Reductions Caused By Improved Living Conditions Prior To Vaccines

Measles Disease Mortality
United States, 1900–1960

Year
Rate Per 100,000

1900 1920 1940 1960

First Vaccine Licensed (1963)

SOURCES:
Reductions Caused By Improved Living Conditions Prior To Vaccines

Diphtheria Disease Mortality
United States, 1900–1960

Year
Rate Per 100,000

Combination Diphtheria Tetanus Toxoids Licensed (1947)

Sources:
### Whooping Cough Disease Mortality

**United States, 1900–1960**

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate Per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>20.0</td>
</tr>
<tr>
<td>1910</td>
<td>18.0</td>
</tr>
<tr>
<td>1920</td>
<td>16.0</td>
</tr>
<tr>
<td>1930</td>
<td>14.0</td>
</tr>
<tr>
<td>1940</td>
<td>12.0</td>
</tr>
<tr>
<td>1950</td>
<td>10.0</td>
</tr>
<tr>
<td>1960</td>
<td>8.0</td>
</tr>
</tbody>
</table>

**SOURCES:**

2. Before the availability of pertussis vaccine in the 1940s, more than 200,000 cases of pertussis were reported annually. “Centers for Disease Control and Prevention. Epidemiology and Prevention of Vaccine-Preventable Diseases. Hamborsky J, Kroger A, Wolfe S, eds. 13th ed. Washington D.C. Public Health Foundation, 2015.”
Reductions Caused By Improved Living Conditions Prior To Vaccines

Polio Disease Mortality
United States, 1921–1970

SOURCES:
20TH CENTURY DISEASE MORTALITY

Reductions Caused By Improved Living Conditions Prior To Vaccines

Varicella (Chicken Pox) Disease Mortality
United States, 1958–2011

SOURCES:
Reductions Caused By Improved Living Conditions Prior To Vaccines

Varicella (Chicken Pox) Disease Mortality with Trendline (Linear)\(^1\)\(^-\)\(^{10}\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>0.10</td>
</tr>
<tr>
<td>1980</td>
<td>0.03</td>
</tr>
<tr>
<td>2000</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Varicella (Chicken Pox) Disease Mortality with Trendline (Exponential)\(^1\)\(^-\)\(^{10}\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>0.10</td>
</tr>
<tr>
<td>1980</td>
<td>0.03</td>
</tr>
<tr>
<td>2000</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Sources:

Best-fit values
- Slope: 0.001291 ± 0.0001738
- Y-intercept: 2.601 ± 0.3436
- X-intercept: 2015
- Trendline for series 1: \(R^2 = 0.619\)

95% Confidence Intervals
- Slope: -0.001644 to -0.0009384
- Y-intercept: 1.904 to 3.299
- X-intercept: 2006 to 2030
- Goodness of Fit: \(R^2 = 0.6051\)
- Sy.x: 0.0175

Is slope significantly non-zero?
- F: 55.16
- DFn,DFd: 1,36
- P Value: < 0.0001
- Deviation from horizontal?: Significant

Data
- Number of XY pairs: 38
- Equation: \(Y = -0.001291X + 2.601\)
Reductions Caused By Improved Living Conditions Prior To Vaccines

Disease Mortality, United States, 1900–1960

No Vaccine in General Usage

**Tuberculosis (Respiratory)**

**Typhoid Fever**

**Sources:**
Reductions Caused By Improved Living Conditions Prior To Vaccines

Disease Mortality, United States, 1900–1960

No Vaccine in General Usage

SOURCES:
Reductions Caused By Improved Living Conditions Prior To Vaccines

Disease Mortality, United States, 1900–1960

1 No Vaccine in General Usage

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate Per 100,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>40</td>
</tr>
<tr>
<td>1910</td>
<td>30</td>
</tr>
<tr>
<td>1920</td>
<td>20</td>
</tr>
<tr>
<td>1930</td>
<td>10</td>
</tr>
<tr>
<td>1940</td>
<td>5</td>
</tr>
<tr>
<td>1950</td>
<td>2</td>
</tr>
<tr>
<td>1960</td>
<td>1</td>
</tr>
</tbody>
</table>

Sources:
Reductions Caused By Improved Living Conditions Prior To Vaccines

Disease Mortality, United States, 1900–1960

No Vaccine in General Usage

**Malaria**

**Erysepiolas**

**SOURCES:**
Reductions Caused By Improved Living Conditions Prior To Vaccines

**Crude Death Rate** for Infectious Diseases

**United States, 1900–1996**

*Per 100,000 population per year.
20TH CENTURY DISEASE MORTALITY

Reductions Caused By Improved Living Conditions Prior To Vaccines

The 10 leading causes of death as a percentage of all deaths
United States, 1900\(^1\) and 1997\(^2\)

<table>
<thead>
<tr>
<th>Disease</th>
<th>1900 Percentage</th>
<th>1997 Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Diarrhea and Enteritis</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>Heart Disease</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>Stroke</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Liver Disease</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Injuries</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Cancer</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>Senility</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

**Sources:**