show 22 results. A filter is applied: 'Free full text, Full text, Journal Article, in the last 10 years'. The results list includes:

- 1 Working conditions and tuberculosis mortality in England and Wales, 1890-1912: a retrospective analysis of routinely collected data. Jackson C, Mostowy JH, Stagg HR, Abubakar I, Andrews N, Yates TA. BMC Infect Dis. 2016 May 20;16:215. doi: 10.1186/s12879-016-1509-z. PMID: 27207086 Free PMC article.
- 2 Strains of Mycobacterium tuberculosis transmitting infection in Brazilian households and those associated with community transmission of tuberculosis. Vinhas SA, Jones-López EC, Ribeiro Rodrigues R, Gaeddert M, Peres RL, Marques-Rodrigues P, de Aguiar...

The interface also features a 'RESULTS BY YEAR' bar chart and 'TEXT AVAILABILITY' options (Abstract, Free full text, Full text).

## Lampiran: PencarianDatabase ProQuest

### 1. Pencarian artikel dengan database ProQuest

The screenshot shows the ProQuest Advanced Search interface. The search criteria are:

- house conditions in Anywhere
- AND transmission in Anywhere
- AND pulmonary tuberculosis in Anywhere

Additional filters include:

- Limit to:  Full text  Peer reviewed
- Publication date: Specific date range...
- Start: Any Day, Any Month, 2010
- End: Any Day, Any Month, 2020

## 2. No Filter

The screenshot shows the ProQuest search results page for the query "(house conditions) AND transmission AND (pulmonary tuberculosis)". The search is filtered by date (2010-2020) and document type (Article). The results are sorted by relevance. The first result is "IgA and IgG against Mycobacterium tuberculosis Rv2031 discriminate between pulmonary tuberculosis patients, Mycobacterium tuberculosis-infected and non-infected individuals" by Abebe, Fekadu, Belay, Mulugeta, Mengistu Legesse, Franken K L M C, Ottenhoff, Tom H M. The second result is "Incidence and Prevalence of Tuberculosis among Household Contacts of Pulmonary Tuberculosis Patients in a Peri-Urban Population of South Delhi, India" by Singh, Jitendra, Manimuthu Mani Sankar, Kumar, Sandeep, Krishnamurthy Gopinath, Singh, Niti, et al.

## 3. Filter Text Availability, Article Type

**Text Availability : Full Text**

The screenshot shows the ProQuest search results page for the query "(house conditions) AND transmission AND (pulmonary tuberculosis)". The search is filtered by date (2010-2020) and document type (Article). The results are sorted by relevance. The first result is "IgA and IgG against Mycobacterium tuberculosis Rv2031 discriminate between pulmonary tuberculosis patients, Mycobacterium tuberculosis-infected and non-infected individuals" by Abebe, Fekadu, Belay, Mulugeta, Mengistu Legesse, Franken K L M C, Ottenhoff, Tom H M. The second result is "Incidence and Prevalence of Tuberculosis among Household Contacts of Pulmonary Tuberculosis Patients in a Peri-Urban Population of South Delhi, India" by Singh, Jitendra, Manimuthu Mani Sankar, Kumar, Sandeep, Krishnamurthy Gopinath, Singh, Niti, et al.

**Article Type : Article**

The screenshot shows a ProQuest search results page. The search query is "(house conditions) AND transmission AND (pulmonary tuberculosis)". The results are filtered to show 843 results. The left sidebar shows the filter "Article" is applied. The main results list shows two articles:

- 1. **IgA and IgG against Mycobacterium tuberculosis Rv2031 discriminate between pulmonary tuberculosis patients, Mycobacterium tuberculosis-infected and non-infected individuals**. Abebe, Fekadu; Belay, Mulugeta; Mengistu Legesse; Franken K L M C; Ottenhoff, Tom H M. *PLoS One; San Francisco* Vol. 13, Iss. 1, (Jan 2018): e0190989.
- 2. **Incidence and Prevalence of Tuberculosis among Household Contacts of Pulmonary Tuberculosis Patients in a Peri-Urban Population of South Delhi, India**. Singh, Jitendra; Manimuthu Mani Sankar; Kumar, Sandeep; Krishnamurthy Gopinath; Singh, Niti; et al. *PLoS One; San Francisco* Vol. 8, Iss. 7, (Jul 2013): e69730.

**4. Filter : Publication Date : 10 years**

The screenshot shows the same ProQuest search results page, but with the filter "Last 10 Years" applied. The total number of results is now 812. The left sidebar shows both "Last 10 Years" and "Article" filters are active. The main results list shows the same two articles as in the previous screenshot:

- 1. **IgA and IgG against Mycobacterium tuberculosis Rv2031 discriminate between pulmonary tuberculosis patients, Mycobacterium tuberculosis-infected and non-infected individuals**. Abebe, Fekadu; Belay, Mulugeta; Mengistu Legesse; Franken K L M C; Ottenhoff, Tom H M. *PLoS One; San Francisco* Vol. 13, Iss. 1, (Jan 2018): e0190989.
- 2. **Incidence and Prevalence of Tuberculosis among Household Contacts of Pulmonary Tuberculosis Patients in a Peri-Urban Population of South Delhi, India**. Singh, Jitendra; Manimuthu Mani Sankar; Kumar, Sandeep; Krishnamurthy Gopinath; Singh, Niti; et al. *PLoS One; San Francisco* Vol. 8, Iss. 7, (Jul 2013): e69730.

# Lampiran: Pencarian Database ScienceDirect

## 1. No Filter

The screenshot shows the ScienceDirect search interface. The search bar contains the text "house conditions, transmission, and pulmonary tuberculosis". Below the search bar, it indicates "2,563 results" and "sorted by relevance | date". On the left side, there are filters for "Refine by:" including "Years" (2021 (6), 2020 (72), 2019 (87)) and "Article type" (Review articles (223), Research articles (731), Encyclopedia (76)). The main content area displays two research articles. The first article is titled "Risk factor model for pulmonary tuberculosis occurrence in Makassar using spatial approach" and is from "Enfermería Clínica, Volume 30, Supplement 4, June 2020, Pages 383-387" by Stang, Anwar Mallongi, Indra Dwinata, Sumarni. The second article is titled "Diagnosis of pulmonary and extrapulmonary tuberculosis using an in-house PCR method in clinical samples from a middle-income resource setting" and is from "Infectio, Volume 15, Issue 3, September 2011, Pages 177-183" by Sandra Coronado-Ríos, Nelson E. Arenas-Suárez, Jorge E. Gómez-Marín. There is a "Download PDF" link for the second article. At the bottom, there is a "Feedback" button and a system tray showing the time as 2:48 PM on 7/20/2020.

## 2. Filter Text Availability, Article Type *Article Type : Research Article*

The screenshot shows the ScienceDirect search interface with filters applied. The search bar contains the text "house conditions, transmission, and pulmonary tuberculosis". Below the search bar, it indicates "736 results" and "sorted by relevance | date". On the left side, the "Article type" filter is set to "Research articles (736)". The main content area displays two research articles, identical to the first screenshot. The first article is titled "Risk factor model for pulmonary tuberculosis occurrence in Makassar using spatial approach" and is from "Enfermería Clínica, Volume 30, Supplement 4, June 2020, Pages 383-387" by Stang, Anwar Mallongi, Indra Dwinata, Sumarni. The second article is titled "Diagnosis of pulmonary and extrapulmonary tuberculosis using an in-house PCR method in clinical samples from a middle-income resource setting" and is from "Infectio, Volume 15, Issue 3, September 2011, Pages 177-183" by Sandra Coronado-Ríos, Nelson E. Arenas-Suárez, Jorge E. Gómez-Marín. There is a "Download PDF" link for the second article. At the bottom, there is a "Feedback" button and a system tray showing the time as 1:25 PM on 8/1/2020.

### 3. Filter : *Publication Date* : 10 years

The screenshot shows a web browser window with the ScienceDirect search results page. The search query is "house conditions, transmission, and pulmonary tuberculosis" and the filter is set to "Year: 2010-2020". The page displays 244 results, sorted by relevance. Two research articles are visible:

- Research article**  
**Risk factor model for pulmonary tuberculosis occurrence in Makassar using spatial approach**  
Enfermería Clínica, Volume 30, Supplement 4, June 2020, Pages 383-387  
Stang, Anwar Mallongi, Indra Dwinata, Sumarni
- Research article** Open access  
**Diagnosis of pulmonary and extrapulmonary tuberculosis using an in-house PCR method in clinical samples from a middle-income resource setting**  
Infectio, Volume 15, Issue 3, September 2011, Pages 177-183  
Sandra Coronado-Ríos, Nelson E. Arenas-Suárez, Jorge E. Gómez-Marín  
[Download PDF](#)

On the left side, there is a "Refine by:" section with a "Years" filter. The years listed are 2020 (28), 2019 (26), 2018 (23), 2017 (23), 2016 (32), 2015 (20), 2014 (17), and 2013 (20). The 2020 filter is selected.

At the bottom of the page, there is a "Want a richer search experience?" section with a "Sign in" link for additional filter options, multiple article downloads, and more. A "Feedback" button is also present.

The browser's taskbar at the bottom shows the time as 1:27 PM on 8/1/2020.

ORIGINAL ARTICLE

## Housing conditions in 2 Canadian First Nations communities

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Received 17 August 2010; Accepted 30 December 2010

### ABSTRACT

**Objectives.** Housing conditions were assessed in 2 Canadian First Nations communities. Possible associations with tuberculosis (TB) were explored.

**Study design.** Participatory community-based survey.

**Methods.** Qualitative and quantitative data on housing and health were collected in the northern Dené community at Lac Brochet (LB), which has experienced endemic and epidemic TB, and the southern Ojibwa community at Valley River (VR), which has not.

**Results.** 72 of 135 (53%) houses at LB and 57 of 95 (60%) houses at VR were enrolled. Houses in both communities were small (mean 882 and 970 sq. ft., respectively) compared to the Manitoba average (1,200 sq. ft.). Crowding was evident at LB (mean persons per room [ppr] 1.1) and VR (mean ppr 0.9). The provincial mean ppr is 0.5. However, only 49% of householders at LB and 19% at VR felt "crowded" in their homes. More than two-thirds of houses had absent or non-functional heat recovery ventilation systems. Mould was observed in 44% of LB houses and 19% of VR houses. At LB a significant association was found between the number of permanent residents in the house and the presence of self-reported latent or active TB, either currently or during residence in that house ( $p=0.001$ ).

**Conclusions.** Houses that were studied in these 2 First Nations communities were predominantly small, crowded and in poor repair. An association was found between the number of persons in a house and self-reported TB. Improved housing conditions in First Nations communities are indicated to promote and sustain health as well as human and Indigenous rights.

(*Int J Circumpolar Health* 2011; 70(2):141-153)

**Keywords:** housing, First Nation, Indigenous, tuberculosis, determinants of health, human rights



# Incidence and Prevalence of Tuberculosis among Household Contacts of Pulmonary Tuberculosis Patients in a Peri-Urban Population of South Delhi, India

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## Abstract

**Background:** Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, is one of the leading causes of mortality and morbidity across all age groups throughout the world, especially in developing countries.

**Methodology/Principal Findings:** In this study, we have included 432 open index cases with their 1608 household contacts in a prospective cohort study conducted from May 2007 to March 2009. The follow-up period was 2 years. All index cases were diagnosed on the basis of suggestive signs and symptoms and sputum being AFB positive. Among the 432 index patients, 250 (57.9%) were males and 182 (42.1%) females; with mean age of  $34 \pm 14.4$  yr and  $26 \pm 11.1$  yr, respectively. Out of 1608 household contacts, 866 (53.9%) were males and 742 (46.1%) females; with mean age of  $26.5 \pm 15.8$  and  $26.5 \pm 16.0$  yr, respectively. Of the total 432 households, 304 (70.4%) had  $\leq 4$  members and 128 (29.6%) had  $\geq 5$  members. The median size of the family was four. Of the 1608 contacts, 1206 were able to provide sputum samples, of whom 83 (6.9%) were found MTB culture positive. Household contacts belonging to adult age group were predominantly (74, 89.2%) infected as compared to the children (9, 10.8%). On screening the contact relationship status with index patients, 52 (62.7%) were first-degree relatives, 18 (34.6%) second-degree relatives and 12 (14.5%) spouses who got infected from their respective index patients. Co-prevalent and incident tuberculosis was found in 52 (4.3%) and 31 (2.6%) contacts, respectively. In incident cases, the diagnosis could be made between 4 to 24 months of follow-up, after their baseline evaluation.

**Conclusion:** Active household contact investigation is a powerful tool to detect and treat tuberculosis at early stages and the only method to control TB in high-TB-burden countries.

**Citation:** Singh J, Sankar MM, Kumar S, Gopinath K, Singh N, et al (2013) Incidence and Prevalence of Tuberculosis among Household Contacts of Pulmonary Tuberculosis Patients in a Peri-Urban Population of South Delhi, India. PLoS ONE 8(7): e69730. doi:10.1371/journal.pone.0069730

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**Competing Interests:** The authors have declared that no competing interests exist.

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## Introduction

Tuberculosis (TB), caused by *Mycobacterium tuberculosis*, is one of the leading causes of mortality and morbidity across all age groups throughout the world, especially in developing countries. In 2011, there were an estimated 8.7 million incident cases of TB (range, 8.3 million–9.0 million) globally and equivalent to 125 cases per 100 000 population [1]. Most of the estimated number of cases in 2011 occurred in Asia (59%) and Africa (26%); India and China alone accounted for 26% and 12% of global cases, respectively [1].

The infection is almost exclusively transmitted through air from patients with pulmonary disease. The risk of transmission to household contacts is greatest when index case is sputum smear positive, closeness of the index case with contacts, overcrowded living conditions, bacillary density in respiratory secretions, and

degree of lung fields involved [2–5]. Therefore, those living within the same household are at higher risk than casual contacts [6–7]. Further, among the household contacts, younger age and absolute or relative immunodeficiency states are at higher risk of acquiring infection from their index case [8–9]. Contact investigation for cases of active pulmonary TB is standard practice in developed countries [10]. Several other studies from high burden countries have shown that active case finding among household contact yields significantly more TB cases than passive case detection [11–17].

Government of India envisions for a “TB-free India”, by 2017, which aims to reduce the burden of TB until it is no longer a major public health problem [18]. To achieve this vision, national tuberculosis control program must emphasize on early diagnosis and treatment of patients to minimize the risk of disease

## Artikel 3



### ORAL

#### The Relations Between Houses Physical Condition Between Tuberculosis Cases In The Working Area Of Sikumana Health Center Community In 2018

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#### Abstract

**Background:** Houses are one of the basic human needs besides clothing and shelter, so the house must be healthy so that its residents can work productively. A healthy home must meet several requirements, namely meeting physiological needs, psychology, preventing accidents and preventing transmission of disease. Unhealthy home conditions are a risk factor for breeding or as a transmission of various diseases, such as *tuberculosis* (TB). Tuberculosis is a contagious infectious disease caused by *mycobacterium tuberculosis* which attacks various organs, especially the lungs. **Aim:** Describe the physical condition of a patient's home *tuberculosis* in the work area of Sikumana Health Center in 2018. **Results:** The results showed that the average humidity measurement fulfilled the requirements of 50 houses (100%), the temperature did not meet the requirements of 49 houses (98%), the ventilation area fulfilled the requirements of 45 houses (90%), the density of occupancy qualified 42 houses (84%), the intensity of lighting does not meet the requirements of 23 houses (46%) and the type of floor meets the requirements of 49 houses (98%). **Conclusion:** It was concluded that the physical condition of home health that fulfilled the requirements included humidity, ventilation area, occupancy density and type of house floor while the health condition of the house that did not meet the requirements was the temperature and intensity of the lighting. Additional lighting is needed in the house and always open the window every day so that air circulation becomes smooth.

**Keywords:** Physical condition of the house, Incidence of tuberculosis.

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RESEARCH ARTICLE

Open Access

# Natural ventilation reduces high TB transmission risk in traditional homes in rural KwaZulu-Natal, South Africa

Melissa Lygizos<sup>1†</sup>, Sheela V Shenoi<sup>2†\*</sup>, Ralph P Brooks<sup>2</sup>, Ambika Bhushan<sup>3</sup>, James CM Brust<sup>4</sup>, Daniel Zelterman<sup>5</sup>, Yanhong Deng<sup>5</sup>, Veronika Northrup<sup>5</sup>, Anthony P Moll<sup>6</sup> and Gerald H Friedland<sup>2</sup>

## Abstract

**Background:** Transmission of drug susceptible and drug resistant TB occurs in health care facilities, and community and households settings, particularly in highly prevalent TB and HIV areas. There is a paucity of data regarding factors that may affect TB transmission risk in household settings. We evaluated air exchange and the impact of natural ventilation on estimated TB transmission risk in traditional Zulu homes in rural South Africa.

**Methods:** We utilized a carbon dioxide decay technique to measure ventilation in air changes per hour (ACH). We evaluated predominant home types to determine factors affecting ACH and used the Wells-Riley equation to estimate TB transmission risk.

**Results:** Two hundred eighteen ventilation measurements were taken in 24 traditional homes. All had low ventilation at baseline when windows were closed (mean ACH = 3, SD = 3.0), with estimated TB transmission risk of 55.4% over a ten hour period of exposure to an infectious TB patient. There was significant improvement with opening windows and door, reaching a mean ACH of 20 (SD = 13.1,  $p < 0.0001$ ) resulting in significant decrease in estimated TB transmission risk to 9.6% ( $p < 0.0001$ ). Multivariate analysis identified factors predicting ACH, including ventilation conditions (windows/doors open) and window to volume ratio. Expanding ventilation increased the odds of achieving  $\geq 12$  ACH by 60-fold.

**Conclusions:** There is high estimated risk of TB transmission in traditional homes of infectious TB patients in rural South Africa. Improving natural ventilation may decrease household TB transmission risk and, combined with other strategies, may enhance TB control efforts.

**Keywords:** Tuberculosis transmission, MDR/XDR TB, Household, South Africa, Infection control, Ventilation

## Background

Airborne infection control is a crucial, often neglected, component of tuberculosis (TB) control [1]. This is particularly true in the era of well-documented primary TB transmission, multidrug-resistant (MDR) and extensively drug-resistant (XDR) TB and in resource-limited settings with high prevalence of TB and HIV [1-6].

Tugela Ferry, in KwaZulu-Natal, South Africa, has been greatly impacted by co-epidemics of HIV and drug-resistant TB [7]. The initial report of the XDR TB epidemic

in Tugela Ferry was attributed, in part, to nosocomial transmission [3]. Modeling studies have subsequently suggested that implementation of combined infection control practices could reduce nosocomial transmission [8], but that an increasing proportion of new XDR TB cases would occur in non-healthcare community settings [9]. TB transmission in community settings and among household contacts of drug susceptible, MDR and XDR TB patients has been receiving increased attention [10-17]. The high prevalence of HIV and drug susceptible and resistant TB in the context of low socioeconomic status in rural KwaZulu-Natal, provides a large pool of vulnerable household contacts underscoring the need for infection control practices in this setting [3,7,15-19].

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RESEARCH ARTICLE

# Tuberculosis Mortality and Living Conditions in Bern, Switzerland, 1856-1950

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## Abstract

### Background

Tuberculosis (TB) is a poverty-related disease that is associated with poor living conditions. We studied TB mortality and living conditions in Bern between 1856 and 1950.

### Methods

We analysed cause-specific mortality based on mortality registers certified by autopsies, and public health reports 1856 to 1950 from the city council of Bern.

### Results

TB mortality was higher in the Black Quarter (550 per 100,000) and in the city centre (327 per 100,000), compared to the outskirts (209 per 100,000 in 1911–1915). TB mortality correlated positively with the number of persons per room ( $r = 0.69$ ,  $p = 0.026$ ), the percentage of rooms without sunlight ( $r = 0.72$ ,  $p = 0.020$ ), and negatively with the number of windows per apartment ( $r = -0.79$ ,  $p = 0.007$ ). TB mortality decreased 10-fold from 330 per 100,000 in 1856 to 33 per 100,000 in 1950, as housing conditions improved, indoor crowding decreased, and open-air schools, sanatoria, systematic tuberculin skin testing of school children and chest radiography screening were introduced.

### Conclusions

Improved living conditions and public health measures may have contributed to the massive decline of the TB epidemic in the city of Bern even before effective antibiotic treatment became finally available in the 1950s.



## OPEN ACCESS

**Citation:** Zürcher K, Ballif M, Zwahlen M, Rieder HL, Egger M, Fenner L (2016) Tuberculosis Mortality and Living Conditions in Bern, Switzerland, 1856-1950. PLoS ONE 11(2): e0149195. doi:10.1371/journal.pone.0149195

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**Data Availability Statement:** All relevant data are within the paper and its Supporting Information files.

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**Competing Interests:** The authors have declared that no competing interests exist.

# Environmental and host-related determinants of tuberculosis in Metema district, north-west Ethiopia

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Number of times this article has been viewed

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**Background:** Each year, one third of the world's population is estimated to be infected with tuberculosis (TB). Globally in 2011, there were an estimated 8.7 million TB cases that resulted in 1.4 million deaths. In Ethiopia, TB is the leading cause of morbidity and the third most common cause of hospital admission. The aim of this study is to assess environmental and host-related determinants of TB in Metema district, north-west Ethiopia.

**Methods:** A community-based unmatched case-control study was conducted from March 12 to April 5, 2013. The study population included 655 subjects (218 cases and 437 controls in a ratio of 1:2). Cases were TB patients selected from a total of 475 cases registered and treated from March 2012 to February 2013 at the Metema District Hospital DOTS (direct observation therapy, short-course) clinic and selected randomly using a lottery method. Controls were people who had had no productive cough for at least 2 weeks previously and were selected from the community.

**Results:** A total of 655 respondents (218 cases and 437 controls) participated in the study. In multivariate analysis, being illiterate (adjusted odds ratio [AOR] 3.65, 95% confidence interval [CI] 2.31–5.76), households containing more than four family members (AOR 3.09, 95% CI 2.07–4.61), living space <4 m<sup>2</sup> per person (AOR 3.11, 95% CI 2.09–4.63), a nonseparated kitchen (AOR 3.27, 95% CI 1.99–5.35), history of contact with a TB patient (AOR 2.05, 95% CI 1.35–3.12), a house with no ceiling (AOR 1.46, 95% CI 1.07–2.21), and absence of windows (AOR 4.42, 95% CI 2.46–7.95) were independently associated with the development of TB.

**Conclusion:** This study identified that the number of family members in the household, educational status, room space per person, history of contact with a TB patient, availability and number of windows, location of kitchen facilities within the house, and whether or not the house had a ceiling were independently associated with contracting TB. Every community should construct houses with the kitchen separated from the main living room, and include a ceiling and more than one window. Cigarette smoking should be avoided since this also contributed to the risk of transmission of TB. Further research focusing on coinfection with human immunodeficiency virus, helminth burden, and malnutrition is important for the control and prevention of TB.

**Keywords:** determinants, tuberculosis, Metema district, north-west Ethiopia

## Background

Tuberculosis (TB) is a major public health problem throughout the world.<sup>1</sup> One third of the world's population is estimated to be infected with tubercle bacilli and at risk of developing active TB.<sup>2,3</sup> According to a 2013 World Health Organization report, in 2012 there were 8.6 million new TB cases and 1.3 million TB deaths. Most TB cases and deaths occur among men, but the burden of the disease is also high in women. In 2012, there were an estimated 2.9 million TB cases and 410,000 TB deaths in women,

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## RESEARCH ARTICLE

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# Potential effect of household environment on prevalence of tuberculosis in India: evidence from the recent round of a cross-sectional survey

S. K. Singh<sup>1</sup>, Gyan Chandra Kashyap<sup>1\*</sup> and Parul Puri<sup>2</sup>**Abstract**

**Background:** Tuberculosis (TB) has been a major health problem globally since ages, and even today, it is a major cause of morbidity in millions of people each year. In 2015 alone, TB accounted for about 1.4 million deaths globally, with India carrying the biggest burden of the disease. The physical environment of the household, an individual living in, has a significant influence on the incidence of TB. Thus, an understanding of the socio-economic, demographic and environmental factors that individuals are exposed to is of importance. The objective of present study is to examine the association of household environment with the prevalence of Tuberculosis in India.

**Methods:** The study utilizes data from the fourth round of National Family Health Survey (NFHS-4), 2015-16, which was collected from self-reported information pertaining to Tuberculosis in the household questionnaire. The specific question was, "Does any usual resident of your household suffer from tuberculosis?" the response to which helped in the detection of Tuberculosis. Binary Logistic regression was performed from which appropriate inferences are drawn on the association of household environment with Tuberculosis.

**Results:** Prevalence of TB was found to be the highest among elderly people (0.9%), no education (0.4%) and people belonging to the poorest wealth quintile (0.53%). Family members who were regularly (daily) exposed to smoke (second-hand smoke) inside the house were more prone to getting tuberculosis (OR = 1.49; CI = 1.39-1.61) as compared with households where people do not smoke inside the house. Further, households having a finished wall (OR = 0.7; CI = 0.6-0.8) are less likely to get TB than the households with mud walls. Households that shared their toilets with other households are more likely to get hold of Tuberculosis (OR = 1.2; CI = 1.1-1.4).

**Conclusions:** Results strongly suggest that a contaminated household environment increases the risk of tuberculosis in India. There are multiple risk factors that are strongly associated with Tuberculosis: smoke inside house, type of cooking fuel, separate kitchen, floor, roofing and wall material, number of persons sleeping in a room, sharing toilet and potable water with other households; and individual characteristics such as age, sex, educational attainment, marital status, place of residence and wealth index.

**Keywords:** Household, Environment, Prevalence of Tuberculosis, India

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## The Ventilation-to-area Ratio and House Lighting Relate to the Incidence of Pulmonary Tuberculosis

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### Abstract

**Background:** Indonesia is one of the heavy burden countries with high pulmonary tuberculosis incidence in the world. The physical condition of houses is one of the environmental factors on how the infection spreads. The objective of this study was to provide supporting facts between the physical environment of the houses and the incidence of pulmonary tuberculosis.

**Methods:** This was an observational analytic study with a case-control design, using checklists among pulmonary tuberculosis patients (n 32) and their healthy controls (n 32). Study subjects were chosen by simple random sampling. The study was performed from March to August 2019 at the Public Health Center (Pusat Kesehatan Masyarakat, Puskesmas) in Sawahan district, Surabaya. The incidence of pulmonary tuberculosis was related to various factors, including window existence, window opening habit, ventilation-to-area ratio, humidity, temperature, lighting, and occupancy density. The collected data were analyzed using the chi-square test to assess statistical significance with a p-value <0.05 was considered significantly related.

**Results:** The ventilation-to-area ratio (p<0.05) and house lighting (p<0.00) were related to pulmonary tuberculosis incidence, whereas other factors such as window existence, window opening habit, temperature, and occupancy density were not.

**Conclusions:** The ventilation-to-area ratio and house lighting have been proven to be related to pulmonary tuberculosis incidence. Government regulation on building permit needs to be encouraged to reduce the spreading and the incidence of pulmonary tuberculosis.

**Keywords:** House lighting, pulmonary tuberculosis, ventilation-to-area ratio

### Introduction

Tuberculosis is an airborne disease caused by *Mycobacterium tuberculosis* and still a problematical disease for public health.<sup>1</sup> In Indonesia, East Java Province has a high prevalence of pulmonary tuberculosis, second after West Java Province.<sup>2</sup> The Sawahan Public Health Center (*Pusat Kesehatan Masyarakat*, Puskesmas) covers areas of Sawahan and Petemon Sub-district in Sawahan District, one of 31 districts in Surabaya, and being 3<sup>rd</sup> among the districts with a high number of incidence.<sup>3</sup>

There are many ways of prevention of tuberculosis, that have been conducted by the government and nonprofit organizations,

also directed by the local community groups. The prevention of tuberculosis that has been carried out includes a free obligatory BCG vaccination, free antituberculosis drugs and mask for the patients, and many other workshops to enhance the knowledge of tuberculosis infection. However, tuberculosis prevention of environmental and behavioral aspects seem to be lacking, especially when it comes to how to live healthy and have a healthy house. The criteria of healthy houses have been written in the Decree of the Ministry of Health of Indonesia, mentioning that a house has to be reviewed from the building material, components and layout, lighting, air quality, ventilation, water, food storage, waste, and also

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RESEARCH ARTICLE

## Risk factors for tuberculosis: A case-control study in Addis Ababa, Ethiopia

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### Abstract

#### Background

Tuberculosis remains a major public-health problem in the world, despite several efforts to improve case identification and treatment compliance. It is well known cause of ill-health among millions of people each year and ranks as the second leading cause of death from infectious disease worldwide. Despite implementation of the World health organization recommended strategy, the reductions in the incidence of TB have been minimal in high burden countries.

#### Objectives and methods

A case control study was carried out to assess the risk factors of TB, where cases were newly registered bacteriologically confirmed pulmonary TB patients with age greater than 15 years who present at twenty health centres in Addis Ababa. Controls were age and sex matched attendees who presented in the same health centers for non-TB health problems.

#### Results

A total of 260 cases and 260 controls were enrolled in the study and 45.8% of cases and 46.2% of controls were in the 26–45 years age bracket. According to the multivariable logistic regression analysis, seven variables were found to be independent predictors for the occurrence of TB after controlling possible confounders. Patients who live in house with no window or one window were almost two times more likely to develop tuberculosis compared to people whose house has multiple windows (AOR = 1.81; 95% CI: 1.06, 3.07). Previous history of hospital admission was found to pose risk almost more than three times (AOR = 3.39; 95% CI: 1.64–7.03). Having a household member who had TB was shown to increase risk of developing TB by three fold (AOR = 3.00; 95% CI: 1.60, 5.62). The study showed that illiterate TB patients were found to be more than twice more likely to develop TB compared to subjects who can at least read and write (AOR, 95% CI = 2.15, 1.05, 4.40). Patients with household income of less than 1000 birrs per month were more than two times more likely to develop TB compared to those who had higher income (AOR = 2.2; 95% CI: 1.28, 3.78).

#### OPEN ACCESS

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**Competing interests:** The authors have declared that no competing interests exist.

Smoking has also been identified as important risk factor for developing TB by four times (AOR = 4.43; 95% CI: 2.10, 9.3). BCG was found to be protective against TB reducing the risk by one-third (AOR = 0.34; 95% CI: 0.22, 0.54).

#### Conclusion

This study showed that TB is more common among the most agile and economically active age group, and number of windows, history of hospital admission, a household member who had TB, illiteracy, low household income and smoking and lack of BCG scar were identified as independent risk factors. Therefore it is imperative that the TB control effort need a strategy to address socio economic issues such as poverty, overcrowding, smoking, and infection control at health care facilities level is an important intervention to prevent transmission of TB within the facilities.



## Housing and tuberculosis in an Inuit village in northern Quebec: a case-control study

Faiz Ahmad Khan MD MPH, Greg J. Fox MD PhD, Robyn S. Lee PhD, Mylene Riva PhD, Andrea Benedetti PhD, Jean-François Proulx MD, Shelley Jung MScPH, Karen Hornby MSc, Marcel A. Behr MD MSc, Dick Menzies MD MSc

### Abstract

**Background:** Between November 2011 and November 2012, an Inuit village in Nunavik, Quebec experienced a surge in the occurrence of active TB; contact investigations showed that TB infection was highly prevalent (62.6%), particularly among those over age 14 years (78.8%). A nested case-control study showed that nutritional inadequacy was associated with acquisition of infection but not progression to disease. We performed a study to determine whether characteristics of one's dwelling were associated with 1) acquisition of newly diagnosed TB infection and 2) progression to confirmed or probable disease among those with TB infection.

**Methods:** In this nested case-control study, we enrolled 200 people who were household or social contacts of at least 1 person with active TB or had received a diagnosis of active TB and assessed whether characteristics of their dwellings were associated with their odds of having newly diagnosed TB infection and/or odds of progression to disease between November 2011 and November 2012. For our first objective, we compared participants with newly diagnosed TB infection (regardless of their disease status) to a control group of contacts who were uninfected. For the second objective, we compared participants with confirmed or probable disease to a control group consisting of those with infection but no disease. We used information collected during investigation of the contacts and from study questionnaires to determine whether participants may have been exposed to TB in their own home (if they had shared a dwelling with someone who had smear-positive TB during the outbreak) or in other dwellings that they visited at least weekly.

**Results:** The participants lived in 79 dwellings. The mean number of people per room was 1.1 (standard deviation [SD] 0.5). The mean room size and ventilation level of the common living space (kitchen and living/dining rooms) were 67.9 (SD 9.4) m<sup>3</sup> and 1.69 (SD 0.26) air changes per hour, respectively. After adjustment for potential confounders, the number of people per room was positively associated with the odds of newly diagnosed infection and odds of disease, but only among participants who lived with someone with smear-positive TB (the minority of participants). Other dwelling characteristics were not associated with either outcome.

**Interpretation:** Reducing household crowding may contribute to TB prevention. Overall, our investigations have not identified associations that explain the elevated disease risk in this village. In light of our results and considering the high prevalence of TB infection, treatment of latent infection is an essential intervention for long-term reduction of TB incidence in this village.

During the period 2008–2012, the average annual tuberculosis (TB) incidence among Canadian Inuit was 190 per 100 000, compared with the national average of 5 per 100 000.<sup>1–5</sup> The reasons for this dramatic difference are unclear, although major disparities in socioeconomic status<sup>6</sup> and general health<sup>7,8</sup> are thought to contribute.

Housing has been a concern for Inuit communities for several years owing to the high prevalence of overcrowding and disrepair of dwellings.<sup>9,10</sup> Although housing is widely regarded as an important determinant of TB,<sup>11,12</sup> there is surprisingly little evidence supporting a causal association between housing conditions and TB infection or disease.

Associations between crowded housing and TB have most been reported in ecologic studies,<sup>13–15</sup> but these community-level associations may have been due to confounding by other social, environmental or biological determinants of TB that

**Competing interests:** None declared.

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BERITA ACARA REVISI SKRIPSI

Penguji : Dr. Pipit Festi W, S.KM.,M.Kes  
Nama : Devi Aryanti Septianingrum  
Judul : KONDISI FISIK RUMAH PASIEN TB PARU DENGAN  
PENULARAN PADA ANGGOTA KELUARGA

No.	Proposal	Perbaikan
1.	Bab 2	Tambahkan teori yang berkaitan dengan pembahasan
2.	Bab 3	Jurnal yang sudah di ekstraksi di tulis
3.	Bab 4	- Dilengkapi sampel, sampling, hasil - Tambahkan teori yang menjelaskan - Kaitkan dengan teori
4.	Bab 5	Saran untuk puskesmas, peneliti selanjutnya

Surabaya, 02 September 2020

Penguji

  
(Dr. Pipit Festi W, S.KM.,M.Kes)

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Pembimbing I



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







Pembimbing II



(Anis Rosyiatul H, S.Kep.,Ns.,M.Kes)

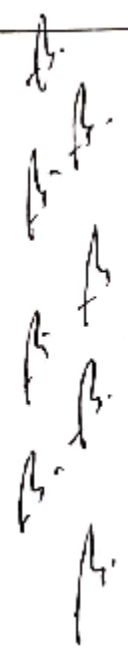
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 Judul Karya Tulis Ilmiah : Kondisi Fisik Rumah Pasien TB Paru dengan  
 Penularan Pada Anggota Keluarga

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1.	Senin 8-6-2020	Bab 1, 2, dan 3	Revisi Bab 1, 2, dan 3	
2.	Jumat 12-6-2020	Bab 1	Revisi Bab 1	
3.	Senin 16-6-2020	Bab 1, 2, dan 3	Acc Bab 1, 2, 3 Lanjut ujian proposal	
4.	Kamis 6-08-2020	Revisi seminar proposal	Lanjut Bab 4 & 5	
5.	Rabu 15-08-2020	Bab 4, 5	Revisi Bab 4, 5	
6.	Kamis 20-08-2020	Bab 4, 5	Revisi Bab 4 dan bunt abstrak	
7.	Senin 24-08-2020	Bab 4, 5	Revisi Bab 5 dan abstrak	
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9.	Senin 07-09-2020	Revisi semhas Bab 4, 5	Acc Bab 4, 5 semhas	

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 Judul Karya Tulis Ilmiah : Kondisi Fisik Rumah Pasien TB Paru dengan  
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No.	Hari, Tanggal	Catatan Pembimbing/ Hal yang direvisi	Hasil Revisi	TTD
1.	Senin, 8-06-2020	Bab 1, 2, & 3	Revisi Bab 1, 2, & 3	
2.	Sabtu 13-06-2020	Bab 3	Revisi Bab 3	
3.	Senin 15-06-2020	Bab 3	Acc Bab 1, 2, & 3 Lanjut ujian proposal	
4.	Kamis 6-08-2020	Revisi seminar proposal	Hasil dan pembahasan di kegalan	
5.	Kamis 20-08-2020	Bab 4, 5	Revisi Bab 4, 5 dan lampiran jurnal	
6.	Senin 24-08-2020	Bab 4, 5	Revisi pembahasan	
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**ABSTRAK**  
**KONDISI FISIK RUMAH PASIEN TB PARU DENGAN PENULARAN**  
**PADA ANGGOTA KELUARGA**

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**Latar belakang:** Penyebab peningkatan kejadian TB Paru adalah tingginya kejadian penularan pasien TB Paru ke orang lain terutama keluarga, karena keluarga yang sering berinteraksi dengan pasien. Penularan TB Paru dapat terjadi melalui perilaku pasien yang tidak sehat. Penyakit menular di masyarakat banyak dipengaruhi oleh kondisi rumah dan lingkungan tidak memenuhi syarat kesehatan. Faktor lingkungan yang dimaksud adalah sanitasi perumahan, antara lain: pencahayaan, ventilasi, kepadatan hunian, dan kelembapan ruangan. **Tujuan:** Untuk mendeskripsikan kondisi fisik rumah pasien TB Paru dengan penularan pada anggota keluarga melalui *literature review*. **Metode:** Sebuah tinjauan sistematis review jurnal mengenai kondisi fisik rumah pasien TB Paru dengan penularan pada anggota keluarga. Pencarian artikel diakses dari internet database yaitu: PubMed, ProQuest dan ScienceDirect. Dari database PubMed ditemukan 2 jurnal, ProQuest ditemukan 5 jurnal dan ScienceDirect ditemukan 3 jurnal. Sistematis review dari tahun 2010-2020 dengan keseluruhan jurnal berbahasa Inggris, *full text*, spesies yang diteliti manusia dan membahas kondisi fisik rumah dengan penularan pada anggota keluarga. **Hasil:** Kondisi fisik rumah pasien TB Paru yang dapat menularkan pada anggota keluarga adalah kepadatan hunian, ventilasi dan pencahayaan. Penyebab penularannya adalah riwayat kontak dengan pasien TB Paru atau memiliki anggota rumah tangga yang memiliki TB Paru. **Kesimpulan:** Kondisi fisik rumah pasien TB Paru yang tidak memenuhi syarat kesehatan dapat menularkan pada anggota keluarga. Pencegahan yang kurang dapat menyebabkan penularan pada anggota keluarga yang tinggal serumah dengan pasien.

**Kata kunci:** *House conditions, transmission, and pulmonary tuberculosis*



**ABSTRAK**  
**PHYSICAL CONDITION OF THE HOUSE OF PULMONARY TB**  
**PATIENTS**  
**WITH TRANSMISSION TO FAMILY MEMBERS**

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**Background:** *The cause of the increased incidence of pulmonary tuberculosis is the high incidence of transmission of pulmonary TB patients to other people, especially families, because families often interact with patients. Pulmonary TB transmission can occur through unhealthy patient behavior. Infectious diseases in the community are mostly influenced by housing and environmental conditions that do not meet health requirements. The environmental factors referred to are housing sanitation, including: lighting, ventilation, occupancy density, and room humidity.* **Objective:** *To describe the physical condition of the home of pulmonary TB patients with transmission to family members through a literature review.* **Methods:** *A systematic review of journal reviews regarding the home physical condition of pulmonary TB patients with transmission to family members. Search for articles accessed from internet databases, namely: PubMed, ProQuest and ScienceDirect. From PubMed database found 2 journals, ProQuest found 5 journals and ScienceDirect found 3 journals. Systematic review from 2010-2020 with all English-language journals, full text, of species studied by humans and discussing the physical condition of the house with transmission to family members.* **Results:** *The physical condition of the patient's home with pulmonary tuberculosis that can transmit to family members is the density of occupancy, ventilation and lighting. The cause of transmission is a history of contact with pulmonary TB patients or having household members who have pulmonary TB.* **Conclusion:** *The physical condition of the home of pulmonary tuberculosis patients who do not meet the health requirements can transmit to family members. Inadequate prevention can cause transmission to family members who live with the patient.*

**Keyword:** *House conditions, transmission, and pulmonary tuberculosis*

## Latar belakang

TB Paru merupakan penyakit menular yang disebabkan oleh bakteri *M.tuberculosis* biasanya menyerang paru – paru. Penyakit menyebar saat penderita TB paru mengeluarkan bakteri ke udara dalam bentuk percikan dahak atau droplet nuclei (WHO, 2018). Penularan TB Paru dapat terjadi melalui perilaku pasien yang tidak sehat. Penyakit menular di masyarakat banyak dipengaruhi oleh kondisi rumah dan lingkungan tidak memenuhi syarat kesehatan. Keadaan sanitasi lingkungan merupakan kondisi yang memerlukan perhatian bagi Negara Indonesia, seperti sanitasi perumahan yang masih tidak memenuhi syarat rumah sehat (Ulinnuha, E. (2012).

Kasus penyakit TB Paru sangat terkait dengan faktor perilaku dan lingkungan yaitu kondisi sanitasi rumah yang memiliki peran sangat penting dalam kejadian penularan penyakit TB Paru. Faktor lingkungan yang dimaksud adalah sanitasi perumahan, antara lain : pencahayaan, ventilasi, kepadatan hunian, dan kelembapan ruangan.

Indonesia pernah menempati urutan ke 3 di dunia dalam hal jumlah pasien TB Paru terbesar hampir 10 tahun lamanya. WHO melaporkan, pada tahun 2016 bahwa terdapat sekitar 10,4 juta kasus infeksi TB dan 1,8 juta kasus kematian akibat TB. Angka kejadian penyakit ini meningkat pada negara - negara berpenghasilan rendah. Empat negara dengan kasus tertinggi yaitu India, Indonesia, Filipina, dan Pakistan. Berdasarkan jumlah kasus baru TB di Indonesia sebanyak 420.994 kasus pada tahun 2017. Jumlah penemuan kasus TB paru di Indonesia mengalami peningkatan. Angka notifikasi kasus/case notification rate (CNR) adalah jumlah semua kasus TBC yang diobati dan dilaporkan akan menggambarkan kecenderungan (trend) meningkat atau menurun nya penemuan kasus dari tahun ke tahun di suatu wilayah (Kemenkes RI, 2018), pada tahun 2017 sebanyak 138 kasus per 100.000 penduduk dan pada tahun 2018 naik menjadi 193 kasus per 100.000 penduduk (Kemenkes RI, 2017). Dan jumlah kasus TB semua tipe pada tahun 2017 sebanyak 360.770 kasus menjadi 511.873 kasus pada tahun 2018 (Kemenkes RI, 2018).

Berdasarkan permasalahan di atas, diharapkan ada kerjasama dengan pelayanan kesehatan yang dilakukan secara komprehensif, meliputi tindakan promotif, preventif, kuratif, dan rehabilitatif. Peneliti bertujuan ingin mendeskripsikan penelitian sebelumnya tentang hubungan kondisi fisik rumah pasien TB Paru dengan penularan pada anggota keluarga dengan menggunakan *sistematik review*.

## Strategi Atau Data Base

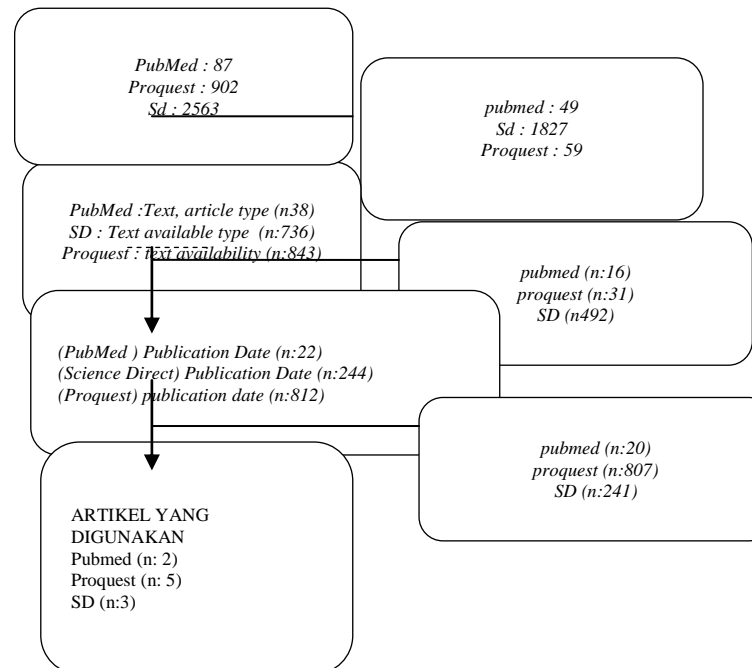
Metode pencarian artikel dalam database jurnal penelitian dan pencarian melalui internet. Pencarian database yang digunakan adalah NCBI PubMed, ProQuest, dan ScienceDirect dari tahun 2010 hingga tahun 2020. Untuk pencarian artikel, kata kunci yang digunakan juga dicantumkan dalam pengumpulan data adalah “*house conditions, transmission, and pulmonary tuberculosis*”.

## Kriteria inklusi

- Dipublikasi dalam bahasa Inggris
- Diterbitkan dari tahun 2010 hingga 2020 (10 tahun terakhir)

- Tipe artikel yaitu Artikel Jurnal
- Ketersediaan teks yaitu *Full Text*
- *Species* yang diteliti Manusia

## Sintesi tematik



## Hasil

Berdasarkan hasil tabel hasil pencarian artikel dari tiga database dengan keyword yang sesuai dengan literatur review. Dari ketiga database setelah difilter hanya diambil sesuai tujuan adalah sebanyak 1.078 artikel. Kemudian dianalisis yang memenuhi criteria adalah sebanyak 10 artikel. Kesepuluh jurnal yang sudah ditemukan membahas tentang kondisi fisik rumah pasien TB Paru dengan penularan pada anggota keluarga. Kondisi fisik rumah yang tidak memenuhi syarat kesehatan dapat menyebabkan risiko penularan pada anggota keluarga adalah kepadatan hunian, ventilasi, pencahayaan, serta orang yang tinggal serumah atau memiliki riwayat kontak dengan pasien TB Paru.

## Pembahasan

### 1. Kepadatan hunian

Penelitian yang dilakukan (Tesema et al., 2015) menjelaskan bahwa orang yang tinggal dengan lebih dari empat anggota keluarga per rumah tangga tiga kali lebih mungkin mengembangkan TB paru dibandingkan mereka yang hidup dengan kurang dari empat anggota keluarga per rumah tangga.

### 2. Ventilasi

TB paru menular dengan jendela dan pintu tertutup adalah 55,4% . Sehingga tidak ada udara yang masuk (Shenoi et al., 2013). Menurut penelitian yang dilakukan (Larcombe et al., 2011) jendela dan pintu rusak (pecah atau tertutup terpaal plastic), kipas dapur yang tidak berfungsi 54%, Ventilasi tidak ada atau tidak berfungsi 88%. Kurangnya ventilasi yang memadai, kurangnya ventilasi yang memadai

telah diidentifikasi sebagai faktor risiko potensial untuk penularan TB Paru.

### 3. Pencahayaan

Hasil penelitian (Zürcher et al., 2016) menjelaskan bahwa ruangan yang tidak diterangi cahaya matahari langsung dan tidak ada jendela adanya jendela. Sehingga tidak ada cahaya sehingga tempat menjadi gelap. Menurut Gould dan Brooker (2003) menyatakan bahwa bakteri *Mycobacterium tuberculosis* adalah sebuah bakteri mesofilik yang dapat hidup di tempat gelap sehingga lebih banyak bakteri berkembang biak di rumah gelap.

### 4. Kelembapan

Tidak ada yang membahas bahwa kelembapan menjadi salah satu factor penularan TB Paru. Hal ini tidak sejalan dengan penelitian yang di lakukan Fatima (2008) menyatakan bahwa terdapat hubungan antara kejadian TB Paru dengan suhu (OR 2,674), kemudian Atmosukarto (2000) yang melakukan penelitian tentang pengaruh hunian lingkungan hidup, dengan itu pada kejadian TB Paru didapatkan bahwa suhu ruangan memiliki pengaruh terhadap kejadian TB Paru (OR 5.126). Hal ini menunjukkan bahwa individu yang memiliki rumah dengan suhu  $<18^{\circ}\text{C}$  atau  $>30^{\circ}\text{C}$  memiliki risiko 2,7 kali TB paru dan 5,1 kali lipat dibandingkan dengan suhu  $18-30^{\circ}\text{C}$  yang merupakan suhu ideal atau optimum. Suhu udara dalam ruangan yang terlalu panas atau terlalu dingin juga akan berpengaruh pada penularan penyakit.

### 5. Riwayat kontak dengan pasien/ memiliki anggota rumah tangga yang memiliki TB Paru

Dalam penelitian (Shimeles et al., 2019) menjelaskan bahwa memiliki anggota rumah tangga yang memiliki TB terbukti meningkatkan risiko mengembangkan TB tiga kali lipat. Anggota keluarga TB Paru BTA (+) merupakan golongan masyarakat yang paling rentan tertular penyakit TB Paru karena sulit menghindari kontak dengan pasien (Lailatul, (2015).

## **Kesimpulan**

Berdasarkan uraian diatas maka dapat ditarik kesimpulan bahwa kondisi fisik rumah pasien TB Paru yang tidak memenuhi syarat kesehatan dapat menularkan pada anggota keluarga adalah kepadatan hunian, ventilasi dan pencahayaan. Sedangkan kelembapan memenuhi syarat. Kondisi fisik rumah yang kurang dan pencegahan yang kurang pula dapat menyebabkan penularan pada anggota keluarga yang tinggal serumah dengan pasien.

**Tabel 1. Hasil Artikel Review**

NO.	Penulis	Tahun	Topik	Sampel Dan Sampling	Desain dan Metodologi			Hasil Penelitian
					Desain	Instrumen	Analysis	
1.	Linda Larcombe, Peter Nickerson, Matthew Singer, Robert Robson, Joseph Dantouze, Lloyd McKay , Pamela Orr	2011	<i>Housing conditions in 2 Canadian First Nations communities</i>	72 orang dari 135 (53%) rumah di LB dan 57 orang dari 95 rumah di VR  (Purposive Sampling)	Cross Sectional	Kuisisioner	Uji T dan Uji Chi Square	Hasil penelitian menunjukkan bahwa 72 dari 135 (53%) rumah di LB dan 57 dari 95 (60%) rumah di VR terdaftar. Rumah di kedua komunitas berukuran kecil (rata-rata 882 dan 970 kaki persegi, masing-masing) dibandingkan dengan rata-rata Manitoba (1.200 kaki persegi). Kerumunan terlihat jelas di LB (rata-rata orang per kamar [ppr] 1,1) dan VR (rata-rata ppr 0,9). Ppr rata-rata provinsi adalah 0,5. Namun, hanya 49% pemilik rumah di LB dan 19% di VR yang merasa "berdesakan" di rumah mereka. Lebih dari dua pertiga rumah tidak memiliki sistem ventilasi pemulihan panas yang tidak berfungsi. Jamur diamati di 44% rumah LB dan 19% rumah VR. Di LB ditemukan hubungan yang signifikan antara jumlah penghuni tetap di rumah dan keberadaan TB laten atau aktif yang dilaporkan sendiri, baik saat ini atau selama tinggal di rumah itu.
2.	Jitendra Singh, Manimuthu Mani Sankar, Sandeep Kumar, Krishnamurthy Gopinath, Niti Singh, Kalaivani Mani, Sarman Singh	2013	<i>Incidence and Prevalence of Tuberculosis among Household Contacts of Pulmonary Tuberculosis Patients in a Peri-Urban Population of South Delhi, India</i>	1608 kontak rumah tangga, 866 adalah laki-laki dan 742 perempuan; dengan usia rata-rata 26,5 6 15.8 dan 26.5 6 16,0 tahun  (Purposive Sampling)	Cohort Study	Pemeriksaan dahak	Analisis Regresi Logistik Multivariat	Hasil penelitian menunjukkan bahwa kondisi rumah pasien TB Paru sebanyak 372 (86,1%) kasus indeks berada di lingkungan yang sangat padat dengan sanitasi yang buruk. Diamati bahwa 395 (91,4%) rumah tangga tinggal di rumah dengan 2 kamar dan 37 (8,6%) di rumah 3-4 kamar. Lingkungan tampak memainkan peran utama dalam penularan TB dari kasus indeks ke kontak rumah tangga
3.	Albina Bare Telan	2018	<i>The Relations Between Houses Physical Condition Between</i>	50 Responden (24 laki-laki dan 26 perempuan)	Cross Sectional	Thermohigrometer dan lux meter	Analisis Univariat	Hasil penelitian menunjukkan bahwa pengukuran kelembaban rata-rata memenuhi persyaratan 50 rumah (100%), suhu tidak memenuhi persyaratan 49 rumah (98%), luas ventilasi memenuhi

			<i>Tuberculosis Cases In The Working Area Of Sikumana Health Center Community In 2018</i>	(Simple Random Sampling)				persyaratan 45 rumah (90%), kepadatan dari kualitas hunian 42 rumah (84%), intensitas penerangan tidak memenuhi persyaratan 23 rumah (46%) dan tipe lantai nya memenuhi persyaratan 49 rumah (98%)Suhu udara dalam ruangan yang terlalu panas atau terlalu dingin juga akan berpengaruh pada penularan TB Paru
4.	Melissa Lygizos, Sheela V Sheno, Ralph P Brooks, Ambika Bhushan, James CM Brust, Daniel ZeltermanYanhong Deng, Veronika Northrup, Anthony P Moll and Gerald H Friedland	2013	<i>Natural ventilation reduces high TB transmission risk in traditional homes in rural KwaZulu-Natal, South Africa</i>	Ventilasi diukur di rumah tradisional Zulu di Tugela Ferry, sebuah daerah pedesaan yang miskin kira-kira 180.000 orang dengan tingkat HIV yang tinggi dan TB yang rentan dan resistan terhadap obat. Rumah tradisional, yang menampung banyak anggota keluarga,  (Simple Random Sampling)	Analitik Koreasional	Kuisisioner	Analisis Multivariat	Hasil penelitian menunjukkan bahwa kondisi rumah dua ratus delapan belas pengukuran ventilasi dilakukan di 24 rumah tradisional. Semua memiliki ventilasi rendah pada awal ketika jendela ditutup (rata-rata ACH = 3, SD = 3,0), dengan perkiraan risiko penularan TB 55,4% selama jangka waktu sepuluh jam dari pajanan pasien TB menular. Terdapat peningkatan yang signifikan dengan membuka jendela dan pintu, mencapai ACH rata-rata 20 (SD = 13.1, p <0,0001) yang mengakibatkan penurunan yang signifikan pada perkiraan risiko penularan TB menjadi 9,6% (p <0,0001). Analisis multivariate mengidentifikasi faktor-faktor yang memprediksi ACH, termasuk kondisi ventilasi (jendela / pintuterbuka) dan rasio jendela terhadap volume. Ventilasi yang diperluas meningkatkan peluang pencapaian $\geq 12$ ACH kali 60 kali lipat.
5.	Kathrin Zürcher, Marie Ballif, Marcel Zwahlen, Hans L. Rieder, Matthias Egger, Lukas Fenner	2016	<i>Tuberculosis Mortality and Living Conditions in Bern, Switzerland, 1856-1950</i>	3.400 rumah dan 10.600 apartemen  (Cluster Sampling)	Analitik Koreasional	Kuisisioner	Uji Chi Square	Hasil penelitian menunjukkan bahwa kondisi rumah TB Paru ruangan yang tidak diterangi cahaya matahari langsung (koefisien korelasi $r = 0,72$ , $p = 0,020$ , dan negative dengan jumlah jendela per apartemen ( $r = -0,79$ , $p = 0,007$ ). Sehingga tidak ada cahaya sehingga tempat menjadi gelap dan berpotensi menularkan TB Paru pada anggota keluarga
6.	Cheru Tesema, Takele Tadesse,	2015	<i>Environmental and host-related</i>	Populasi penelitian termasuk 655	Case Control	Kuisisioner	Analisis Multivariat	Hasil penelitian menunjukkan bahwa kondisi rumah pasien yang memiliki

	MulatGebrehiwot, AzanawTsegaw, FitsumWeldegebreal		<i>determinants of tuberculosis in Metema district, north-west Ethiopia</i>	<p>subjek (218 kasus dan 437 kontrol dengan rasio 1: 2). Kasus adalah pasien TB yang dipilih dari total 475 kasus yang terdaftar dan dirawat</p> <p>(Simple Random Sampling)</p>				lebih dari empat anggota keluarga (AOR 3,09, CI 95%) 2.07–4.61), ruang hidup, 4 m <sup>2</sup> per orang (AOR 3.11, 95% CI 2.09–4.63), dapur yang tidak terpisah (AOR 3.27, 95% CI 1.99–5.35), riwayat kontak dengan pasien TB (AOR 2.05, 95% CI 1.35–3.12), rumah tanpa batas atas (AOR 1,46, 95% CI 1,07-2,21), dan tidak adanya jendela (AOR 4,42, 95% CI 2,46-7,95) terkait dengan risiko penularan TB Paru keanggota keluarga
7.	S. K. Singh, Gyan Chandra Kashyap and ParulPuri	2019	<i>Potential effect of household environment on prevalence of tuberculosis in India: evidence from the recent round of a cross-sectional survey</i>	<p>628.900 rumah tangga dipilih sebagai sampel, dimana 616.346 di antaranya ditempati. Dari rumah tangga yang ditempati, 601.509 berhasil diwawancarai, tingkat tanggapan 98%. Dalam rumah tangga yang diwawancarai, 723.875 wanita berusia 15 tahun yang memenuhi syarat - 49 tahun diidentifikasi untuk diwawancarai secara individual, 699.686 diwawancarai, perempuan, tingkat respons 97%. Di antara laki-laki, ada 122.051 pria yang memenuhi syarat usia 15 - 54 tahun di rumah tangga yang dipilih untuk modul negara.</p>	Survey Kesehatan Keluarga Nasional (NFHS-4).	Kuisisioner	Analisis Regresi Logistik Biner	<p>Hasil penelitian menunjukkan bahwa prevalensi TB ditemukan lebih tinggi pada rumah tangga yang menggunakan bahan bakar padat untuk memasak (0,37%), dan rumah tangga yang tidak memiliki area terpisah untuk memasak (0,39%). Diperkirakan, orang yang tinggal di tempat tinggal berkualitas buruk memiliki risiko lebih tinggi untuk terkena Tuberkulosis. Prevalensi TB lebih tinggi - masing-masing 0,42, 0,41, dan 0,51% - di rumah tangga dengan lantai, dinding, dan atap dari lumpur (atau bahan lain yang tersedia secara alami). TB jauh lebih tinggi (0,34%) di rumah tangga yang berbagi toilet dengan rumah tangga lain, dan mereka yang tidak menggunakan air minum (0,4%).</p>

				Wawancara selesai dengan 112.122 pria, tingkat respons 92%.  (Multistage Sampling)				
8.	Adil Jihad Muhammad, Pudji Lestari, Agung Dwi Wahyu Widodo	2020	<i>The Ventilation-to-area Ratio and House Lighting Relate to the Incidence of Pulmonary Tuberculosis</i>	32 px TB Paru  (Simple Random Sampling)	Case Control	Meteran roll, hygrometer, dan lux meter	Uji Chi Square	Hasil penelitian menunjukkan bahwa kondisi rumah pasien TB Paru sebagian besar pasien tidak menyadari pentingnya ventilasi (30 dari 32) dan penerangan (29 dari 32) di rumah mereka. Data tentang suhu dan kelembapan di Surabaya maret dan agustus 2019 persentasi paling lembab masuk maret (65%) dan terendah pada agustus (36,5%), sedangkan suhunya stabil dari waktu ke waktu. Ventilasi dan pencahayaan terbukti berhubungan dengan penularan pada anggota keluarga
9.	Ezra Shimeles, Fikre Enqueselassie, Abraham Aseffa, Melaku Tilahun Alemayehu Mekonen, Getachew Wondimagegn, Tsegaye Hailu	2019	<i>Risk factors for tuberculosis: A case-control study in Addis Ababa, Ethiopia</i>	260 kasus dan 260 kontrol. pasien TB paru yang dikonfirmasi secaraCbakteriologis baru dengan usia lebih dari 15 tahun yang hadir di dua puluh pusat kesehatan di Addis Ababa yang dipilih untuk penelitian tersebut dengan berkonsultasi dengan Biro Kesehatan Addis Ababa, sementara kontrol adalah peserta yang cocok dengan usia dan jenis kelamin yang hadir dalam presentasi yang sama.	Case Control	Tes laboratorium dan mikroskopik AFB	Analisis Regresi Logistik Multivariat	Hasil penelitian menunjukkan bahwa kondisi rumah pasien TB Paru lebih dari setengah dari kasus (53,8%) dan 38,1% dari kontrol tinggal di rumah dengan satu kamar, dan 22,7% dari kasus dan 35,8% dari kontrol yang tinggal di dalam rumah dengan dua kamar. Dalam hal jumlah jendela, 69,6% kasus dan 38,1% kontrol tinggal di rumah dengan jendela tunggal atau tanpa jendela, sementara 21,2% kasus dan 36. 2% kontrol di rumah dengan dua hingga tiga jendela. Hampir setengah (48,7%) dari kasus dan 33,2% dari kontrol mengklaim membuka jendela mereka sepanjang hari, sementara 18,1% dari kasus dan 13,5% dari kontrol tidak pernah membukanya. Hampir seperenam (16,5%) dari kasus dan 7,3% dari kontrol memiliki anggota rumah tangga yang memiliki TB dan berpotensi menular pada anggota rumah

				(Purposive Sampling)				
10.	Faiz Ahmad Khan MD MPH, Greg J. Fox MD PhD, Robyn S. Lee PhD, Mylene Riva PhD, Andrea Benedetti PhD, Jean-François Proulx MD, Shelley Jung MScPH, Karen Hornby MSc, Marcel A. Behr MD MSc, Dick Menzies MD MSc	2016	<i>Housing and tuberculosis in an Inuit village in northern Quebec: a case-control study</i>	200 orang yang merupakan kontak rumah tangga atau sosial darisetidaknya 1 orang dengan TB aktifatautelahmenerima diagnosis TB aktif  (Simple Random Sampling)	Case Control	Uji kulit tuberkulin	Analisis Multivariat	Para peserta tinggal di 79 tempat tinggal. Jumlah rata-rata orang per kamar adalah 1,1 (standar deviasi [SD] 0,5). Ukuran ruang rata-rata dan tingkat ventilasi dari ruang tamu umum (dapur dan ruang tamu / ruang makan) adalah 67,9 (SD 9,4) m <sup>3</sup> dan 1,69 (SD 0,26) pergantian udara per jam. Setelah penyesuaian untuk pembauran potensial, jumlah orang per kamar dikaitkan secara positif dengan kemungkinan infeksi yang baru diagnosis dan kemungkinan penyakit, tetapi hanya di antara peserta yang tinggal dengan seseorang dengan TB BTA-positif



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