

To view an archived recording of this presentation please click the following link:

<https://youtu.be/I8HL0XQr36k>

Please scroll down this file to view a copy of the slides from the session.

#### Disclaimer

**This document was created by its author and/or external organization. It has been published on the Public Health Ontario (PHO) website for public use as outlined in our Website Terms of Use. PHO is not the owner of this content. Any application or use of the information in this document is the responsibility of the user. PHO assumes no liability resulting from any such application or use.**

# One Health in Action



**Dr. Francisco Olea Popelka, DVM, MSc, PhD**

Beryl Ivey Chair in One Health

Department of Pathology and Laboratory Medicine

Epidemiology and Biostatistics

Western University

London, Ontario, Canada

**Public Health Ontario**

**Microbiology Rounds**

December 1<sup>st</sup>, 2022

# Disclaimer

---

- I have no conflicts of interest.
- The opinions I express in this talk **do not necessarily** reflect the official policies or views of Public Health Ontario, nor of the multiple institutions and organizations mentioned during this talk.

# Objectives

---

**By the end of this session, participants will be able to:**

- Describe the One Health approach and its key concepts.
- Discuss the interdependence between people, other animal species, and environmental health under the One Health approach.
- Understand the importance and relevance of using the One Health approach to address health challenges affecting people, other animal species, and the environment.

# Outline

---

1. What is One Health (OH)?
2. Examples of collaborative, multisectoral, and trans-disciplinary OH projects, activities, and initiatives.
3. Final reflection / take home message.

# 1. What is One Health (OH)?

## Previous OH definition:

One Health is the collaborative effort of ~~multiple health care professions~~, together with their related disciplines and institutions – working locally, nationally, and globally – to attain optimal health for **people, domestic animals, wildlife, plants, and our environment.**

[https://www.onehealthcommission.org/en/why\\_one\\_health/what\\_is\\_one\\_health/](https://www.onehealthcommission.org/en/why_one_health/what_is_one_health/)

## Subsequent OH definition:

One Health is a **collaborative, multisectoral, and trans-disciplinary approach** - working at local, regional, national, and global levels – **to achieve optimal health** and well-being outcomes recognizing the **interconnections** between **people, animals, plants** and their shared **environment.**

# Tripartite and UNEP support OHHLEP's definition of "One Health"

Joint Tripartite (FAO, OIE, WHO) and UNEP Statement

1 December 2021 | Joint News Release | Reading time: 2 min (506 words)

## One Health High Level Expert Panel (OHHLEP)

One Health is an integrated, unifying **approach** that aims to sustainably balance and optimize the **health of people, animals and ecosystems.**

It recognizes the health of **humans, domestic and wild animals, plants, and the wider environment** (including ecosystems) are closely **linked and inter-dependent.**

The approach mobilizes **multiple sectors, disciplines and communities at varying levels of society** to work together to foster well-being and tackle threats to health and ecosystems, while addressing the collective need for clean water, energy and air, safe and nutritious food, **taking action** on climate change, and contributing to sustainable development.

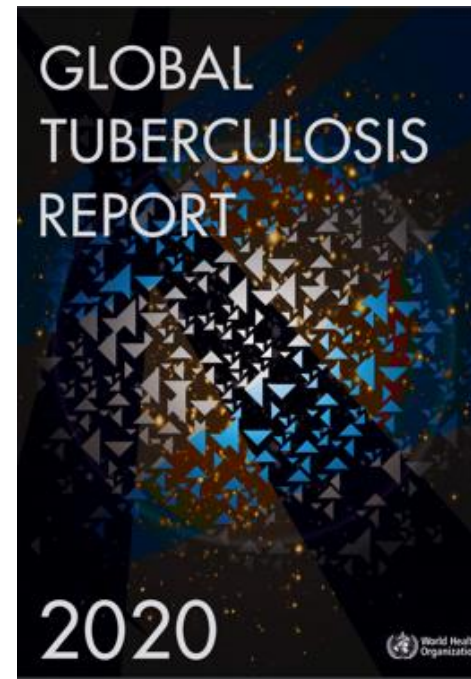


**2. Examples of  
collaborative, multisectoral, and  
trans-disciplinary OH projects, activities, and  
initiatives.**



# Tuberculosis (TB) in Humans

Primarily caused by *Mycobacterium tuberculosis* (*M. tb*)



SCAD, n.d.

TB can affect anyone anywhere, but:  
TB is a disease of **poverty**, and  
**economic distress**, **vulnerability**, **marginalization**, **stigma** and discrimination are  
often faced by people affected by TB.

WHO TB Report 2020



# Tuberculosis

14 October 2020

## Key facts



## Related

## Publications

About **one-quarter of the world's population** has a TB infection, which means people have been infected by TB bacteria but are not (yet) ill with the disease and cannot transmit it.

People infected with TB bacteria have a **5–15% lifetime risk of falling ill with TB**.

Those with **compromised immune systems**, such as people living with **HIV**, **malnutrition** or **diabetes**, or people who use **tobacco**, have a higher risk of **falling ill**.

*WHO TB Report 2020*

# GLOBAL TUBERCULOSIS REPORT

# 2021



[Health Topics](#) ▾

[Countries](#) ▾

[Newsroom](#) ▾

[Emergencies](#) ▾

[Home](#) / [Newsroom](#) / [Fact sheets](#) / [Detail](#) / Tuberculosis

## Tuberculosis

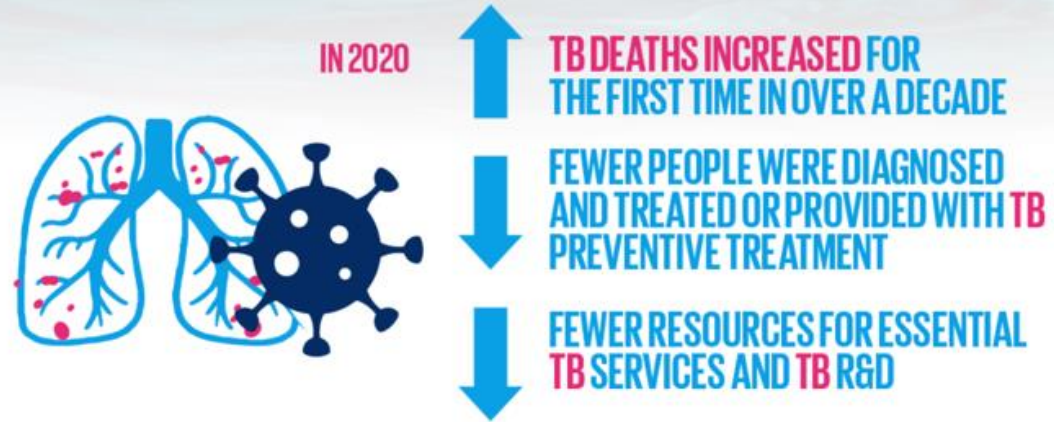
14 October 2021

### Key facts

- A total of 1.5 million people died from TB in 2020 (including 214 000 people with HIV). Worldwide, TB is the 13th leading cause of death and the second leading infectious killer after COVID-19 (above HIV/AIDS).
- In 2020, an estimated 10 million people fell ill with tuberculosis (TB) worldwide. 5.6 million men, 3.3 million women and 1.1 million children. TB is present in all countries and age groups. But TB is curable and preventable.
- In 2020, 1.1 million children fell ill with TB globally. Child and adolescent TB is often overlooked by health providers and can be difficult to diagnose and treat.



# THE COVID-19 PANDEMIC HAS REVERSED YEARS OF PROGRESS MADE IN THE FIGHT TO END TB



Actions to mitigate and reverse the impact of the COVID-19 pandemic on access to essential TB services are urgently needed.

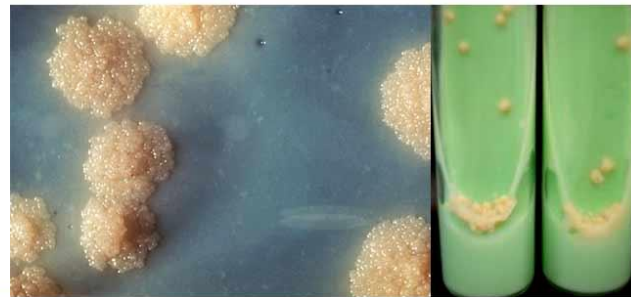
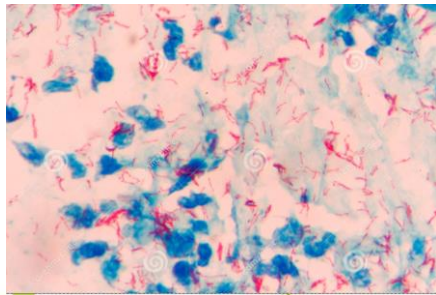


World Health Organization

WHO TB Report 2021


# *M. tuberculosis* complex

- *Mycobacterium tuberculosis*
- *Mycobacterium bovis*
- *Mycobacterium africanum*
- *Mycobacterium microti*
- *Mycobacterium caprae*
- *Mycobacterium orygis*
- *Mycobacterium canettii*
- *Mycobacterium pinnipedii*
- *Mycobacterium mungi*



# TB Vaccine (BCG: Bacille Calmette-Guerin)


Global Regions ▾



World Health Organization

Home Health Topics ▾ Countries ▾

## BCG vaccine



The formulation of international requirements for the manufacture and control of BCG vaccine was first considered by the WHO Expert Committee on Biological Standardization in its thirteenth report. In its fourteenth report, the Committee requested WHO to make arrangements as soon as possible for the formulation of such requirements. These requirements were approved by the WHO Expert Committee on Biological Standardization at its eighteenth meeting and appeared as Annex 1 to its report.

*Mycobacterium tuberculosis* (Mtb), the ethiological agent of tuberculosis (TB), is a leading cause of human disease and death, particularly in developing countries. In the global context, TB is intimately linked to poverty, and control of TB is ultimately a question of justice and human rights. In some areas with a high burden of TB, existing strategies for TB control are currently overwhelmed by the rising numbers of cases of TB occurring in parallel with or the HIV/AIDS pandemic. Emerging mycobacterial drug resistance is further complicating the situation. After decades of steady decline, the incidence of TB is also increasing in industrialized countries, mainly as the result of outbreaks in particularly vulnerable groups.

The bacille Calmette-Guérin (BCG) vaccine has existed for 80 years and is one of the most widely used of all current vaccines, reaching >80% of neonates and infants in countries where it is part of the national childhood immunization programme. BCG vaccine has a documented protective effect against meningitis and disseminated TB in children. It does not prevent primary infection and, more importantly, does not prevent reactivation of latent pulmonary infection, the principal source of bacillary spread in the community. The impact of BCG vaccination on transmission of Mtb is therefore limited.



Review > Tuber Lung Dis. 1999;79(4):242-50. doi: 10.1054/tuld.1999.0206.

## Development of the *Mycobacterium bovis* BCG vaccine: review of the historical and biochemical evidence for a genealogical tree

T Oettinger<sup>1</sup>, M Jørgensen, A Ladefoged, K Hasløv, P Andersen

Affiliations + expand

PMID: 10692993 DOI: 10.1054/tuld.1999.0206

### Abstract

The original *Mycobacterium bovis* Bacillus Calmette Guérin vaccine strain has developed into several different substrains which have been used for production of BCG vaccines throughout the world since 1921. Based on the latest genetic and antigenic knowledge, as well as the early

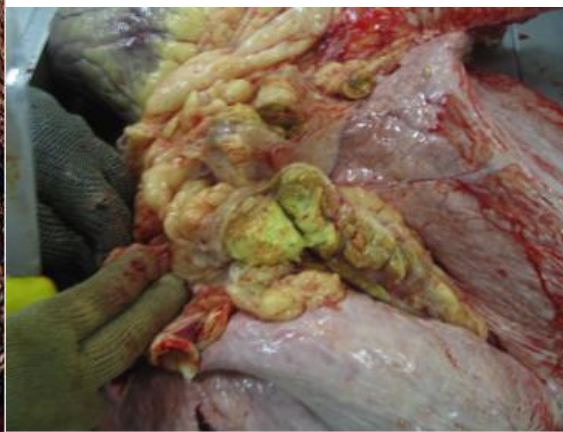


Source: Dr. Olea-Popelka

# Bovine tuberculosis

## *Mycobacterium bovis* (*M. bovis*)

Source: Dr. Olea-Popelka



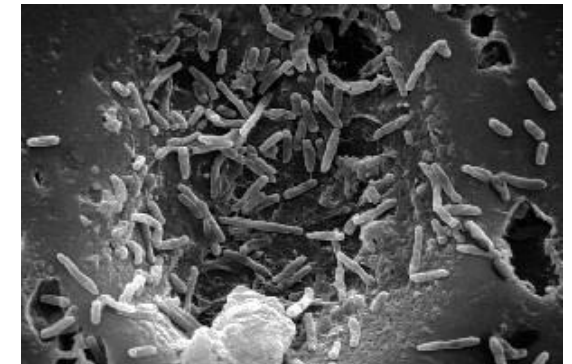
Source: Dr. Olea-Popelka

### Bovine Tuberculosis

Edited by Mark Chambers, Stephen Gordon,  
Francisco Olea-Popelka and Paul Barrow



- Gram positive rods
- Non-spore forming
- Contain a high lipid content
- *Mycobacterium* spp.
- Slow growing acid-fast bacteria requires 15 - 20 hours/generation
- Aerobic
- Do not grow in solid caseous material but can survive



(Source: CDC)



(Courtesy of Dr. Adrian Muwonge, Uganda)



# Modes of transmission/infection

- Airborne
- Ingestion - milk-borne
- Congenital, or sexually transmitted



*Source: Dr. Olea-Popelka*

# Advanced stages of TB in cattle



(Courtesy of Dr. Hill)



(Courtesy of Dr. Hill)

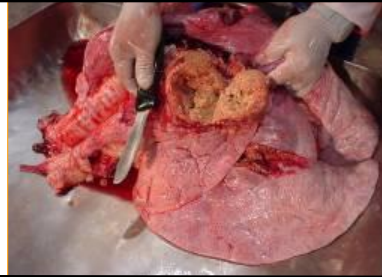
# Pathology

- ***Bovine tuberculosis***

Typical granulomatous lesions



Source: CDC



Courtesy of Dr. Bob Meyer, USDA



Courtesy of CVERA, UCD, Dublin



Source: Dr. Olea-Popelka



Source: Dr. Olea-Popelka



Courtesy of Kruger National Park, South Africa

# Host susceptibility

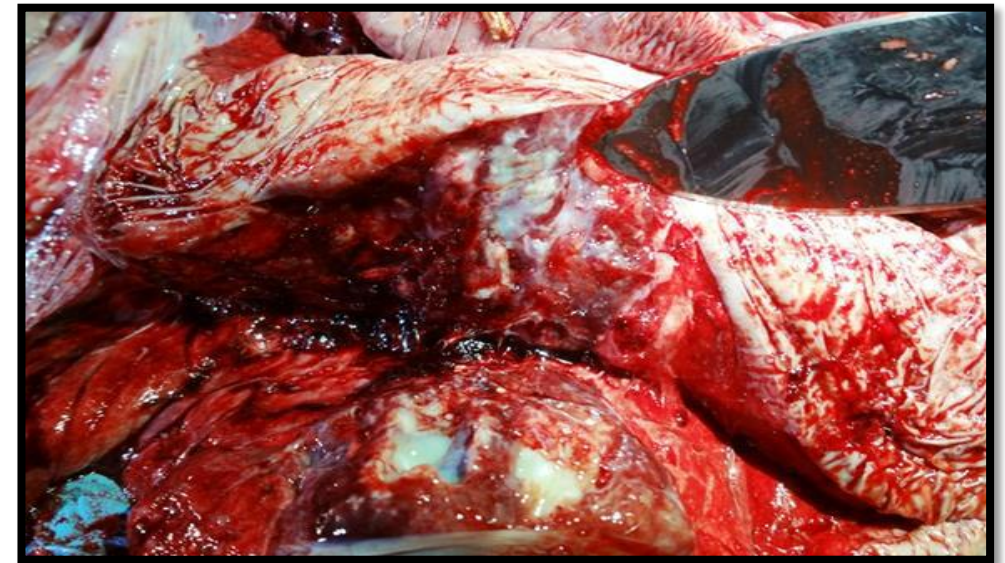
- The main reservoir of *M. bovis* is cattle



- Most warm-blooded vertebrates, including humans, can be infected and progress to TB (disease)



Photos Source: Dr. Olea-Popelka



## Clinical History

History:

**June 17<sup>th</sup> 2016**

Adult female black rhino in very poor body condition (1/5) noted stationary next to H4-1 just north of Lubyelubye loop for past 36 hours. Exam - animal recumbent and only lifted its head when darted. No external injuries. Large number of ticks in axillar and perineal regions. Clear area with scuff marks surrounding the animal. Fresh normal looking faeces present in the area immediately around the rhino

**Position:** Left lateral recumbency

**Condition:** BCS 1/5



Sample	PCR
Abdominal Inn.	negative
Peripheral Inn.	negative
Right lung	M. bovis
Left lung	M. bovis
Retropharyngeal Inn.	negative
Head Inn.	negative
Thoracic Inn.	negative



SPECIES	SAMPLE DESCRIPTION	METHOD	MICROSCOPY	CULTURE	IDENTIFICATION
Rhinoceros	Tissue	TB/ME002	POSITIVE	POSITIVE	M. bovis
Rhinoceros	Tissue	TB/ME002	POSITIVE	POSITIVE	M. bovis



October 1<sup>st</sup>, 2016

Male, African Elephant, ~45 years old



Dr. Michele Miller



Dr. Peter Buss



Animal TB Research Group Stellenbosch University

P.O. Box 241 Cape Town 8000 South Africa



frontiers in Veterinary Science

ORIGINAL RESEARCH published: 06 February 2019 doi: 10.3389/fvets.2019.00018



# Laboratory findings

## Fatal Tuberculosis in a Free-Ranging African Elephant and One Health Implications of Human Pathogens in Wildlife

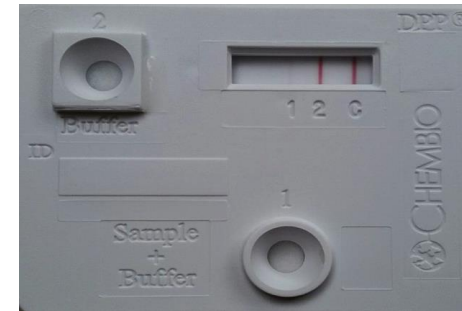
Michele A. Miller<sup>1\*</sup>, Peter Buss<sup>2\*</sup>, Eduard O. Roos<sup>1</sup>, Guy Hausler<sup>1</sup>, Anzaan Dippenaar<sup>1</sup>, Emily Mitchell<sup>3,4</sup>, Louis van Schalkwyk<sup>5</sup>, Suelee Robbe-Austerman<sup>6</sup>, W. Ray Waters<sup>7</sup>, Alina Sikar-Gang<sup>8</sup>, Konstantin P. Lyashchenko<sup>8</sup>, Sven D. C. Parsons<sup>1</sup>, Robin Warren<sup>1</sup> and Paul van Helden<sup>1</sup>

OPEN ACCESS

Edited by: Kathryn Christine Gamble.

Sample	Culture & PCR
Lung – SUN	M. tb on direct PCR
Thoracic Inn. – SUN	M. tb on direct PCR
Lung – SUN & OVI	M. tuberculosis
Thoracic Inn. - SUN	M. tuberculosis
Abdominal Inn. – SUN	M. tuberculosis

Spoligotyping revealed M. tb belonged to F11 family; common strain in human cases in South Africa



ChembioVetTBDPP assay:

Antibodies present to:

- ESAT6/CFP10 (strong positive; T2)
- MPB70 (weak positive; T1).

Source: Dr. Michele Miller





Examples of tuberculosis cases at human–livestock–wildlife interfaces.

Affected species	Suspected source	Country	Reference
Asian elephant	Humans	Nepal	[15]
Asian elephant	Humans	Thailand	[3]
Asian elephant	Humans	India	[15]
Chacma baboons	Humans	South Africa	[40]
Panther	Cattle	Argentina	[45]
American mink	Cattle	Argentina	[32]
Jaguar	Cattle	Venezuela/USA	[24]
Humans	Cattle products	USA	[42]
Humans	White rhinoceros	USA	[10]
Humans	Asian elephant	USA	[38]
Humans	Sea lions	Netherlands	[27]
African lions	African buffalo	South Africa	[41]
African buffalo	Cattle	South Africa	[41]
White-tailed deer	Cattle	USA	[6]
European badger	Cattle	UK/Ireland	[6]

Review

## One Health in the shrinking world: Experiences with tuberculosis at the human–livestock–wildlife interface

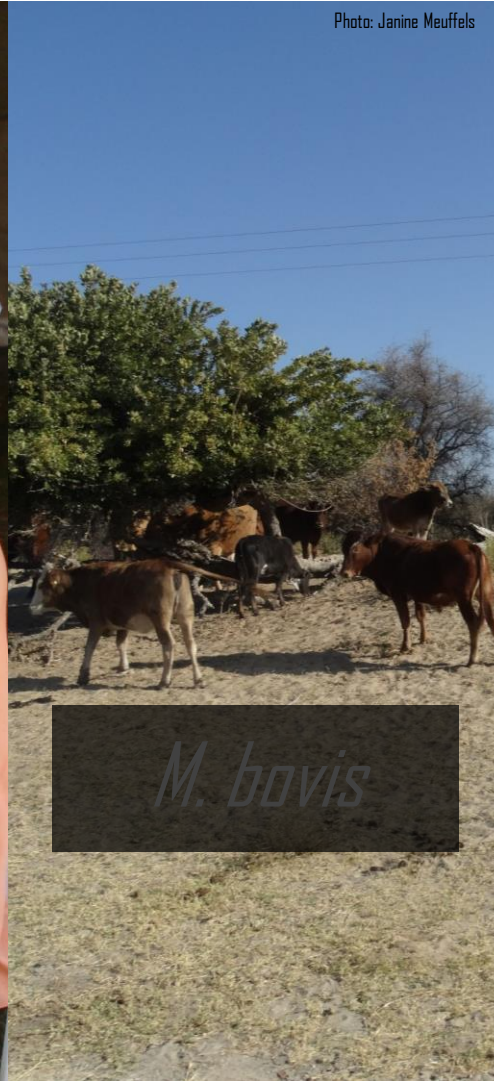
Michele Miller<sup>a</sup>,  , Francisco Olea-Popelka<sup>b</sup>

<sup>a</sup> Department of Conservation Medicine, Palm Beach Zoo, 1301 Summit Blvd., West Palm Beach, FL 33405, USA

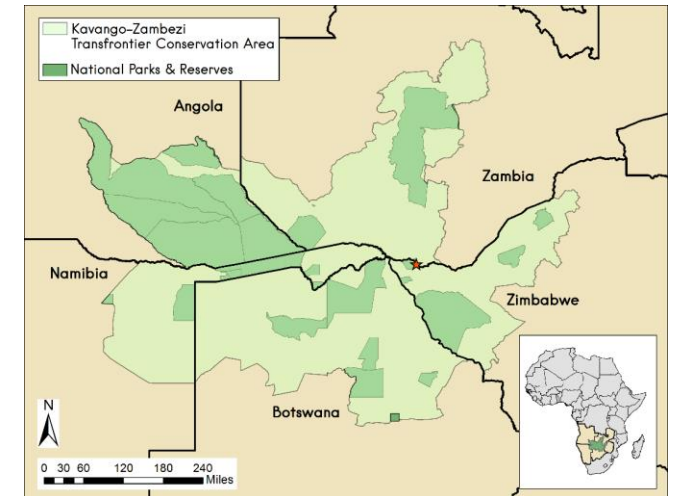
<sup>b</sup> Colorado State University, College of Veterinary Medicine and Biomedical Science, Department of Clinical Sciences, Animal



# Multi-species approach for TB



## Victoria Falls, Zimbabwe









ORIGINAL ARTICLE

## Tuberculosis serosurveillance and management practices of captive African elephants (*Loxodonta africana*) in the Kavango-Zambezi Transfrontier Conservation Area

L. E. Rosen [✉](#), T. G. Hanyire, J. Dawson, C. M. Foggin, A. L. Michel, K. P. Huyvaert, M. A. Miller, F. J. Olea-Popelka

First published: 16 November 2017 [Full publication history](#)

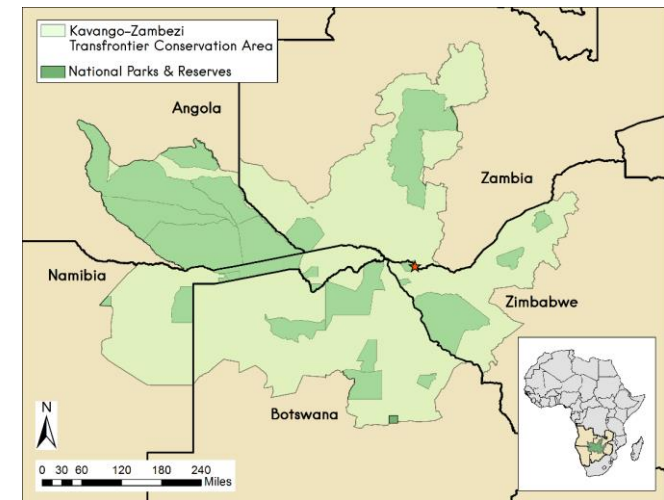


ORIGINAL ARTICLE

## Seroprevalence of *Mycobacterium bovis* infection in warthogs (*Phacochoerus africanus*) in bovine tuberculosis-endemic regions of South Africa

E. O. Roos, F. Olea-Popelka, P. Buss, L.-M. de Klerk-Lorist, D. Cooper, P. D. van Helden, S. D. C. Parsons, M. A. Miller [✉](#)

First published: 8 March 2018 [Full publication history](#)



# Zoonotic tuberculosis caused by *Mycobacterium bovis* in humans.

The Union  
International Union Against Tuberculosis and Lung Disease  
Health solutions for the poor

WHO WE ARE WHAT WE DO WHERE WE WORK NEWS CENTRE GET INVOLVED

GET INVOLVED » JOIN THE UNION » SCIENTIFIC SECTIONS AND WORKING GROUPS



MEMBER HIGHLIGHT: THE ZOOONOTIC TB SUB-SECTION \*  
Tuberculosis (TB) is an infectious, contagious disease caused by mycobacteria. Different species of mycobacteria have complex cross-infection patterns between domestic animals, wildlife species and humans.

The image shows a person from behind, wearing a yellow and purple striped shirt and blue shorts, herding a group of cows in a field. The cows are of various colors, including black and white. The background consists of green trees and a clear blue sky. Navigation arrows are visible on the left and right sides of the image.

# Zoonotic Tuberculosis (TB) Challenge

The screenshot shows the WHO website interface. At the top, there are language options: العربية, 中文, English, Français, Русский, and Español. The WHO logo is on the left, and social media icons for YouTube, RSS, Twitter, Facebook, and Google+ are on the right. A navigation bar includes links for Health topics, Data, Media centre, Publications, Countries, Programmes, and About WHO, along with a search box. The main content area is titled 'Zoonoses' and features a sidebar with links to Zoonoses, Outbreak alerts, Diseases, Veterinary public health, Collaborating institutions, and Information resources. The main article is titled 'SEVEN NEGLECTED ENDEMIC ZOOSE - some basic facts' and includes sections for Anthrax and Bovine tuberculosis. The Anthrax section features a microscopic image of spores and text explaining that anthrax is primarily a disease of herbivores, caused by the bacterium Bacillus anthracis. The Bovine tuberculosis section includes a photograph of a cow and text explaining that in humans, TB is caused by Mycobacterium tuberculosis, but can also be caused by Mycobacterium bovis, which has a wider host range and is often clinically indistinguishable from M. tuberculosis.

**SEVEN NEGLECTED ENDEMIC ZOOSE - some basic facts**

**Anthrax**

Anthrax is primarily a disease of herbivores, although all warm-blooded species are susceptible to an extent. The causative agent is the spore-forming bacterium *Bacillus anthracis*. The 'reservoir' of the disease is soil contaminated by spores in the recent past or even several decades ago. Humans normally acquire anthrax either by direct or indirect contact with infected animals, or through occupational exposure to contaminated animal products. Of 80 countries reporting anthrax in 2004, nearly 60% were developing countries. In animals, the disease is almost always rapidly fatal. In people the disease takes three forms. Inhalation anthrax is an occupational disease reported only in industrialized countries and acquired by breathing in spores; gastro-intestinal anthrax is acquired from eating infected meat from an animal that died of the disease and the cutaneous form, which accounts for more than 95% of reported cases in developing countries, is acquired through skin lesions. In strong contrast to the fear of this disease in the West caused by its bio-terrorist potential, its role, year in, year out, in causing illness in poor livestock-keeping communities and sudden deaths in their herds and flocks, is largely ignored.

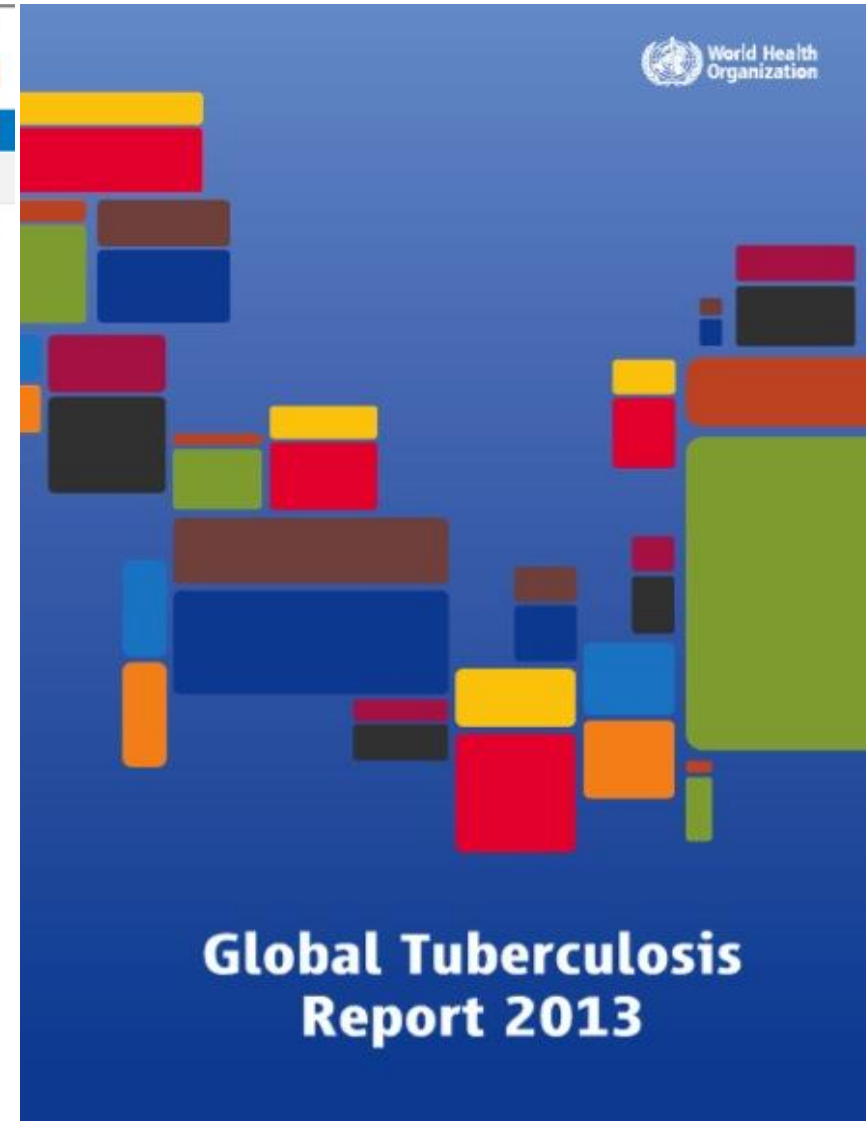
[read more](#)

**Bovine tuberculosis**

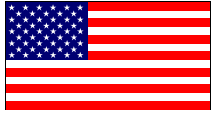
In humans, the vast majority of cases of tuberculosis are caused by *Mycobacterium tuberculosis*. However, TB can be caused by a number of other bacteria, of which *Mycobacterium bovis*, causing so-called 'bovine tuberculosis' is one of the more prevalent and has the widest host range of all TB bacteria. TB due to *M. bovis* often occupies sites other than the lungs (it is extra-pulmonary), but in many cases is clinically indistinguishable from *M. tuberculosis* infection.

However, patients with *M. bovis* often do not respond to the drugs commonly used to treat TB, sometimes resulting in a fatal outcome. Other, far more expensive, drugs are often needed – placing an added burden on health services. Very little is known about the share of bovine TB in the global TB epidemic, but sporadic reports of cases are received from many African and Asian countries and recent work undertaken in the United Republic of Tanzania indicates that this may be a substantial fraction. Bovine TB appears to be increasing at a similar rate to the total number of cases of TB, and HIV is the greatest factor for progression of TB infection to active TB disease. In livestock, particularly cattle, the disease causes lowered productivity, but seldom death. Like brucellosis, bovine TB has been largely eradicated from herds in the developed world by a test-and-slaughter programme.

[read more](#)



# ZTB Challenge



1.4% is the generally perceived estimate for the proportion of human TB cases infected with *M. bovis*.

Thoen, LoBue and de Kantor,  
2010  
Why has zoonotic tuberculosis not received much attention?



~ 1.4 % overall in USA (Hlavsa *et al.*, 2008)

1994-2005 among TB patients in San Diego, CA, *M. bovis* accounted for (Rodwell *et al.*, 2008):

- 45% patients < 15 years old
- 6% of adult patients



0.4 – 10% in African countries (Michel *et al.*, 2010).

6% in Mexico (Milian-Suazo *et al.*, In Press)

In Mexico City: (Cicero *et al.*, 2009)

13.8% among HIV + patients

7.2% among HIV - patients

# Reported *M. bovis* infection among assessed subgroups of TB patients

**Mexico (28%)** Portillo-Gomez L, Sosa-Iglesias EG. Molecular identification of *Mycobacterium bovis* and the importance of zoonotic tuberculosis in Mexican patients. *Int J Tuberc Lung Dis* 2011; **15**: 1409–14.

**Nigeria (15%)** Mawak J, Gomwalk N, Bello C, Kandakai-Olukemi Y. Human pulmonary infections with bovine and environment (atypical) mycobacteria in Jos, Nigeria. *Ghana Med J* 2006; **40**: 132–36.

**Tanzania (16%)** Kazwala RR, Daborn CJ, Sharp JM, Kambarage DM, Jiwa SF, Mbembati NA. Isolation of *Mycobacterium bovis* from human cases of cervical adenitis in Tanzania: a cause for concern? *Tuber Lung Dis* 2001; **5**: 87–91.

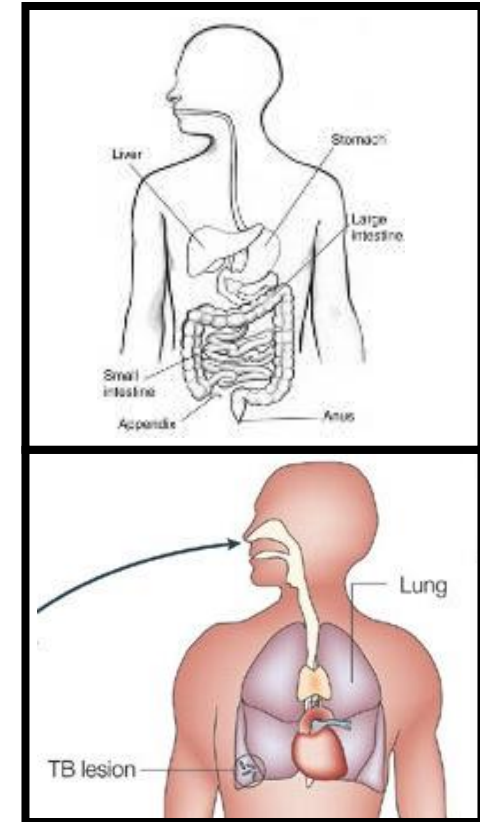
**Ethiopia (17%)** Kidane D, Olobo JO, Habte A, et al. Identification of the causative organism of tuberculous lymphadenitis in Ethiopia by PCR. *J Clin Microbiol* 2002; **40**: 4230–34.

**India (9%)** Prasad HK, Singhal A, Mishra A, et al. Bovine tuberculosis in India: potential basis for zoonosis. *Tuberculosis (Edinb)* 2005; **85**: 421–28.

**Turkey (5%)** Bayraktar B, Bulut E, Barış AB, et al. Species distribution of the *Mycobacterium tuberculosis* complex in clinical isolates from 2007 to 2010 in Turkey: a prospective study. *J Clin Microbiol* 2011; **49**: 3837–41.

# *M. bovis* in humans

- The **most common** route of exposure is the **gastrointestinal tract** following consumption of contaminated dairy products. (Cosivi *et al.*, 1998; Thoen *et al.*, 2006, 2010; Ayele *et al.*, 2010; Michel *et al.*; 2010).



Courtesy Dr. Randy Basaraba

Copyright © 2005 Nature Publishing Group  
Nature Reviews | Immunology

# ZTB vulnerable communities

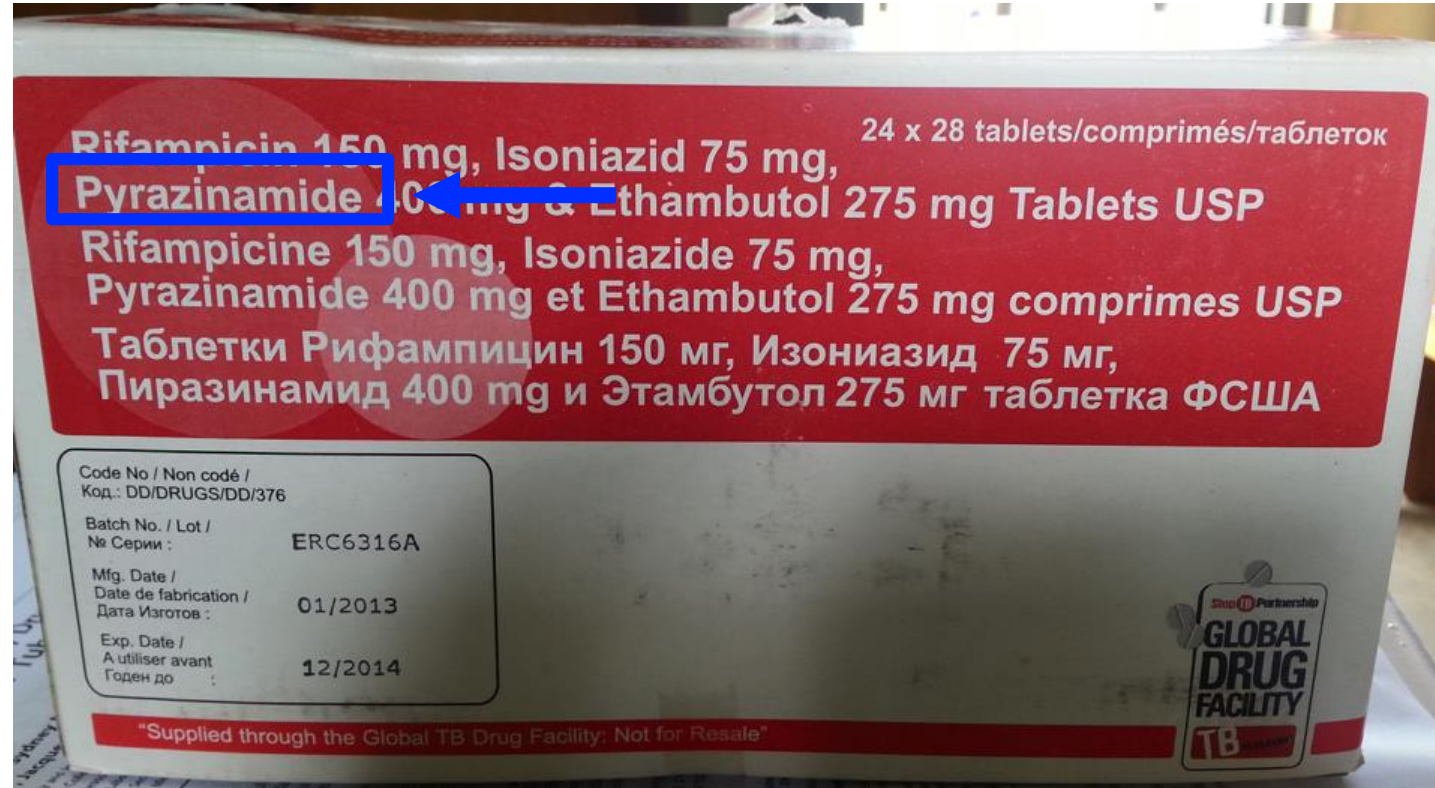
---

- The risk of ZTB increases for people living in communities with:
  - Higher **prevalence of bovine TB in livestock**
  - **Lack of milk pasteurization**
  - Human immunodeficiency virus (**HIV**)
- The people at risk and affected by ZTB are the **most neglected**, living in **rural** areas far away from health centers.





# Treatment for human Tuberculosis



*M. bovis* is naturally resistant to pyrazinamide, and can acquire resistance to other TB drugs

# “TB” in humans



- TB in humans is primarily caused by *Mycobacterium tuberculosis (M. tb)*

**What is the true incidence of *M. bovis* among humans?**

<http://www.corbisimages.com/images/67/AE1154EE-FD3F-4CC8-898A-E9FF030EB084/IH159034.jpg0>

2010

The Union  
International Union Against Tuberculosis and Lung Disease  
*Health solutions for the poor*

WHO WE ARE WHAT WE DO WHERE WE WORK NEWS CENTRE GET INVOLVED

WHO WE ARE » LEADERSHIP » COORDINATING COMMITTEE OF SCIENTIFIC ACTIVITIES (CCSA)

## Coordinating Committee of Scientific Activities (CCSA)



Physicians, Veterinarians, Public Health workers, Nurses, Civil Society  
TB – HIV/AIDS – Tobacco  
CDC, The Union, Governments, Academia, NGO's

# The Union

International Union Against  
Tuberculosis and Lung Disease  
*Health solutions for the poor*

[WHO WE ARE](#)
[WHAT WE DO](#)
[WHERE WE WORK](#)

## WHO WE ARE

## The Union: from evidence to public health action

The Union draws from the best scientific evidence and expertise to advance solutions to public health challenges affecting people living in poverty:

**TUBERCULOSIS · TOBACCO USE · HIV AND AIDS · LUNG DISEASE · NON-COMMUNICABLE DISEASES**

Our partners include governments, international agencies, civil society and the private sector.

*"Know. Share. Act. These principles have driven The Union's work since its founding nearly 100 years ago."*  
– José Luis Castro, Executive Director, The Union



**KNOW**



**SHARE**



**ACT**



2013, I created a working group to increase global awareness of ZTB

[Dr Tim Rodwell](#)  
Dr Alejandro Perera  
Dr Adrian Muwonge

International Union Against Tuberculosis and Lung Disease

# ZOOONOTIC TUBERCULOSIS

**ELUSIVE**

Lack of targeted diagnosis hides **TRUE NUMBER** of affected humans.

**Mycobacterium bovis** clinically indistinguishable from **Mycobacterium tuberculosis**

**GLOBAL**

higher risk in countries where bovine TB is uncontrolled

UNPASTEURIZED DAIRY PRODUCTS are a common source

**CHALLENGING**

Current diagnostics & surveillance are INSUFFICIENT.

Natural RESISTANCE to PZA (pyrazinamide) & EXTRA-PULMONARY TB lesions complicate treatment.

**JOIN US** The Union Zoonotic TB Sub-Section [WWW.THEUNION.ORG](http://WWW.THEUNION.ORG)

## CREATING AWARENESS OF TUBERCULOSIS CAUSED BY MYCOBACTERIUM BOVIS

Angela T Varnum<sup>1</sup>, Francisco J Olea-Popelka<sup>1</sup>, Adrian Muwonge<sup>2</sup>, Alejandro Perera<sup>3</sup>, Anna S Dean<sup>4</sup>, Elizabeth Mumford<sup>5</sup>, Elisabeth Erstcher-Vinder<sup>6</sup>, Simona Forcella<sup>7</sup>, Lucka Dittu<sup>8</sup>, Ahmed El Khrisi<sup>9</sup>, Mario Raviglione<sup>9</sup>, Ottorino Cosivi<sup>10</sup>, Paula I Fujiwara<sup>11</sup>

**BACKGROUND**

Mycobacterium tuberculosis is recognized as the primary causal agent of human TB throughout the world. However, due to the absence of routine surveillance data, the role of Mycobacterium bovis, the causal agent of bovine TB and zoonotic TB in humans, is uncertain. Zoonotic TB patients face important challenges such as:

- All zoonotic TB patients are presumed to be M. tuberculosis
- Zoonotic TB is associated with anti-pasteurization TB
- Human TB is endemic in poor and rural communities in developing countries, and those humans who have direct contact with infected animals or animal products such as unpasteurized milk have a higher risk of contracting zoonotic TB

**INTERVENTION WE CREATED**

**AWARENESS**

Infographic posters for lay and professional audiences to target zoonotic TB

**COLLABORATION**

Multi-national research network for zoonotic TB

**RESULTS**

International media coverage: widespread coverage by major media sources demonstrates the challenge presented by zoonotic TB for achieving an end to human TB worldwide

**CONCLUSIONS**

Awareness, collaboration, and action are crucial steps toward establishing zoonotic TB surveillance and prevention capacity in rural or marginalized areas

**OBJECTIVES**

Further awareness of ZTB in rural developing areas by creating multimedia promotional materials about challenges of the disease for various audiences

Strengthen collaboration between veterinary and human medical professionals and researchers through shared goals and progress

Secure advice of all involved collaborators to support ZTB knowledge, research and policy worldwide

**ACTION**

Representation in world veterinary medical and zoonotic conferences

A dedicated message to the rural livestock and human communities at risk to raise key zoonotic TB issues



Angela Varnum, MPH, DVM  
Colorado School of Public Health

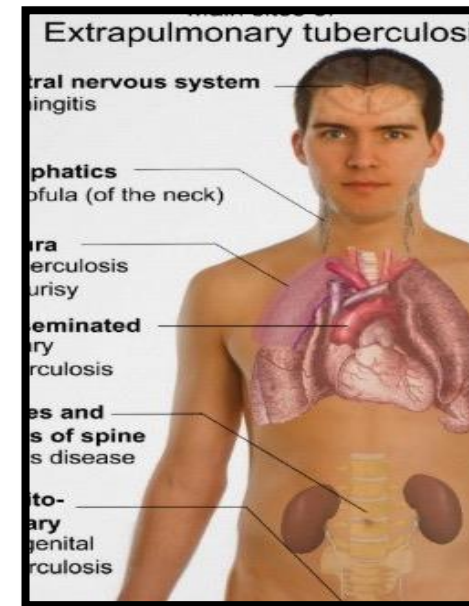
# Why It Is Important to Distinguish *Mycobacterium bovis* as a Causal Agent of Human Tuberculosis

Paula I. Fujiwara<sup>1</sup> and Francisco Olea-Popelka<sup>2</sup>

<sup>1</sup>International Union Against Tuberculosis and Lung Disease, Paris, France; and <sup>2</sup>College of Veterinary Medicine and Biomedical Sciences, Department of Clinical Sciences and Mycobacteria Research Laboratories, Colorado State University, Fort Collins

(See the Major Article by Scott et al on pages 594–601.)

- 1) The true incidence of ZTB remains uncertain.
- 2) Clinical features of ZTB present special challenges for patient treatment and recovery.
- 3) *M. bovis* is naturally resistant to pyrazinamide, and can acquire resistance to other TB drugs.
- 4) *M. bovis* infection in humans is mostly foodborne.
- 5) *M. bovis* infection and ZTB in humans is associated with extra-pulmonary TB -however, *M. bovis* airborne transmission among people has been documented, and thus, deserves further attention.





# More “Papers”

## PERSPECTIVE ARTICLE

Front. Public Health | 12 June 2018 | <https://doi.org/10.3389/fpubh.2018.00167>



## Building a Multi-Institutional and Interdisciplinary Team to Develop a Zoonotic Tuberculosis Roadmap

 [Francisco Olea-Popelka](#)<sup>1,2\*</sup> and  [Paula I. Fujiwara](#)<sup>2</sup>


<sup>1</sup>Mycobacteria Research Laboratories, Department of Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Fort Collins, CO, United States

<sup>2</sup>International Union Against Tuberculosis and Lung Disease, Paris, France

THE LANCET  
Infectious Diseases

COMMENT | [VOLUME 18, ISSUE 2, P137-138, FEBRUARY 01, 2018](#)

### A roadmap for zoonotic tuberculosis: a One Health approach to ending tuberculosis

[Anna S Dean](#)  • [Simona Forcella](#) • [Francisco Olea-Popelka](#) • [Ahmed El Idrissi](#) • [Philippe Glaziou](#) • [Amina Benyahia](#) • et al. [Show all authors](#)

Published: February, 2018 • DOI: [https://doi.org/10.1016/S1473-3099\(18\)30013-6](https://doi.org/10.1016/S1473-3099(18)30013-6)



# “The Papers”

Personal View 

THE LANCET  
Infectious Diseases

## Zoonotic tuberculosis in human beings caused by *Mycobacterium bovis*—a call for action



Francisco Olea-Popelka, Adrian Muwonge, Alejandro Perera, Anna S Dean, Elizabeth Mumford, Elisabeth Erlacher-Vindel, Simona Forcella, Benjamin J Silk, Lucica Ditiu, Ahmed El Idrissi, Mario Raviglione, Ottorino Cosivi, Philip LoBue, Paula I Fujiwara

*Mycobacterium tuberculosis* is recognised as the primary cause of human tuberculosis worldwide. However, substantial evidence suggests that the burden of *Mycobacterium bovis*, the cause of bovine tuberculosis, might be underestimated in human beings as the cause of zoonotic tuberculosis. In 2013, results from a systematic review and meta-analysis of global zoonotic tuberculosis showed that the same challenges and concerns expressed 15 years ago remain valid. These challenges faced by people with zoonotic tuberculosis might not be proportional to the scientific attention and resources allocated in recent years to other diseases. The burden of zoonotic tuberculosis in people needs important reassessment, especially in areas where bovine tuberculosis is endemic and where people live in conditions that favour direct contact with infected animals or animal products. As countries move towards detecting the 3 million tuberculosis cases estimated to be missed annually, and in view of WHO's end TB strategy endorsed by the health authorities of WHO Member States in 2014 to achieve a world free of tuberculosis by 2035, we call on all tuberculosis stakeholders to act to accurately diagnose and treat tuberculosis caused by *M bovis* in human beings.

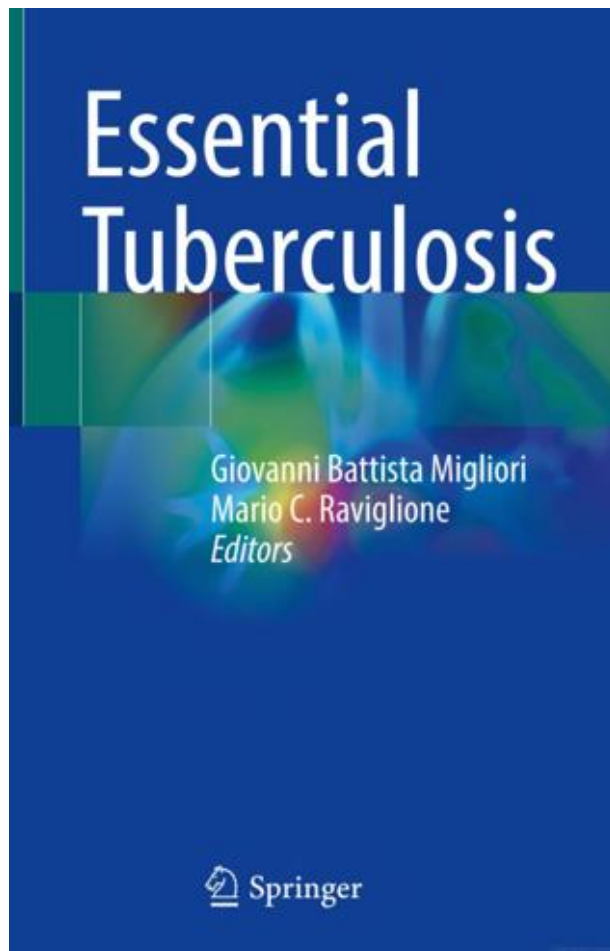
Lancet Infect Dis 2016

Published Online

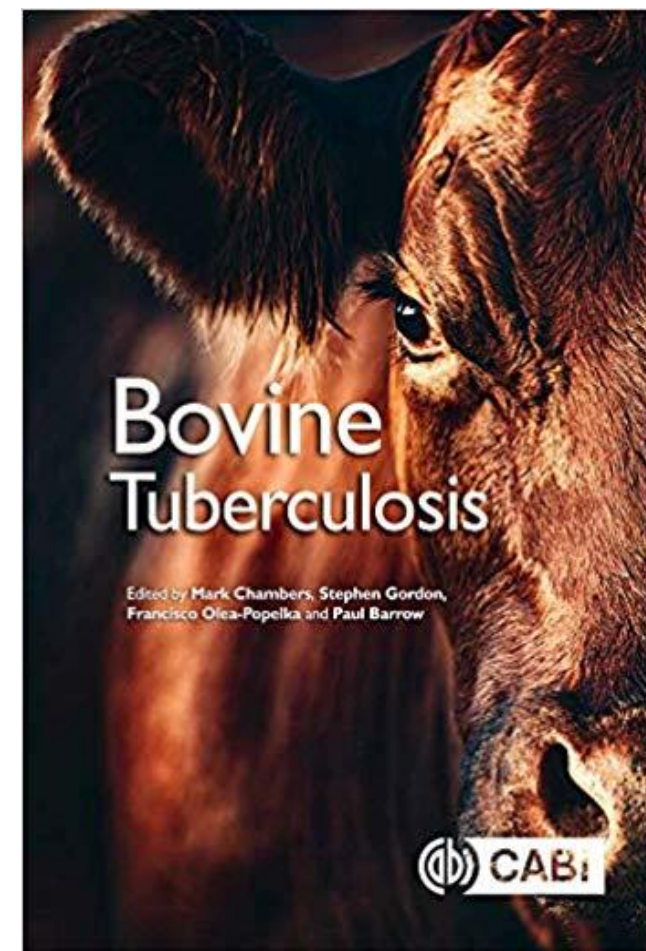
September 30, 2016

[http://dx.doi.org/10.1016/S1473-3099\(16\)30139-6](http://dx.doi.org/10.1016/S1473-3099(16)30139-6)

Department of Clinical Sciences and Mycobacteria Research Laboratories, College of Veterinary Medicine and Biomedical Sciences, Colorado State University, Fort Collins, CO, USA (F Olea-Popelka PhD); Genetics and Genomics, Roslin Institute, Royal (Dick) School of



## The Books



[Essential Tuberculosis](#) pp 359-365 | [Cite as](#)

### A One Health Approach to Zoonotic Tuberculosis

Authors

[Authors and affiliations](#)

Francisco Olea-Popelka , Paula I. Fujiwara, Anna S. Dean

Chapter

First Online: 27 July 2021

215

Downloads

Chapter 2 (Page no: 16)

***Mycobacterium bovis* as the causal agent of human tuberculosis: public health implications.**

Chapter 3 (Page no: 31)

**Economics of bovine tuberculosis: a one health issue.**

# A key moment



Dr. Paula Fujiwara, MD



**Michael Kessler**  
Media consultant  
based in  
Barcelona  
working in the  
field of global  
health  
communications.

## Jove Oliver

Senior Advisor – Communications

Jove Oliver has advised The Union on Communications since February 2014. He brings 15 years of experience in designing and implementing results-driven media, communications and digital strategies to address the major global challenges of our time.

Jove was a director at the Clinton Global Initiative (CGI), leading the communications and marketing departments. In that capacity, Jove was responsible for former President Bill Clinton's media bookings, speechwriting and briefings related to CGI. He oversaw CGI's branding, web development, correspondence, print production and graphic design. Working personally with CGI's membership of heads of state, Fortune 500 CEOs, celebrities and civic leaders gave him a unique insight into how the public and private sectors can collaborate effectively.

Prior to joining CGI, Jove worked for the World Health Organization (WHO) developing social mobilisation and communications strategies for projects in more than 40 countries.



# The Media

## Animal TB threatens human health say vets and doctors

By James Gallagher  
Health and science reporter [redacted] News website

1 October 2016 | Health

Share

By Meera Senthilingam, CNN  
Updated 6:14 AM ET, Mon October 31, 2016



Home / Infectious Diseases

## Zoonotic TB threat to human health 'underestimated'



# ZTB Media coverage



## Bovine TB, a major public health risk

Friday 4 December 2015 18:35  
SABC

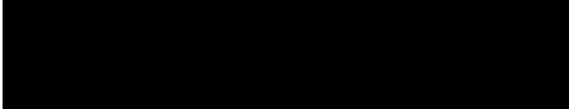


Bovine tuberculosis (TB) is becoming a major public health risk and a growing challenge worldwide. This type of TB is contracted by humans from cattle, and other wildlife. It is contracted via drinking unpasteurised milk, and eating infected meat.

The issue was raised at a World Conference on Lung Health in Cape Town on Friday.

Because the bacteria infecting TB patients are not differentiated, those who have been infected by animals cannot immediately be detected. To compound this, bovine TB is resistant to some

Currently there is not an exact figure on how many people in South Africa are living with latent TB (LTBI).



## Cattle TB can hinder fight against human TB, scientists say

Nurul Isam Habib from Cape Town, South Africa, [bdnews24.com](mailto:bdnews24.com)  
Published: 2015-12-04 21:29:40.0 CoST | Updated: 2015-12-05 18:39:30.0 CoST

Medical students generally know that tuberculosis in cattle can be passed on to humans.

But the ongoing 46th Union World Conference on Lung Health in Cape Town has learnt that this can frustrate ongoing efforts to end human TB by 2030.

Scientists flagged this bovine strain of TB after a study found high rates of zoonotic TB among Nigerian cattle and livestock workers.

Dr Francisco Olea-Popeika, Assistant Professor at the College of Veterinary Medicine and Biomedical

## How animals can give you tuberculosis



**Story highlights**

Editor's Note: *Vital Signs* is a monthly program bringing viewers health stories from around the world.



### Fluffy could give you TB

From your pet cat to the lions of the Kruger Park, animal carriers of TB are becoming an increasing concern as research continues to

INTERNACIONAL NACIONAL CIUDAD JUSTICIA ESTADOS NEGOCIOS CANCHA GENTE CULTURA CIENCIA REVISTA RARI

## Más de Portada

Piden 50 mil cobijas y compran 200 mil

Reclaman esclarecer la muerte de reo

Niega Edomex datos policíacos

Tras no actuar, NL denunciar a CTM

## Alertan sobre tuberculosis bovina

Natalia Vitela  
Cd. de México (24 marzo 2017).- La tuberculosis que los humanos adquieren por la bacteria que afecta a animales es más severa que la causada por la de contagio humano, sin embargo, el País carece de un programa de prevención, diagnóstico y tratamiento de esta primera enfermedad, advirtió Alejandro Perera, médico veterinario mexicano que trabaja en el



La Mycobacterium bovis causa la tuberculosis bovina que puede contagiarse a humanos mediante el consumo de lácteos sin pasteurizar de vacas contaminadas o

## La tuberculosis multirresistente gana visibilidad

MÉDICO.- Cette maladie infectieuse tue près de 5000 personnes par jour. Un congrès mondial qui s'est tenu fin octobre à Liverpool a recensé toutes les avancées contre la bactérie en cause



En 2010, la tuberculosis a tué plus de 1,4 million de personnes en tout à travers le monde. La tuberculose multirésistante (TBM) est devenue un problème mondial de santé publique. Cette maladie infectieuse tue près de 5000 personnes par jour. Un congrès mondial qui s'est tenu fin octobre à Liverpool a recensé toutes les avancées contre la bactérie en cause.

La tuberculose multirésistante (TBM) est devenue un problème mondial de santé publique. Cette maladie infectieuse tue près de 5000 personnes par jour. Un congrès mondial qui s'est tenu fin octobre à Liverpool a recensé toutes les avancées contre la bactérie en cause.

Quatre nouvelles molécules ont été développées et sont en phase avancée de développement clinique. Elles sont destinées à être combinées avec les médicaments existants pour améliorer l'efficacité du traitement.

Le traitement de la TBM est long et complexe. Il nécessite une surveillance étroite et un suivi régulier. Les patients doivent être traités pendant au moins deux ans.

Le diagnostic de la TBM est difficile. Il nécessite des tests spécifiques et une expertise médicale.

La prévention de la TBM est essentielle. Elle implique une surveillance étroite des animaux et une hygiène rigoureuse.



# ZTB Media coverage

zoonotic TB



A Roadmap to beat Zoonotic TB

zoonotic TB



Dr. Francisco Olea-Popelka's Bovine TB Work

One Health Institute at Colorado State University

Search



**دكتور فرانسيسكو أوليا-بوبيلكا**  
"بمجرد إصابة الشخص بالسبل  
الحيواني يمتد المرض لخارج  
الرئة ويصيب أعضاء أخرى  
من جسم الإنسان ما يزيد من  
صعوبة التشخيص والعلاج."

مرض السبل الحيواني

أطباء يحذرون من أن المرض قد يشكل تهديدا كبيرا ونسخة أشد ضرا

20:25 GMT العمل بالمادة 50 للخروج من الاتحاد الأوروبي قبل نهاية شهر آذار مارس المقبل



# Advocacy from policy makers

January 30<sup>th</sup> 2014



**Nick Herbert MP**

Since becoming an MP Nick has worked closely with the international development charity Results on the growing problem of tuberculosis, especially in developing countries. In 2006 he helped to form, and was elected co-chairman of, the All Party Parliamentary Group on Global TB. ←

Nick went to school at Haileybury, from where he won an Open Exhibition to read Law and Land Economy at Magdalene College, Cambridge.

# ZTB now into the Global Plan to Stop TB

## THE PARADIGM

←SHIFT 2016-2020

Stop TB Partnership  
a partnership hosted by United Nations at UNOPS

Global Plan to End TB → END TB

GLOBAL PLAN  
TO STOP TB 2016/2020

Stop TB Partnership



THANK YOU  
for your participation

DOWNLOAD THE CHAPTER / 90-(90)-90 TARGETS



### 3. REACHING KEY POPULATIONS

People affected by zoonotic TB

Zoonotic TB in humans, caused by *Mycobacterium bovis* (the causal agent of bovine TB), is mostly acquired from domestic animals and their products. The general public that consumes unpasteurized milk or untreated animal products from infected animals, people living in rural communities in which bovine TB is endemic, cattle herders, dairy workers, and workers that come in contact with infected animals or animal products are all at a higher risk of contracting zoonotic TB.

The scale of zoonotic TB cases is unknown (due to the lack of adequate diagnostic tests for *M. bovis*) and its measurement complicated by a



April 2016  
ZTB Consultation meeting  
WHO- Geneva, Switzerland



UNIVERSITY OF IBADAN  
*...the first and the best*



Colorado State University  
COLLEGE OF  
VETERINARY MEDICINE  
& BIOMEDICAL SCIENCES



Swiss TPH



WHO and The Union organize  
landmark consultation to galvanize  
action against Zoonotic TB

Zoonotic TB at the WHO- STAG meeting  
June 2016





# UN Political Declaration

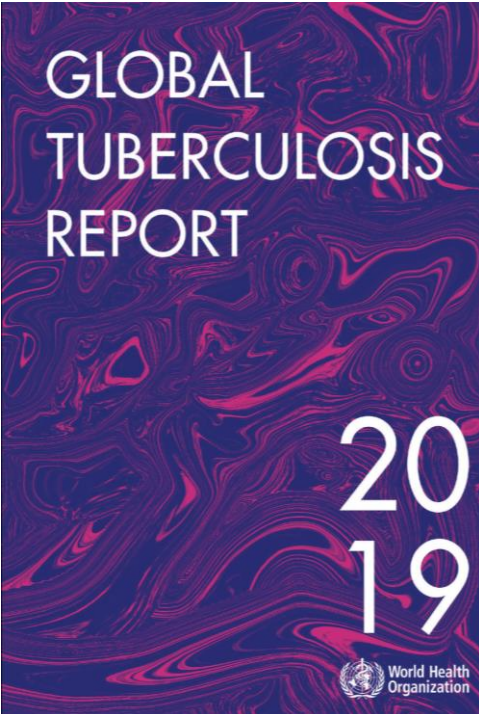
20 July 2018

Excellency,

Further to my letter dated 11 June 2018, I have the honour to enclose herewith a letter dated 20 July 2018 from H.E. Mr. Walton Webson, Permanent Representative of Antigua and Barbuda, and H.E. Mr. Koro Rascho, Permanent Representative of

**are vulnerable or in vulnerable situations, such as women and children, indigenous peoples, health care workers, migrants, refugees, internally displaced people, people living in situations of complex emergencies, prisoners, people living with HIV and AIDS, people who use drugs particularly those who inject drugs, miners and others exposed to silica, urban and rural poor, underserved populations, undernourished people, individuals who face food insecurity, ethnic minorities, people and communities at risk of exposure to bovine tuberculosis, people living with diabetes, people with mental and physical disabilities, people**

Today (since 2019), Zoonotic TB due to *M. bovis* in humans is officially recognized by the WHO



**TABLE B3.4.1**

**Estimated incidence and mortality due to *M. bovis* TB.** Best estimates (absolute numbers) are followed by the lower and upper bounds of the 95% uncertainty interval.

REGION	INCIDENT CASES		DEATHS	
	BEST ESTIMATE	UNCERTAINTY INTERVAL	BEST ESTIMATE	UNCERTAINTY INTERVAL
Africa	72 700	19 500–160 000	9 300	2 460–20 600
The Americas	822	223–1 810	41	11–90
Eastern Mediterranean	7 660	1 930–17 300	654	173–1 450
Europe	1 160	309–2 570	84	23–183
South-East Asia	46 700	11 100–107 000	2 080	548–4 620
Western Pacific	18 000	4 740–40 000	350	92–777
GLOBAL	147 000	71 800–249 000	12 500	4 870–23 700



# Roadmap for Zoonotic Tuberculosis (2017)

<https://apps.who.int/iris/handle/10665/259229>

The Union

International Union Against  
Tuberculosis and Lung Disease  
Health solutions for the poor



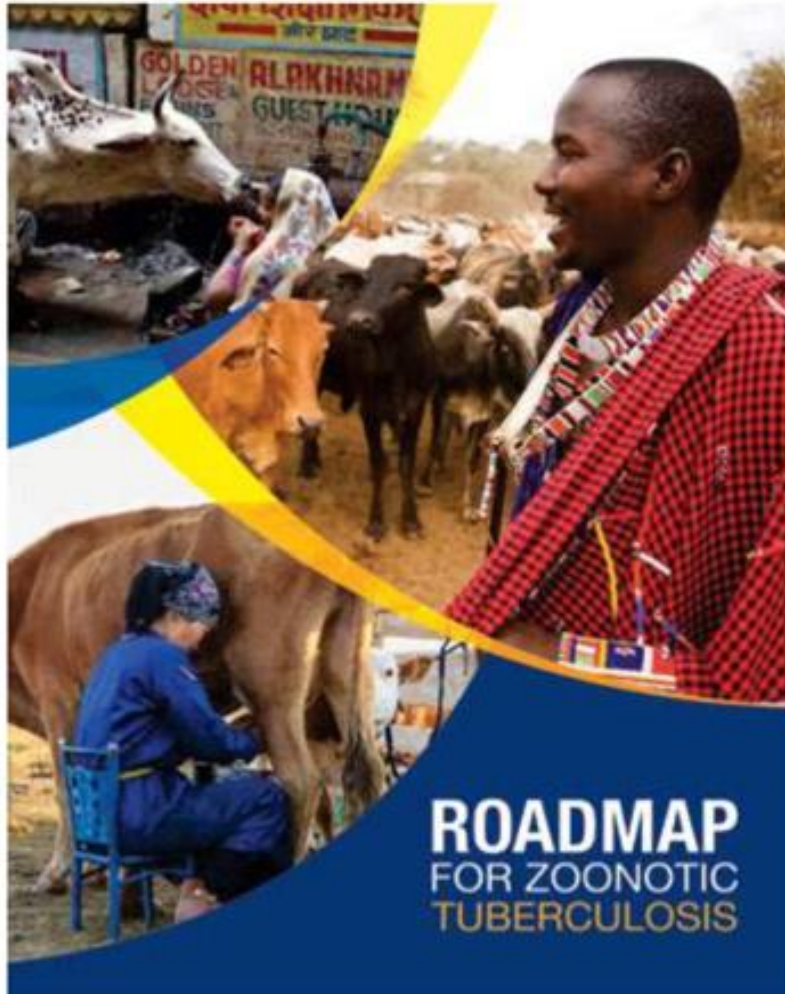
World Health  
Organization



World  
Organisation  
for Animal  
Health



Food and Agriculture  
Organization of the  
United Nations



# 10

## PRIORITIES FOR ADDRESSING ZOOONOTIC TB

### IMPROVE THE SCIENTIFIC EVIDENCE BASE

1. Collect and report more complete and accurate data
2. Improve diagnosis in people
3. Address research gaps

### REDUCE TRANSMISSION AT THE ANIMAL-HUMAN INTERFACE

4. Ensure safer food
5. Improve animal health
6. Reduce the risk to people

### STRENGTHEN INTERSECTORAL AND COLLABORATIVE APPROACHES

7. Increase awareness, engagement and collaboration
8. Develop policies and guidelines
9. Implement joint interventions
10. Advocate for investment

## STRENGTHEN INTERSECTORAL AND COLLABORATIVE APPROACHES

7. Increase awareness, engagement and collaboration
8. Develop policies and guidelines
9. Implement joint interventions
10. Advocate for investment

2020 - 2021

## The Global Fund

*One Health input paper for the GF strategy development by the Germany Constituency*

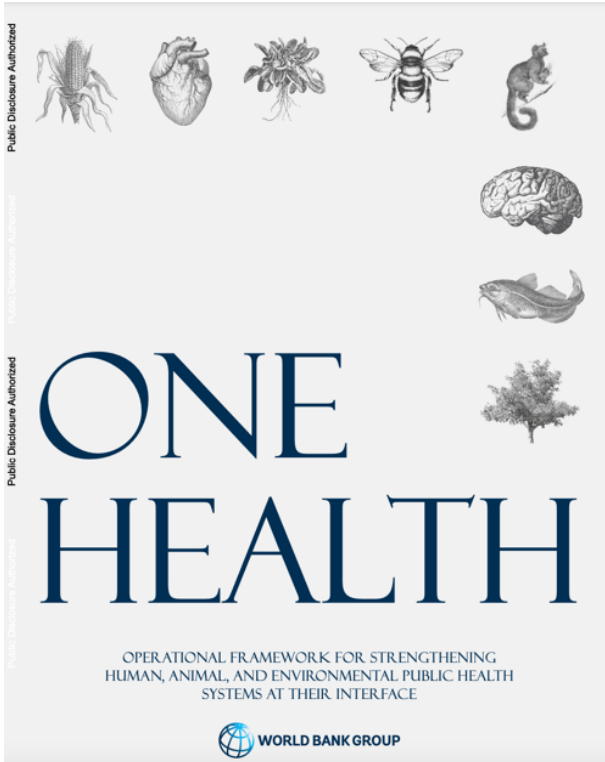
*04/02/2021*

### **Integration of the One Health approach into the work of the Global Fund to Fight AIDS, TB and Malaria**

Input paper by the Germany Constituency as a contribution to strategy development<sup>1</sup>

#### **Executive Summary**

World leaders at several high-level meetings have called for a multi-disciplinary “One Health” approach to improve Global Health Security and to fight future pandemics on the basis of lessons learned from the COVID-19 pandemic. As the Global Fund to Fight AIDS, Tuberculosis and



# In 2020 I created the [ztbnetwork.org](https://ztbnetwork.org)

## THE ZOONOTIC TUBERCULOSIS NETWORK

Membership About Us What is ZTB? News Events Information Opportunities More

francis...

### THE ZTB NETWORK VISION:

Connecting stakeholders working towards addressing the challenges posed by zoonotic tuberculosis

## THE ZOONOTIC TUBERCULOSIS NETWORK

Home What is ZTB? About Us Media Events Publications and Books Scientific Publications Forum More

### MEDIA

#### THE LATEST ZTB VIDEOS

<p>Timpiyan Leseni: Tuberculosis Advocate (2019)</p>	<p>Timpiyan Leseni: ZTB Treatment Adherence (2017)</p>
<p>Dr. Olea Popelka Bovine Tuberculosis Animation (2016)</p>	<p>A Roadmap to Beat Zoonotic Tuberculosis (2016)</p>

## THE ZOONOTIC TUBERCULOSIS NETWORK

Home What is ZTB? About Us Media Events Publications and Books Scientific Publications Forum More

francis...

<p><b>Dr. Simeon Cadmus, DVM</b> Department of Veterinary Public Health and Preventive Medicine University of Ibadan Nigeria</p>	<p><b>Dr. Paula Fujiwara, MD</b> Scientific Director The International Union Against Tuberculosis and Lung Disease Paris, France</p>
<p><b>Dr. Alejandro Perera, DVM</b> USDA-APHIS Mexico City</p>	<p><b>Dr. Fred Quinn, PhD</b> Professor Department Head Infectious Diseases University of Georgia United States of America</p>
<p><b>Dr. Ellen Brooks Pollock</b> University of Bristol</p>	<p><b>Dr. Anna Dean, DVM</b> The World Health Organization Geneva, Switzerland</p>
<p><b>Dr. James Sunstrum, MD</b> Beaumont Health System, Dearborn, Michigan, United States of America</p>	<p><b>Dr. Michele Miller, DVM, PHD</b> Stellenbosch University, South Africa</p>
<p><b>Michael Kesler</b> Media Consultant The International Union Against Tuberculosis</p>	<p><b>Dr. Clovice Kankya</b> Makerere University, Uganda</p>

# 2020 - 2021

## Economist, Anthropologist, Veterinarian

Health at every level: a systems approach to bring holistic, innovative, and scalable protections against tuberculosis in high burden settings

Miller T, Stockbridge, E, Spence E, Olea Popelka F, Heaton, C, Pagán, J, Navario PS, Boufford J,  
University of North Texas Health Science Center Health  
Western University  
University of New York



**5 Million US Dollars for a 5 Years Project**

**Approved, but funding not allocated to this project (September 2021)**





# 2020-2022

## Affected People/Communities

### Timpiyan Leseni Maasai Community



The screenshot shows the website for Talaku Community, which is focused on eradicating TB. The navigation menu includes Home, About Us, Projects undertaken, Gallery, Blog, and Contact Us. A search bar is also present. The main content area features a large photograph of a busy outdoor market place with many people and livestock. A green text box overlaid on the bottom of the photo reads: "Market place sensitization where Maasai men meet to sell their livestock".



**TIMPIYAN LESENI**

Zoonotic TB Survivor

"I suffered from abdominal TB as a consequence of my cultural traditions of drinking unpasteurized milk. I am now working to educate my community on how to fight zoonotic TB through my civil society organization *Talaku*".



# Review, approval, and involvement of key Government Stakeholders



Kenyan Medical  
Research Institute  
Ethical Review



National Commission  
for Science, Technology  
& Innovation



MOH  
National Tuberculosis, Leprosy  
and Lung Disease Program



Kajiado County  
Government

# Anthropologist / Public Health

School of Health Studies



ABOUT ▾

UNDERGRADUATE ▾

ACADEMIC COUNSELLING ▾

GRADUATE ▾

RESEARCH ▾

Home > About > Faculty Members > Elysée Nouvet, PhD

## About SHS

[Administration & Staff](#)

[Faculty Members](#)

[Strategic Planning](#) ↗

[Request IT Support](#) ↗

[Online Teaching and Learning Support](#) ↗

[Join our Team: Faculty Position Postings](#) ↗

## Elysée Nouvet, PhD



Assistant Professor

Room 215, HSB  
519 661-2111 x82217  
[enouvet@uwo.ca](mailto:enouvet@uwo.ca)

### Education and Training

- Postdoctoral Fellowship (McMaster)
- PhD (York)
- MA (Concordia)
- MA (Goldsmiths College; University of London)

### Academic Appointments

- McMaster University: Department of Health Evidence, Methods, and Impact

### Supervising Graduate Students

- Yes

# Understanding and Addressing the Realities, Experiences, and Challenges of **Community Health Volunteers** as Agents for Behaviour Change in the Context of Human and Zoonotic Tuberculosis in Kajiado County, Kenya



Western Strategic Support for SSHRC Success  
2020 Open Research Grant Application Form

## Applicant & Project Information

### Principal Investigator:

Name:	Francisco Olea Popelka	
Email:	<a href="mailto:foleapop@uwo.ca">foleapop@uwo.ca</a>	Extensi
Department or School:	Pathology and Laboratory Medicine	
Faculty:	Schulich School of Medicine & Dentistry	
Rank (e.g. Prof., Associate Prof., Assistant Prof.,	Associate Professor	





## The experiences and challenges of community health volunteers as agents for behaviour change programming in Africa: a scoping review

Mary Ndu, Ellena Andoniou, SORCHA McNALLY, Francisco Olea Popelka, Marisa Tippet & Elysée Nouvet

To cite this article: Mary Ndu, Ellena Andoniou, SORCHA McNALLY, Francisco Olea Popelka, Marisa Tippet & Elysée Nouvet (2022) The experiences and challenges of community health volunteers as agents for behaviour change programming in Africa: a scoping review, *Global Health Action*, 15:1, 2138117, DOI: [10.1080/16549716.2022.2138117](https://doi.org/10.1080/16549716.2022.2138117)

To link to this article: <https://doi.org/10.1080/16549716.2022.2138117>



© 2022 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 31 Oct 2022.

# Research Projects with Talaku – Kenya

Evaluation of healthcare facilities and services provided for tuberculosis and zoonotic tuberculosis within the rural Maasai Community in Kajiado County



Joel Zhang, MSc

## Response/Participation Rate

Data collected between Jan-Feb, 2022

25/25 (100%) of healthcare facilities  
69/75 (92%) of healthcare workers





# Assessment of Rabies Control in Rural Areas in Victoria Falls, Zimbabwe



# Rabies and One Health

- **Viral Zoonotic disease**
- Globally, 60,000 people die of rabies every year (*WHO, 2020*)
  - >99% of cases from **dog bites**
  - **40%** of victims are **children under 15 years old**
  - 95% of deaths occurs in Asia & Africa
- Case fatality rate = 100%\*
- Rabies: a model for the **One Health Approach**
  - **Mass dog vaccinations** – vaccination of 70% of the dog population breaks rabies transmission
  - **Access to Post-exposure prophylaxis (PEP)** – wound management, human rabies vaccines, rabies Ig
  - **Awareness and Community engagement**





# ***“If you want to go fast go alone, if you want to go far go together”***

*-African Proverb*

**Ryan LaPenna, MSc**

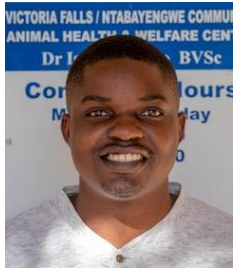


**Veterinarians for Animal Welfare Zimbabwe**

**Dr. Chris Foggin**



**Dr. Isaac Moyo**



**Supervisor**

**Dr. Francisco Olea Popelka**



**Onderstepoort Veterinary institute**

**Dr. Claude Sabeta**



**Victoria Falls Wildlife Trust**

**Jessica Dawson, CEO**



# Response/Participation Rate

500 surveys completed  
100% response/participation rate



x500





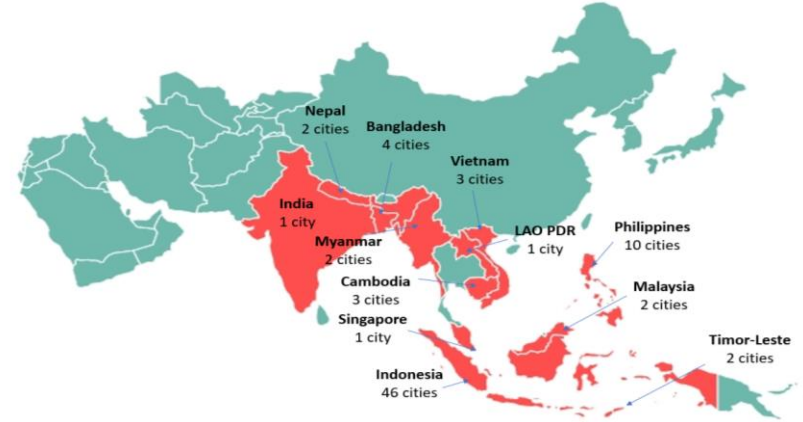
# APCAT

Asia Pacific Cities Alliance  
for Health and Development

Original Goal: curb rampant growth of tobacco use → reduced NCD rates

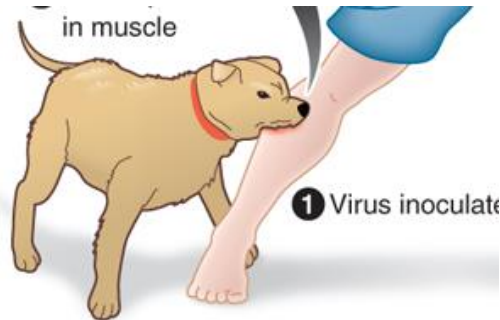


- Regional alliance of **Mayors**, sub-national leaders
  - **78 cities**,
  - **12 countries.**



### Structure

- **BOD of Mayors and Advisory Council (MOHs)**
- **Management Unit**
- **Partners** (WHO, Donors, NGOs, Universities, Public Health, activists)
- **APCAT Parliamentarians** policy development, resource management, implementation at national and subnational levels
- **APCAT Media** -- info sharing, best practice (Journalists)



**Our Project:**  
**Vaccinate 200,000 dogs in BALI-INDONESIA against Rabies**





**APCAT**  
Asia Pacific Cities Alliance  
for Health and Development

The Union

International Union Against  
Tuberculosis and Lung Disease



World Organisation  
for Animal Health  
Founded as OIE



# Multisectoral Partnership in Prevention of Rabies Through *One Health*

7 July 2022  
Prime Plaza Hotel Sanur



**APCAT Summit**  
7 Dec. 2021

Introduction of One Health

**One Health High-level Webinar**  
2 June 2022

Subnational leadership in One Health

**Multisectoral partnership in One Health – rabies prevention in Bali**  
7 July 2022

Actions in rabies control through One Health in Bali

**Inter-ministerial meeting – Indonesia**  
13 July 2022

Inter-ministerial coordination in rabies prevention, Indonesia



NOVEMBER 16, 2022

# G20 Bali Leaders' Declaration

 [BRIEFING ROOM](#) [STATEMENTS AND RELEASES](#)

THE WHITE HOUSE



[Administration](#) [Priorities](#) [The Record](#)

sustainably produce and distribute food, ensure that food systems better contribute to adaptation and mitigation to climate change, and halting and reversing biodiversity loss, diversify food sources, promote nutritious food for

THE WHITE HOUSE



[Administration](#)

[one health](#)

production and supply of COVID-19 diagnostics and therapeutics. We remain committed to embedding a multisectoral **One Health** approach and enhancing global surveillance, including genomic surveillance, in order to detect pathogens and antimicrobial resistance (AMR) that may threaten human health. To enable global pathogen surveillance as part of our commitment to implement the IHR (2005), we encourage sharing of pathogen data in a timely manner on shared and trusted platforms in collaboration with WHO. We encourage sharing of benefits arising from the utilization of pathogens consistent with applicable national laws.



# One Health Cases

Real life examples of One Health in practice

Search

[Advanced Search](#)

## **The role of sub-national leaders implementing the One Health approach**

Bam Tara Singh<sup>1,2</sup>, Fujiwara Paula I.<sup>2</sup>, Abila Ronello<sup>3</sup>; Furco André<sup>3</sup>, Karapan Sabita<sup>1</sup>, Aditama Tjandra Yoga<sup>2</sup>, Duana Made Kerta<sup>4</sup>, Bam Tanu<sup>5</sup>, Bhambal Prabodh<sup>2</sup>, Ryan LaPenna<sup>6</sup>, and Olea Popelka Francisco<sup>6,7</sup>

<sup>1</sup>International Union Against Tuberculosis and Lung Disease, Singapore, <sup>2</sup>Asia Pacific Cities Alliance for Health and Development, Singapore <sup>3</sup>World Organisation for Animal Health, Bangkok, Thailand <sup>3</sup>

<sup>4</sup>Indonesian Public Health Association, Bali, Indonesia, <sup>5</sup>International Medical University, Kuala Lumpur <sup>6</sup>Department of Pathology and Laboratory Medicine and <sup>6</sup> Department of Epidemiology and Biostatistics, Schulich School of Medicine & Dentistry, University of Western Ontario, Canada.



# INTERNATIONAL BUSINESS INSTITUTE

The IBI aims to be a premier global forum for research, teaching, and outreach on international business.

## INTERNATIONAL BUSINESS INSTITUTE

# About the 39 Country Initiative

[International Business](#) > [39 Country Initiative](#) > [About the 39 Country Initiative](#)

## Who we are

Founded in 2010 by Prof. Paul Beamish, the 39 Country Initiative is housed in the International Business Institute at the Ivey Business School. The initiative supports the world's poorest 39 countries, as defined by a per capita income of less than \$2,000 USD annually. It leverages [Ivey Publishing's](#) vast collection of case studies and teaching materials and has built a [global network of schools](#) supporting its key activities.

## Our vision

## Our mission

# Dr. Paul Beamish



# COVID-19 and Mink

## A Case Study



W26104

### MINK FARMING AND COVID-19<sup>1</sup>

*Paul Beamish, Francisco Olea-Popelka, and Alex Beamish wrote this case solely to provide material for class discussion. The authors do not intend to illustrate either effective or ineffective handling of a managerial situation. The authors may have disguised certain names and other identifying information to protect confidentiality.*



W26105

### Teaching Note

### MINK FARMING AND COVID-19<sup>1</sup>

*Paul Beamish, Francisco Olea-Popelka, and Alex Beamish wrote this teaching note as an aid to instructors in the classroom use of the case Mink Farming and COVID-19, No. W26104. This teaching note should not be used in any way that would prejudice the future use of the case.*



# Climate Change, Sustainable Food Systems and Health Nexus

WesternU.ca Popular Links

## Western Research

RESEARCH SUPPORT ▾ FUNDING ▾ OVERSIGHT & COMPLIANCE ▾ RESEARCH EXCELLENCE ▾ ABOUT US ▾

Home > Funding > Internal > Interdisciplinary Development Initiatives

### Find Funding

- ROLA Funding Opportunities
- Pivot Expertise Database

Internal

- Western Innovation Fund
- Western Strategic Support
- Interdisciplinary Development Initiatives
- Bell-Western 5G Research Grant

### Interdisciplinary Development Initiatives



WesternU.ca Popular Links

## Department of Geography and Environment

Western SocialScience

ABOUT US ▾ UNDERGRADUATE ▾ GRADUATE ▾ RESEARCH ▾ PEOPLE ▾ RESOURCES ▾

Home > People > Faculty > Isaac Luginaah


ENHANCED BY Google Go

### People

- Administration
- Staff
- Full Time Faculty
- Part Time Faculty
- Adjunct Faculty
- Cross Appointments
- Emeritus Faculty

### Isaac Luginaah

**Professor**  
Canada Research Chair, Health Geography



Contact Information  
Office: Room 1409, SSC  
Tel: 519 661-2111, 86944  
E-mail: iluginaa@uwo.ca

Research Areas  
Geography of Health and Health Care; Environment and Health; Advanced Studies in Environment, Development & Health

# Achieving Research and Knowledge Translation Capacity for Climate Change Resilience, Food Security and Sustainable Livelihoods in West Africa

## Queen Elizabeth Scholars (QES) Grant

### Department of Geography and Environment

WesternU.ca Popular Links



ENHANCED BY Google Go

- ABOUT US
- UNDERGRADUATE
- GRADUATE
- RESEARCH

Home > People > Faculty > Isaac Luginaah

### People

- Administration
- Staff
- Full Time Faculty
- Part Time Faculty
- Adjunct Faculty
- Cross Appointments
- Emeritus Faculty

## Isaac Luginaah

Professor

Canada Research Chair, Health Geography



#### Contact Information

Office: Room 1409, SSC  
Tel: 519 661-2111, 86944  
E-mail: [iluginaa@uwo.ca](mailto:iluginaa@uwo.ca)

#### Research Areas

Geography of Health and Health Care  
Environment, Development & Health

- EVENTS & NEWS
- ABOUT THE INSTITUTE
- YOUNG SCHOLARS
- QES PROGRAM
- RESEARCH & SCHOLARSHIP

Home > QES Program

### QES Program

Call for Scholars

Alumni

### QES Program



QUEEN ELIZABETH  
*Scholars boursiers*  
de la REINE ELIZABETH



ENHANCED BY Google

- ABOUT THE INSTITUTE
- FACULTY
- QE II SCHOLARS
- RESEARCH & SCHOLARSHIP

Home > Faculty > Dr. Saverio Stranges

### Meet Our Faculty

- Faculties
- Directory of Faculty Members
- Sustainable Development Goals

## Dr. Saverio Stranges



Professor and Chair, Department of Epidemiology and Biostatistics

Office: Kresge, K201-B  
Telephone: 519-661-2111 x 86267  
Email: [saverio.stranges@uwo.ca](mailto:saverio.stranges@uwo.ca)  
Website: [http://www.schulich.uwo.ca/epibio/people/core\\_faculty/dr\\_saverio\\_stranges.html](http://www.schulich.uwo.ca/epibio/people/core_faculty/dr_saverio_stranges.html)  
Curriculum Vitae

The Queen Elizabeth Scholars (QES) program helps young Canadians grow into global citizens through international student exchange and civic engagement, while promoting Canada as a destination for the world's top talent and international research leaders.



# Dr. Anna Gunz: Medical Director Children's Environmental Health Clinic Ontario (ChEHC ON)



Schulich MEDICINE & DENTISTRY Schulich School of Medicine & Dentistry


ABOUT THE SCHOOL ▾ FUTURE STUDENTS ▾ EDUCATION PROGRAMS ▾ DEPARTMENTS ▾ RESEARCH ↗ ALUMNI ↗

Home > About the School > News > 2021 > October > Feature: Meeting the challenge of the climate crisis

ENHANCED BY Google Go

**About the School** **Feature: Meeting the challenge of the climate crisis**

- COVID-19 Planning, Updates, Recovery, Return to Campus
- The Dean's Office
- Who We Are
- Major Initiatives
- News
  - 2022
  - 2021
    - January
    - February

 Dr. Anna Gunz says that climate change is the biggest health crisis of our lifetime.



## Indigenous Health

**Dr. Gerald McKinley**

**Dr Stephanie Frisbee**



## Social Determinants of Health

# University of Guelph - OVC - OHI

UNIVERSITY OF GUELPH  
Centre for Public Health and Zoonoses

About Us Events Resources



## One Health Poster Day 2020

One Health Seminar & Poster Day  
Nov. 3, 2020 | 9:30AM – 2:00PM (EST) | Virtual

Schulich MEDICINE & DENTISTRY  
Olea-Popelka One Health

ONE HEALTH RESEARCH PEOPLE PUBLICATIONS NEWS ABOUT US


Home > Research > One Health Research Day

ENHANCED BY Google Go

## Research

- Research Projects
- Wildlife
- One Health Research Day
- Research Opportunities
- Schulich Medicine & Dentistry Research
- Western Research

## One Health Research Day 2021



UNIVERSITY OF GUELPH  
OPENED OPEN LEARNING AND EDUCATIONAL SUPPORT

About Us Courses, Programs & Events Current Students Instructor Resources English Language Programs

## ONE HEALTH AND DEVELOPMENT FOR A WORLD UNDER PRESSURE

A collaborative symposium for scholars in Global Health, Development Studies and One Health

May 9-11, 2022 | Online and In Person (University of Guelph, Canada)

## One Health and Development Symposium Panel Discussion Taking Action



Dr. Francisco Olea Popelka, DVM, MSc, PhD  
Beryl Ivey Chair in One Health  
Western University  
London, Ontario, Canada

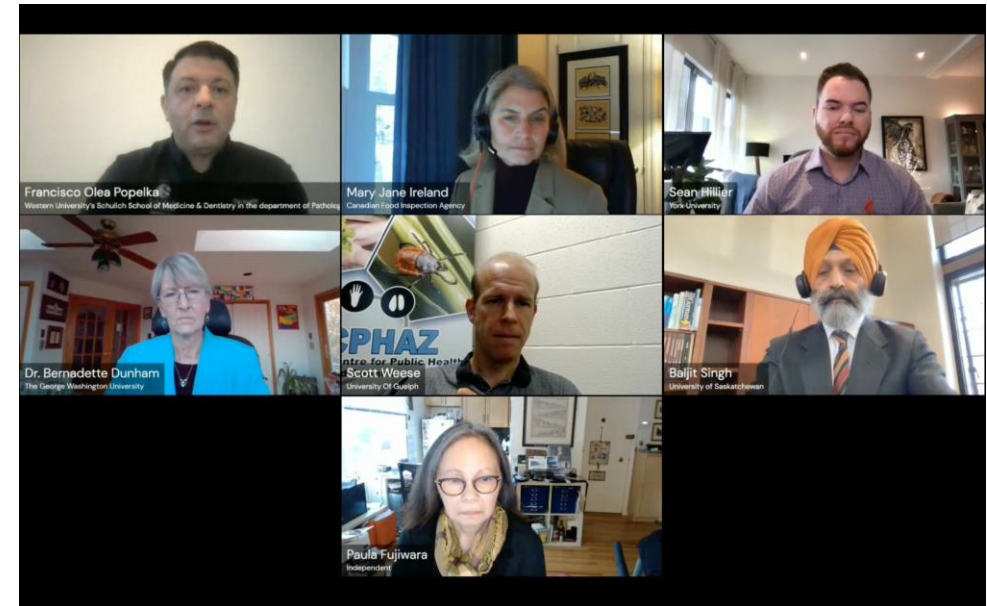


University of Guelph  
May 11, 2022



# Canadian Science Police Conference: 2021

Organized by: University of Guelph



**Scott Weese** – Scientist/Researcher, University Of Guelph

**Bernadette Dunham** – Professional Lecturer, The George Washington University

**Mary Jane Ireland** – Executive Director of the Animal Health Directorate, Policy and Programs Branch, Canadian Food Inspection Agency (CFIA)

**Baljit Singh** – Vice-President Research, University of Saskatchewan

**Paula I. Fujiwara** – Former Scientific Director, International Union Against Tuberculosis and Lung Disease (The Union)

**Sean Hillier** – Scientist/Researcher, York University

**Moderator:** Francisco Olea-Popelka – Western University's Schulich School of Medicine & Dentistry in the Department of Pathology and Laboratory Medicine



**Schulich**  
MEDICINE & DENTISTRY

# Pathology and Laboratory Medicine

UNDERGRADUATE ▾ GRADUATE & POSTDOCTORAL ▾ POSTGRADUATE ▾ RESEARCH ▾ PEOPLE ▾ ABOUT US ▾

Home > Undergraduate > One Health  Go

## Undergraduate

- Bachelor of Medical Sciences (BMSc)
- Medicine
- Dentistry
- Nursing

## One Health

## Related Links

- > OWL
- > Bachelor of Medical Sciences (BMSc)

**Schulich**  
MEDICINE & DENTISTRY

# Pathology and Laboratory Medicine

UNDERGRADUATE ▾ GRADUATE AND POSTDOCTORAL ▾ POSTGRADUATE ▾ RESEARCH ▾ PEOPLE ▾ ABOUT US ▾

Home > Graduate and Postdoctoral > Research Based Graduate Programs > Programs > MSc and PhD  Go

## Graduate and Postdoctoral

### Research Based Graduate Programs

- Future Students
- Programs
  - MSc and PhD
  - Oral and Maxillofacial Surgery
  - MD/PhD Program
- Course Requirements
- Policies and Regulations
- Financial Support
- Departmental Awards
- Research Based Program Forms
- Career Information

## MSc and PhD

- Pathology
- ▾ One Health

### 3. Reflection / Take home message





One Health focuses on integrating different siloes (*disciplines, sectors*)



**“Local solutions, by local stakeholders, to local problems”**

# One Health

**Collaboration across sectors and disciplines is critically needed.**

To improve health:

**“science & medical knowledge are 100% necessary, but not sufficient”**

*Dr. Olea-Popelka, India November 2019, The Union Annual TB Conference*



**Thanks for your attention.  
Questions?**

