

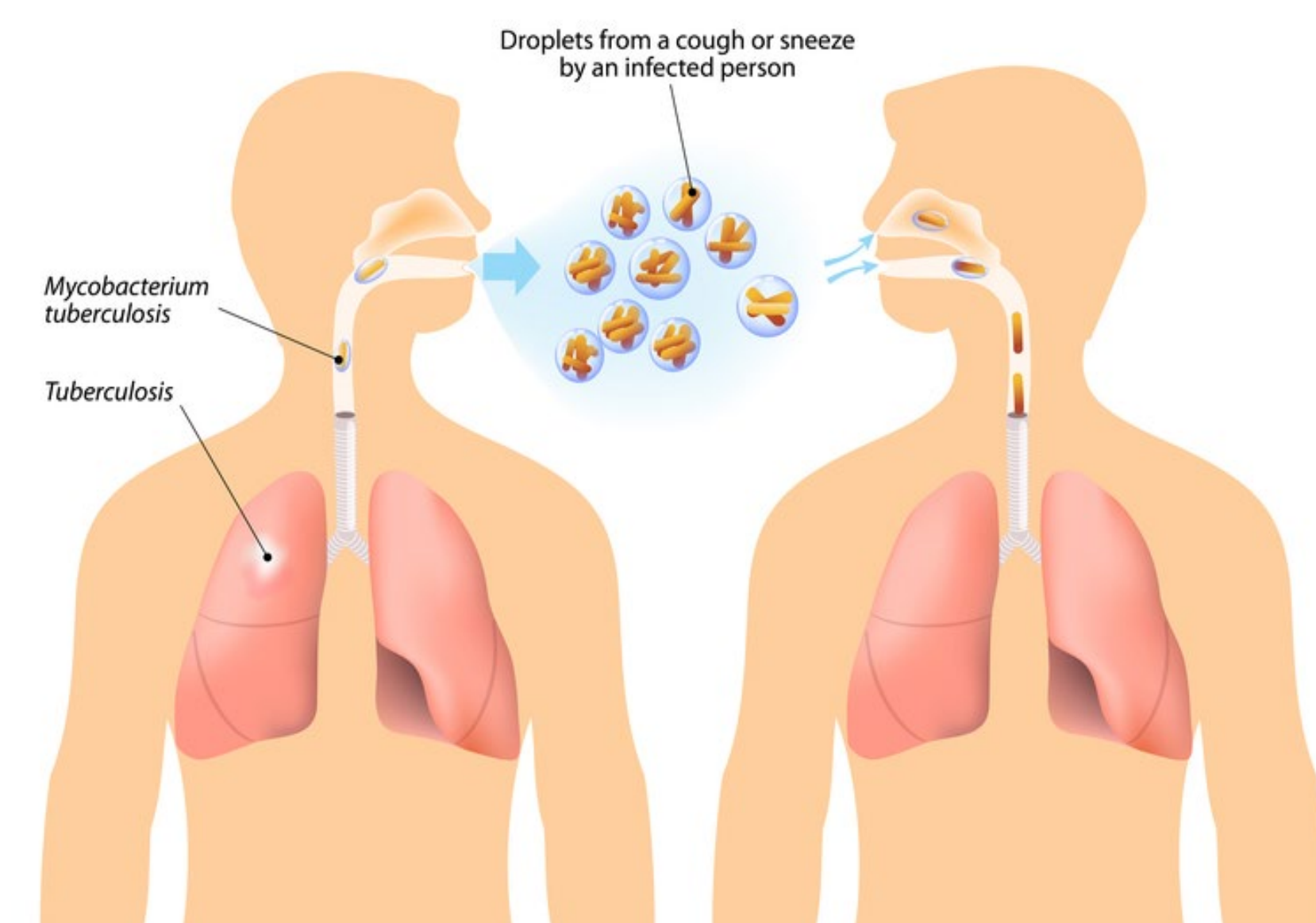
## Abstract

The objective of this project is to test for possible correlation between the trend of Tuberculosis incidence rate in the US and the Tuberculosis incidence rate in Puerto Rico from 1993 to 2017. Data from CDC Wonder- Online Tuberculosis Information System and Pearson Correlation test were used to investigate the relationship. Analysis shows a positive association and a significant correlation between TB incidence rate between both region during the 26-year timeframe. This result has the potential for in-depth future research to identify the common variables and causes for the positive correlation.

## TUBERCULOSIS

### What is TB?

- Lung disease- Mycobacterium tuberculosis<sup>1</sup>.
- Airborne aerosol (Highly infectious)<sup>2</sup>.
- Effect kidney, spine and other major organs<sup>2</sup>.



Source: health.harvard.edu<sup>13</sup>

## Background

- Tuberculosis is one of the top leading cause of death in the world<sup>3</sup>.
- In 2018, estimated 10 million new cases of TB was recorded with about 1.5 million deaths<sup>3</sup>.
- Why is TB so prevalent: difficulty in diagnosing, lack of medical infrastructure, low vaccine access, low reportings, increase in HIV/immunosuppressed cases and drug resistance<sup>4,5,6</sup>.
- World's tuberculosis incidence rate is reducing at 1.5%;
  - WHO's goal of 5% reduction in 2020 and 10% in 2025<sup>7</sup>.
- In 2017, US had reported around 2.8 new cases of TB per 100,000<sup>9</sup>
- Puerto Rico had even lower incidence rates of about 1.5 TB cases per 100,000<sup>8</sup>.

## Research focus:

- Identify candidate countries with steady decrease in TB incidence rate over 25 years (1993-2017)

## Hypothesis:

- There is a significant, positive correlation between Tuberculosis incidence rate trend in US and the Tuberculosis incidence-rate trend in Puerto Rico from 1993 to 2017.

Year	US Rate per 100,000	PR Rate per 100,000
2017	2.8	1.2
2016	2.86	2.03
2015	2.97	1.5
2014	2.95	1.24
2013	3.02	1.36
2012	3.16	1.95
2011	3.37	1.36
2010	3.59	2.15
2009	3.75	1.68
2008	4.24	2.53
2007	4.41	2.59
2006	4.6	2.94
2005	4.76	2.96

Year	US Rate per 100,000	PR Rate per 100,000
2004	4.95	3.21
2003	5.11	3.01
2002	5.23	3.37
2001	5.6	3.17
2000	5.78	4.57
1999	6.27	5.26
1998	6.63	5.32
1997	7.24	6.84
1996	7.87	5.96
1995	8.53	7.11
1994	9.2	7.51
1993	9.66	7.11

## Correlations

		US Rate per 100,000	PR Rate per 100,000
US Rate per 100,000	Pearson Correlation	1	.974**
	Sig. (2-tailed)		.000
	N	26	26
PR Rate per 100,000	Pearson Correlation	.974**	1
	Sig. (2-tailed)	.000	
	N	26	26

\*\* Correlation is significant at the 0.01 level (2-tailed).

## Trend between US and PR

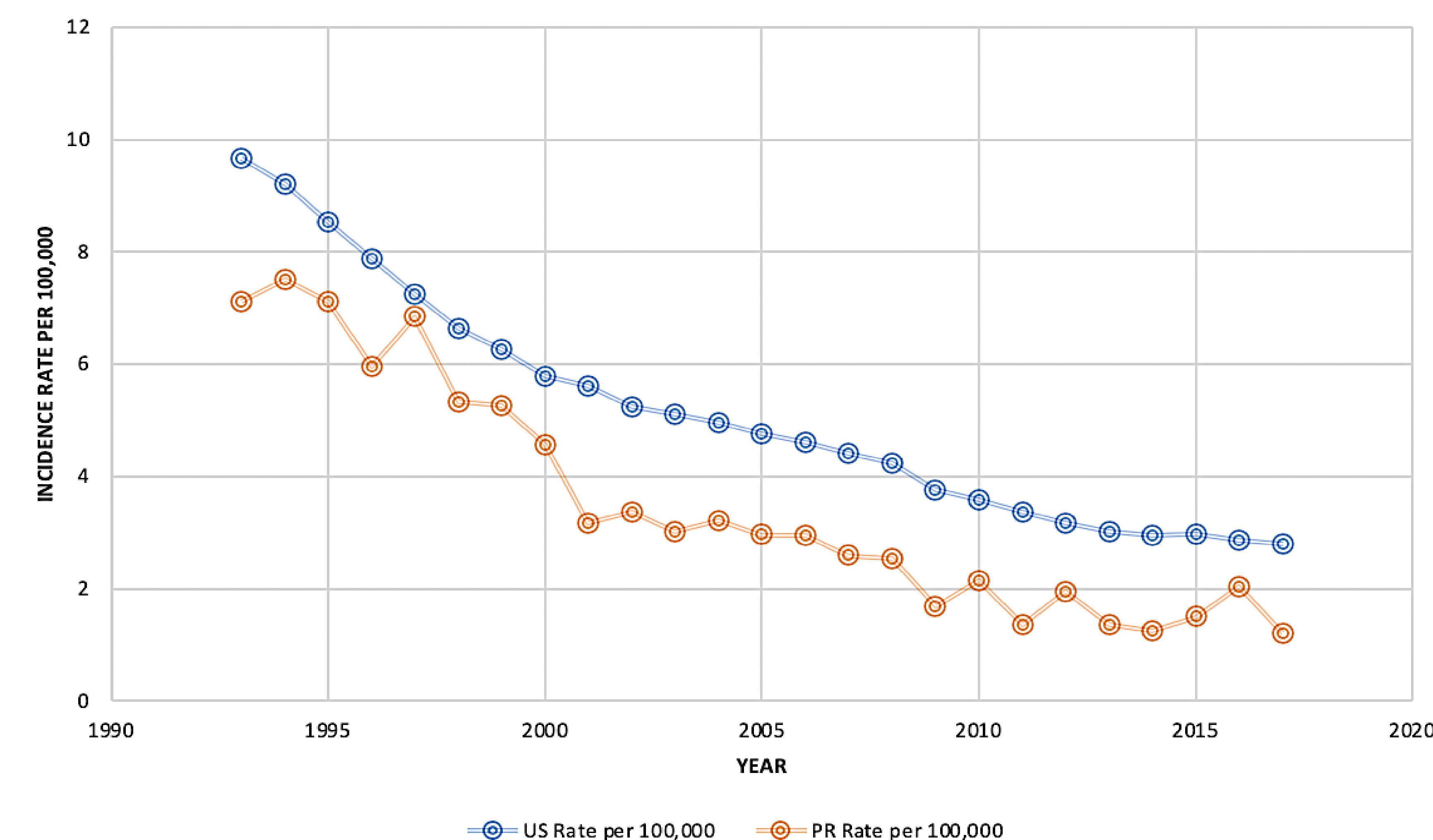


Figure 1: Graph of the Tuberculosis Incidence rate (per 100,000) between 1993 and 2017. A steady and constant decline is seen for both the US and Puerto Rico.

## Methods

Data Collection: CDC wonder database

- "Online Tuberculosis Information System" was used to select TB-incidence rate data from year 1993 to 2017 for US and PR.
- Data Analysis: Pearson Correlation test (Sample size, n=26)
- The dependent variable: TB incidence rate per 100,000 in US, and TB incidence rate per 100,000 in Puerto Rico.
- The independent variable: Timeline from 1993 to 2017.

## Conclusion

- There is a strong, positive and significant correlation between the TB incidence rate of US and Puerto Rico from 1993 to 2017.

## Future Direction

- Identify possible causes for the decline in TB incidence rate
  - Public Health policies, socio-economic development, fighting risk factors, better medical education, Infection control, and improvement in diagnosis/TB Therapy could have caused the decline in TB incidence rate<sup>11,12</sup>.
- Cross-reference both regions for same/similar healthcare efforts that have enabled decreased TB spread
  - Apply these programs globally to combat the spread of Tuberculosis

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