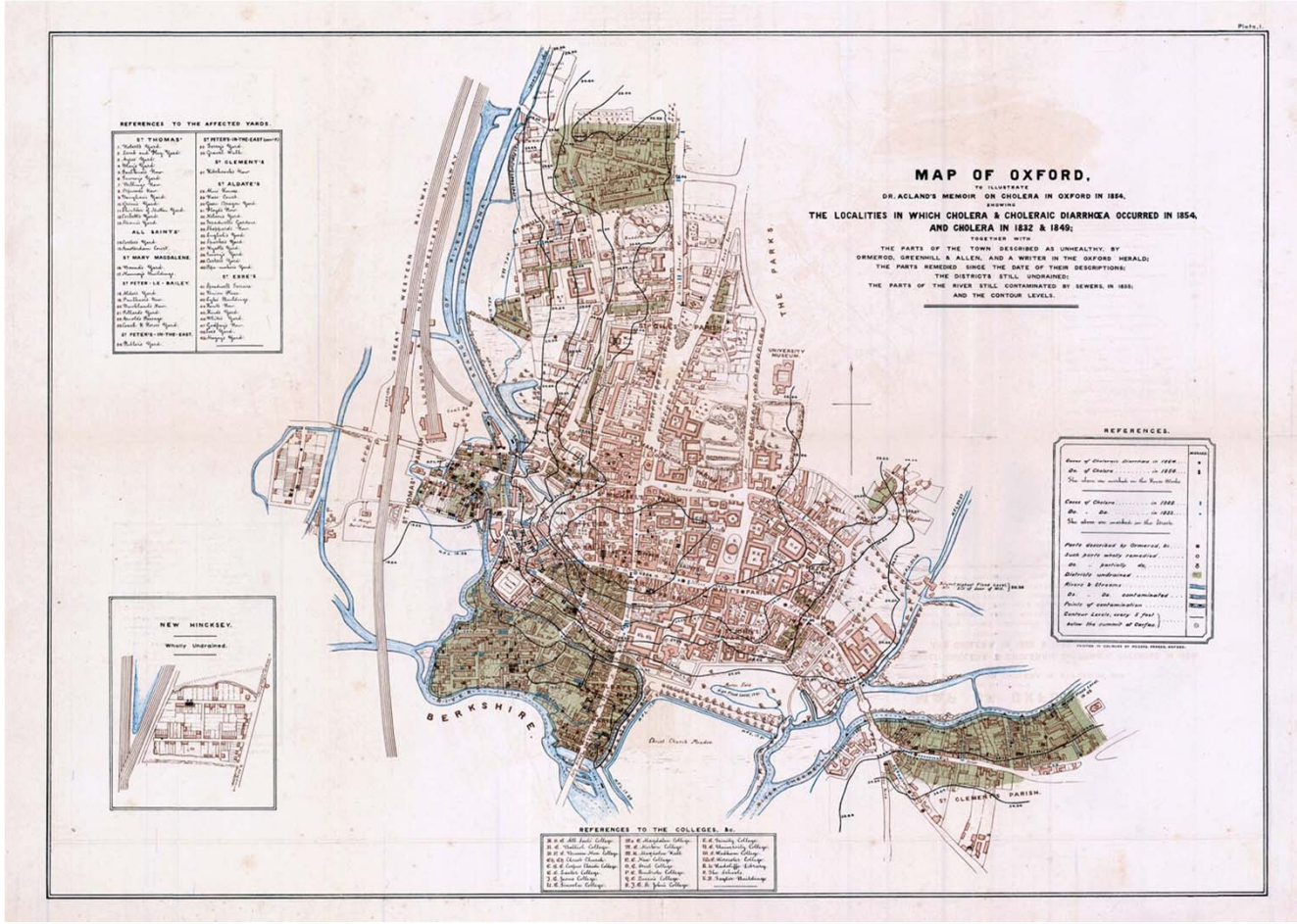
A Contagious City –
120 years of typhoid control and eradication in Oxford



Claas Kirchhelle & Samantha Vanderslott
University of Oxford

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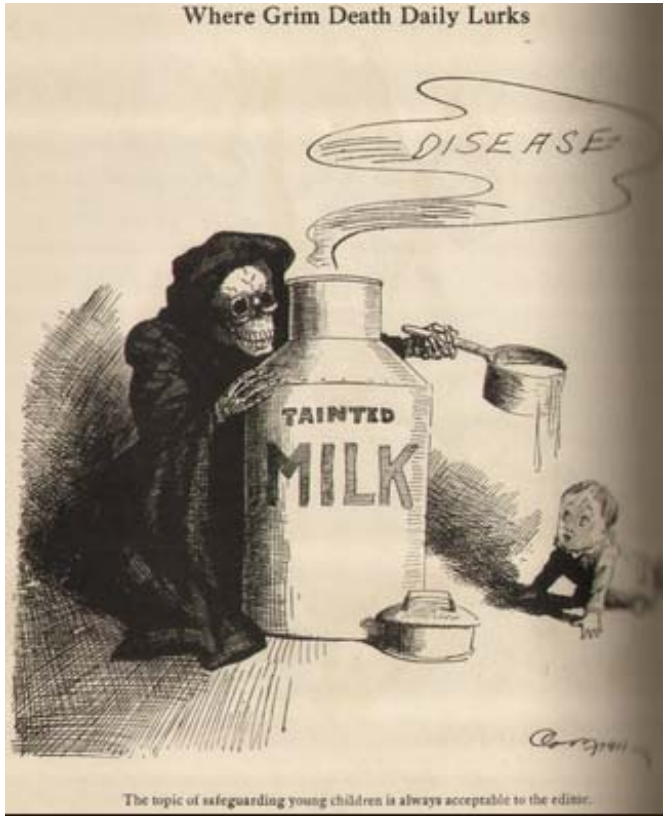
Aims

1. Show potential of interdisciplinary research to utilize past data on disease and interventions.

2. Challenge heroic tales of Western sanitary control.

3. Highlight historical importance of financial credit and bottom-up coalitions for typhoid control.



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Part One – Oxford

Image *A busy day on The High, Wikicommons*

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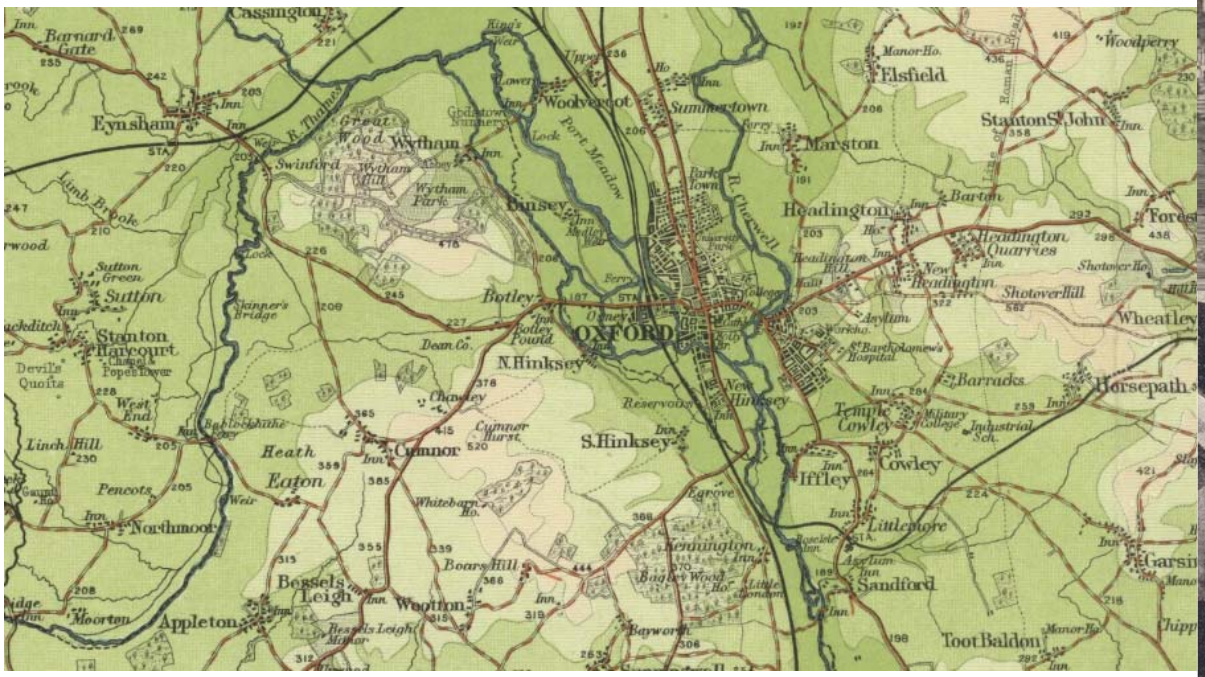
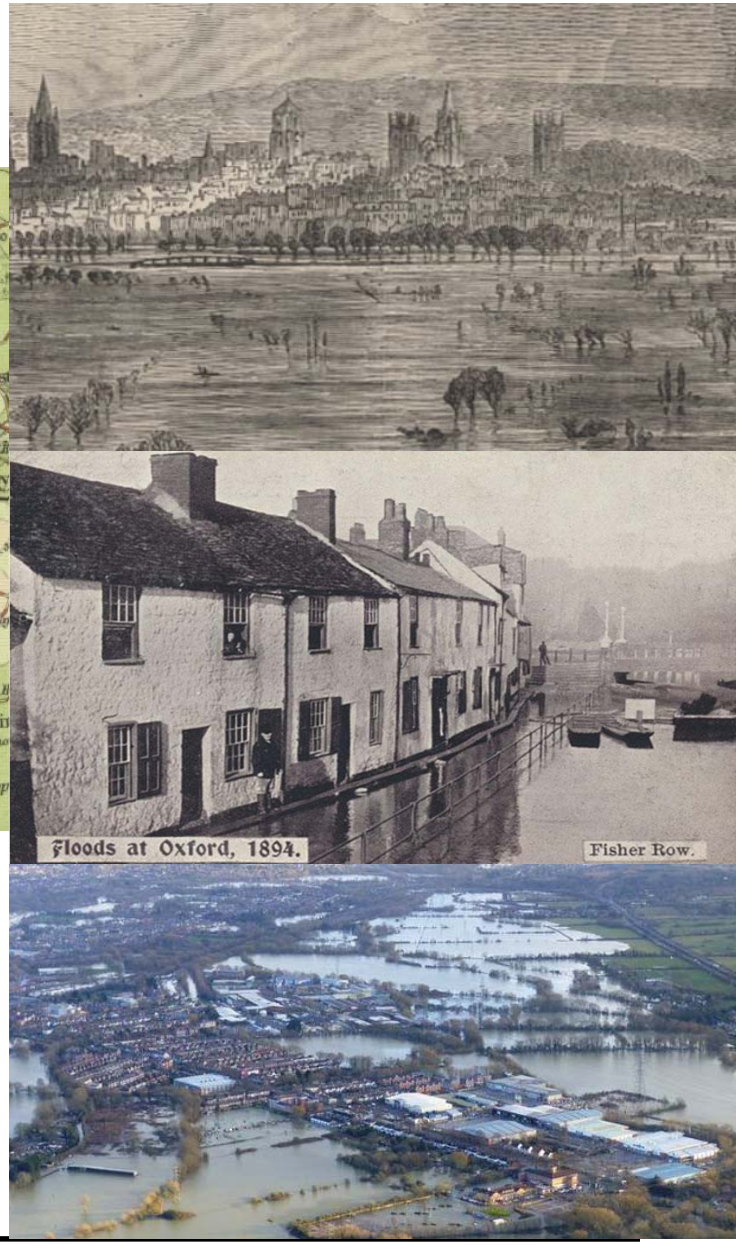
Context: Hydrology





- Low-lying
- At conjunction of two river systems (Thames and Cherwell)
  - ➢ Prone to flooding
  - ➢ Poor drainage

Image Source: Bartholomew's Half-inch map of Engl. & Wales, 1903, S 24 Oxford; BBC 2014; Oxfordhistory.org

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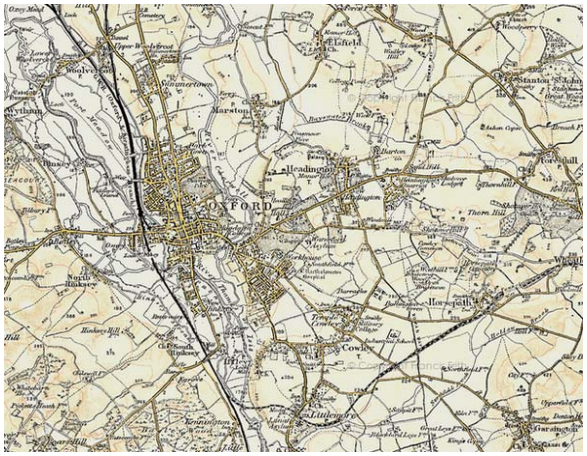
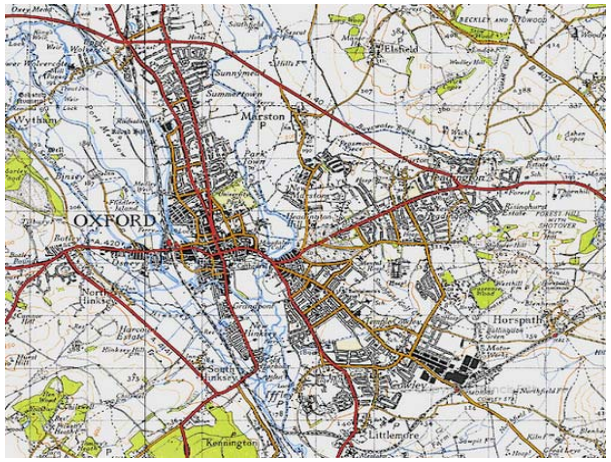
Context: From Country to Industrial Town



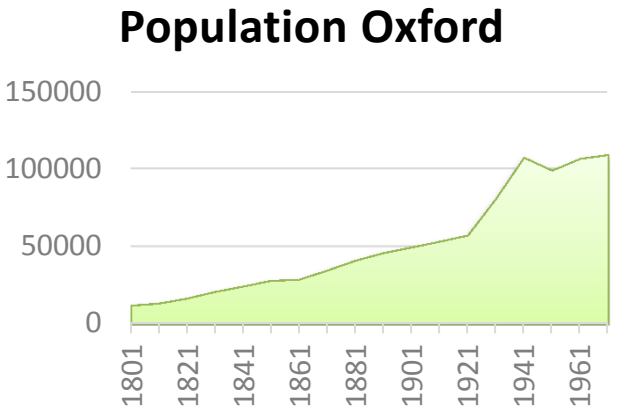


Rapid growth during 19th and 20th centuries fuelled by:

- Rural Migration
- Industrialisation
- Administrative expansion

Population growth from:

- Ca. 12,000 (1801) to 49,000 (1901) to 98,684 (1951)



➢ Expanding urban foot print, housing crisis, resource constraints

Image Source County Ordnance Maps 1898/1899; 1919; 1946

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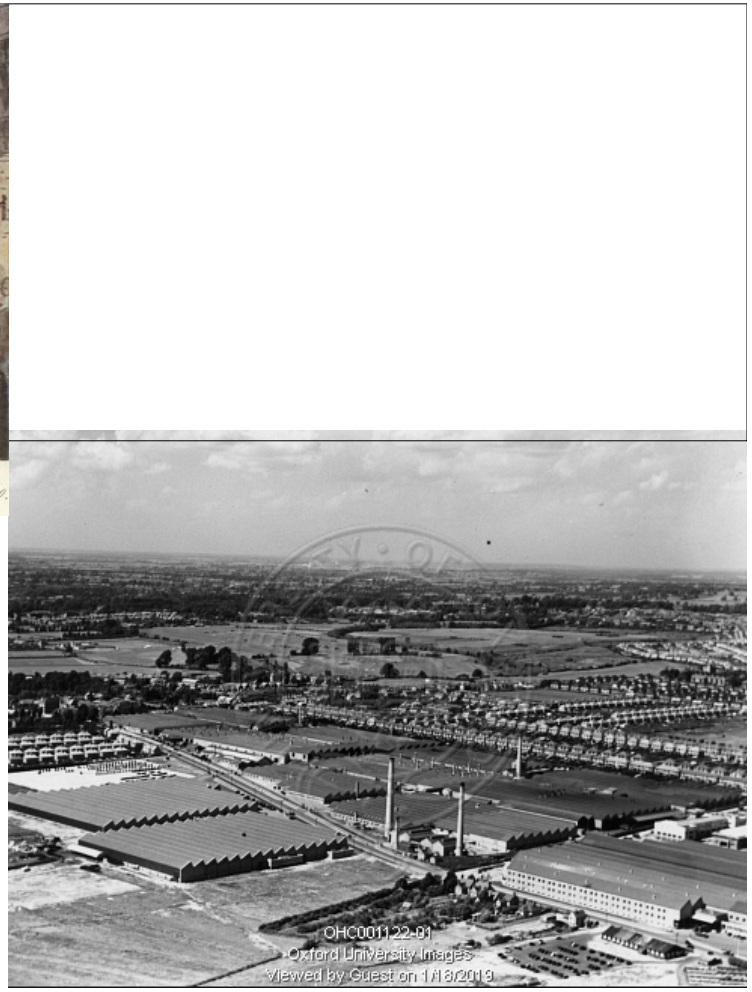
Context: from county to industrial town



- Significant seasonal migration (students).
- High-levels of economic inequality
- Social tensions (town vs. gown)
- Geographically defined destitution (slums).

Image Source University of Oxford; Levanthal Collections

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Part Two – Finding Typhoid in Oxford

Image Source Punch, 1879

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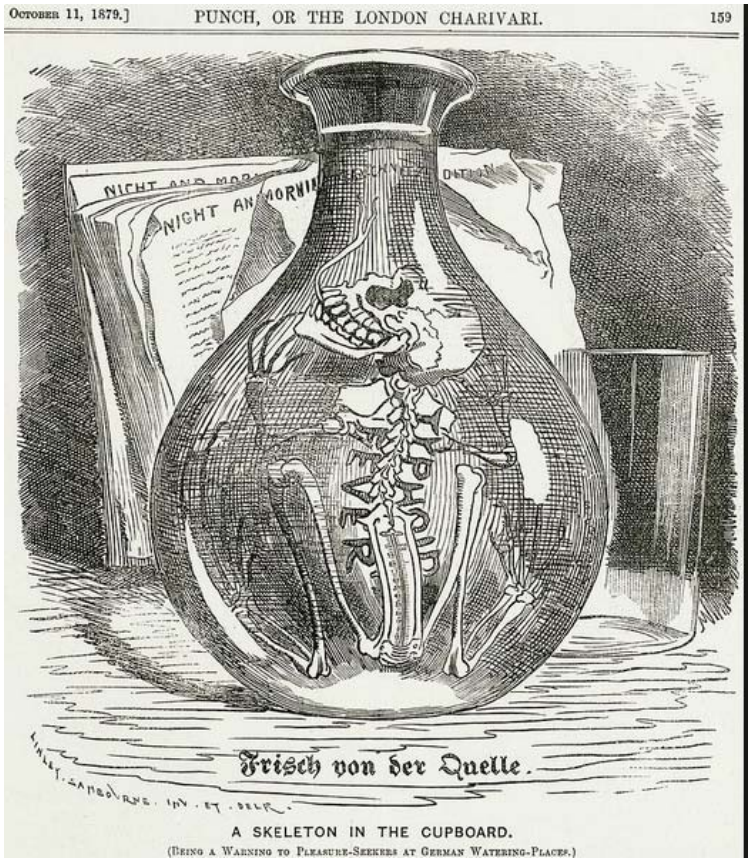
Finding Typhoid in Oxford

1837 Registration Act
1837 Gerhard sets out the clinical/ pathological difference with typhus
1849 Budd shows cholera water transmissible
1872 Oxford appoints full time MoH
1880 Eberth identifies typhoid bacillus
1889 Notification of Diseases Act
1900 Paratyphoid B isolated



- Problem of retrospective diagnosis:
- Consistent Oxford reporting only from 1870s onwards/

Image Source Punch 1879

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Typhoid in Oxford 1872-1947

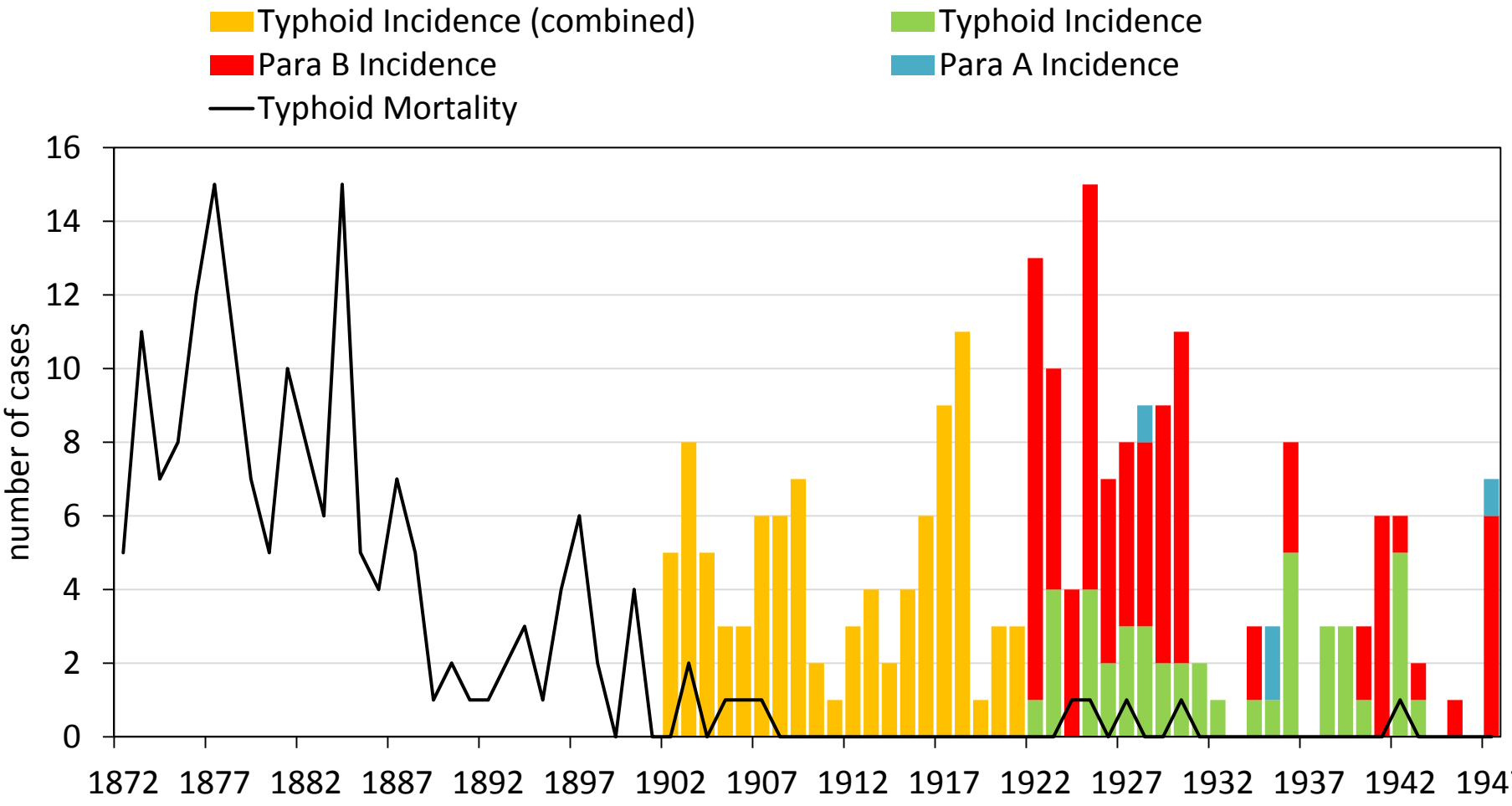

Image Source Kirchhelle & Vanderslott (2018)

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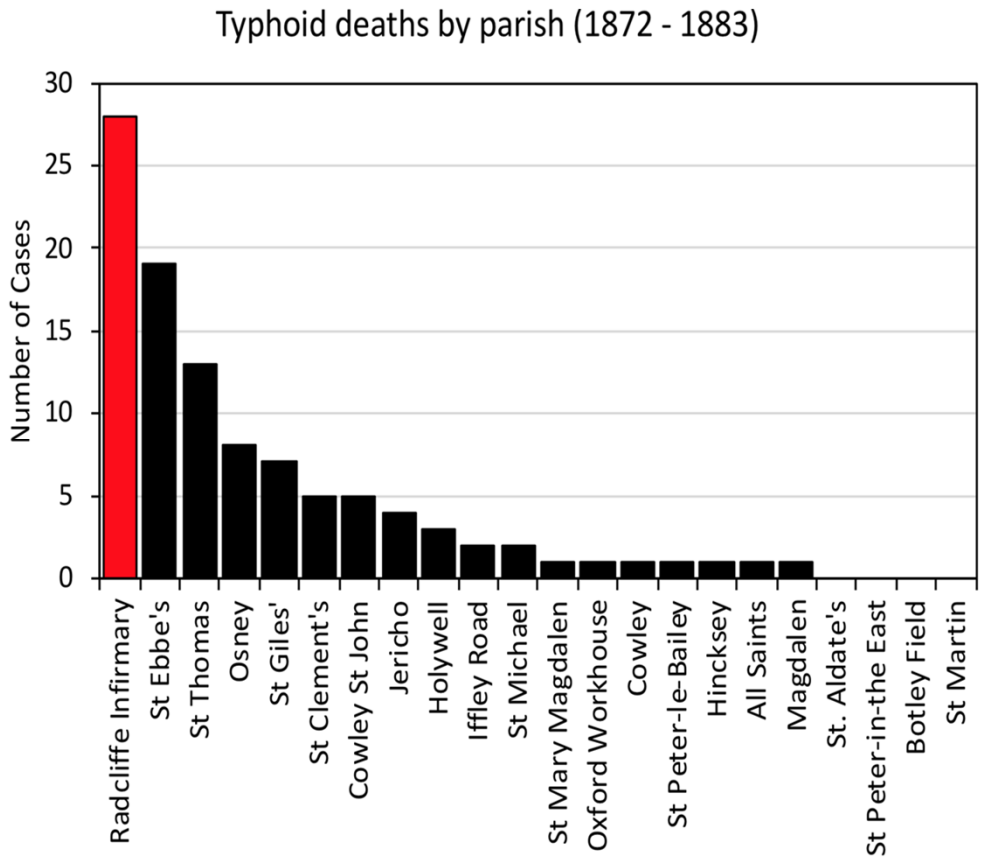
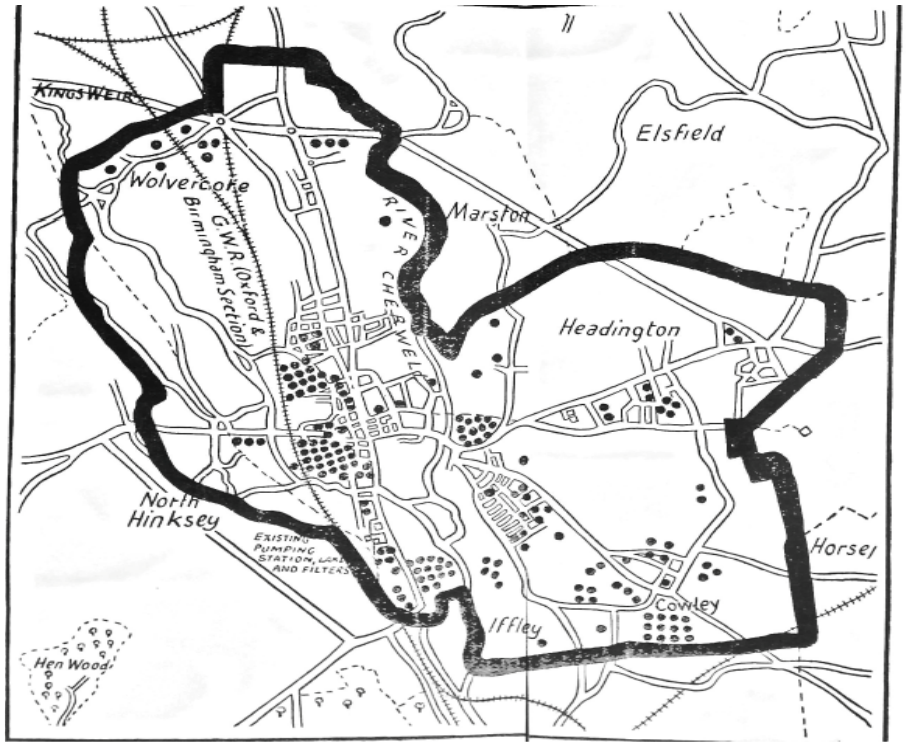
Incidence by District





- **Incidence & mortality highest in poorest, overcrowded, and low-lying areas of the city**

Source: Kirchhelle & Vanderslott 2018, MoH Report 1936,

Part Three – Contested Reform

A COURT FOR KING CHOLERA.

Image Source Punch, 1852

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A Heroic Age? – non-linear reforms

Water quality and inadequate drainage identified as health problems since 18th century.

However, intervention stalemate due to:

- Fragmented local interests (town vs. gown)
- Disagreement over finance & solutions
- Professional rivalry
- Hostility towards government control

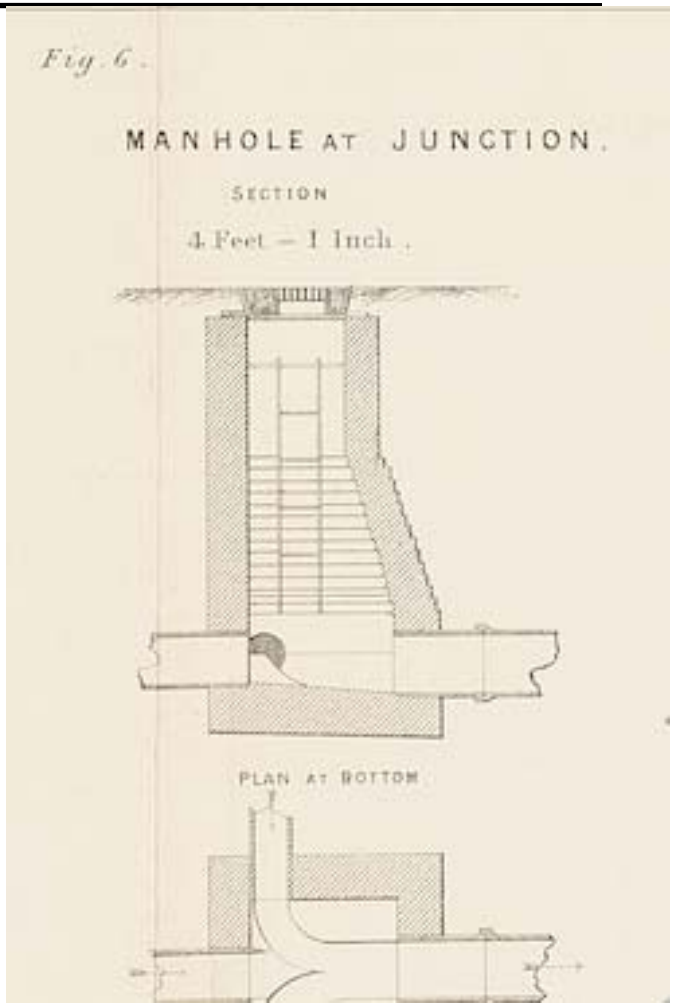

Image Source OHC, 1871 Oxford Plan

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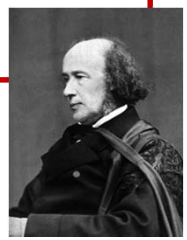
The Local Economy of Typhoid

University Clinicians

William Ormerod
(1818–1860)
Henry Acland
(1815–1900)
William Greenhill
(1814–1894)



Engineers/surveyors

Sir William Cubitt
(1785–1861)
Thomas Smith
(1826-1886)
John Galpin
(1824–1891)
Sir Joseph Bazalgette
(1819–1891)
John La Trobe Bateman
(1810–1889)

Public Health

Gilbert Child
(1715–1886)
George Rowell
(1804–1892)
Sir George Buchanan
(1831–1895)
Central government

Local Clinicians

City

James Grainge
(1827–1879)

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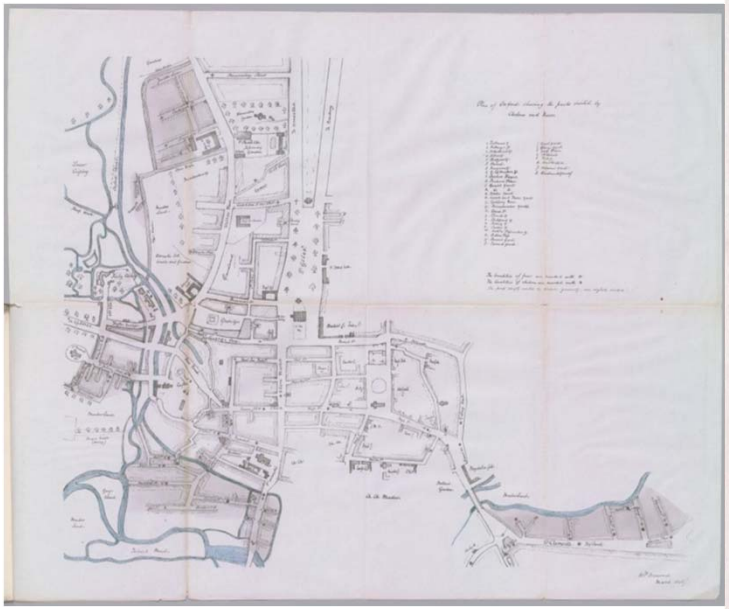
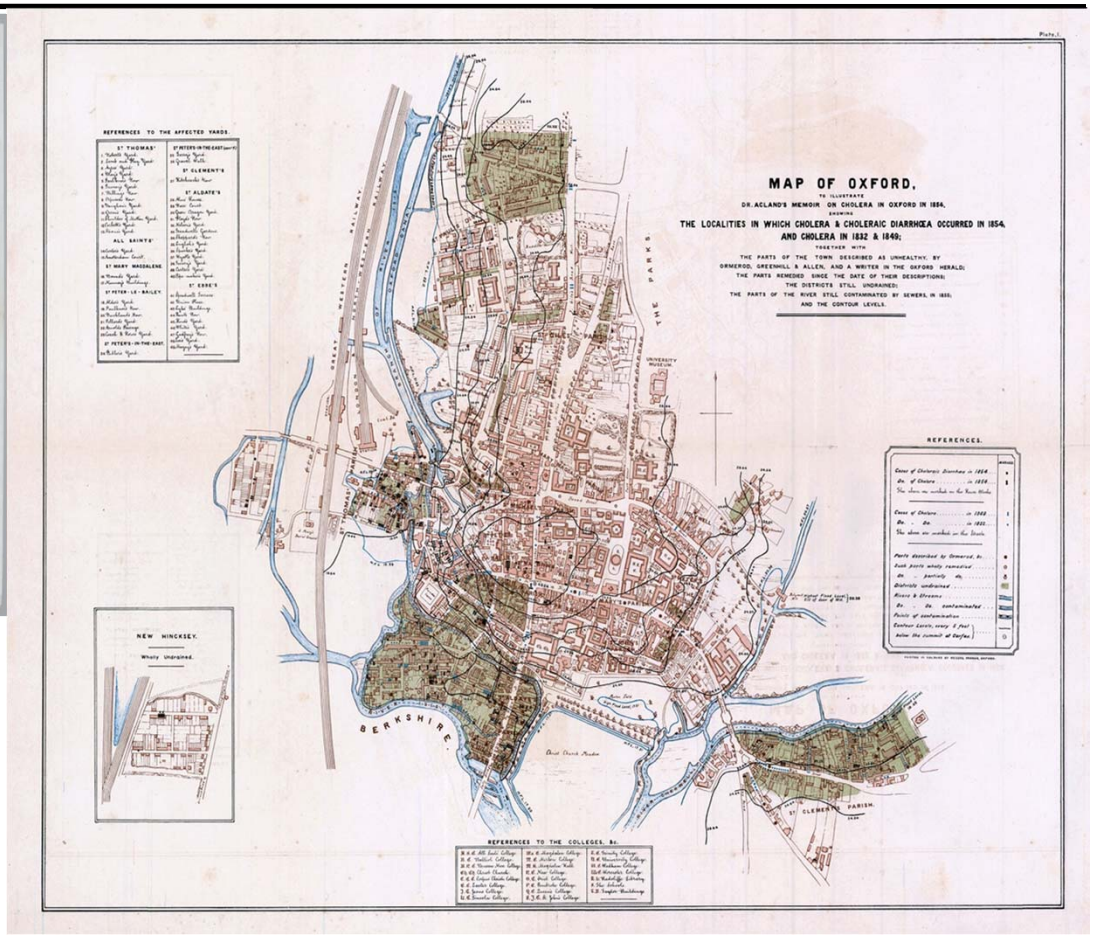
Reform in a time of Cholera: 1832, 1849, 1854



William Ormerod 1848

University experts compile data from 1832/1849/1854 cholera outbreaks.

- **Target non-university areas.**



Henry Acland 1856

Image Source Bodleian Libraries

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Town vs. Gown: Finance Deadlock

Public health and sanitation	Drainage	Sewage
Ormerod On the Sanatory Condition of Oxford (1848)	**Cubbitt & Smith** Inquiry into (18 – *turned down because of great expense*	**Galpin** 1st reporton improved sewage – *not adopted* (1854)
Rowell The public health of Oxford (1849)	**Ba**[illegible] plan for [illegible] – *no action*	
Greenhill Report on the mortality & public health of Oxford (1850)	**Bateman** Drainage rep – *too expensive*	**Galpin** 2nd report on – *no money for adoption*
Acland Memoir on the cholera at Oxford, in the year 1854 (1856)	**Ewart** Drainage report (1867) – *recommended but overhauled*	
Child two reports on Oxford sanitation (1866) – *recommended overhaul of system*	**Cla**[illegible] (1869)	
Buchanan re[illegible] health and provision (1870-3)		

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Scandal & Credit

Stagnation of sanitary reform only resolved by:

Prominent Oxford typhoid outbreaks:

1874 Typhoid outbreak kills 3 undergraduates
1875 Prince Leopold ill with typhoid
1879 Mayor dies of typhoid

Damning national reports

The provision of cheap national credit:

1848 Public Health Act
1871 Local Government Act

- 1870s/1880s: Wave of reform, end of separate water systems, creation of self-sustaining municipal services.

Image Source Jericho 1850s, BBC; Prince Leopold 1884, Wikicommons.

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Scandal & Credit

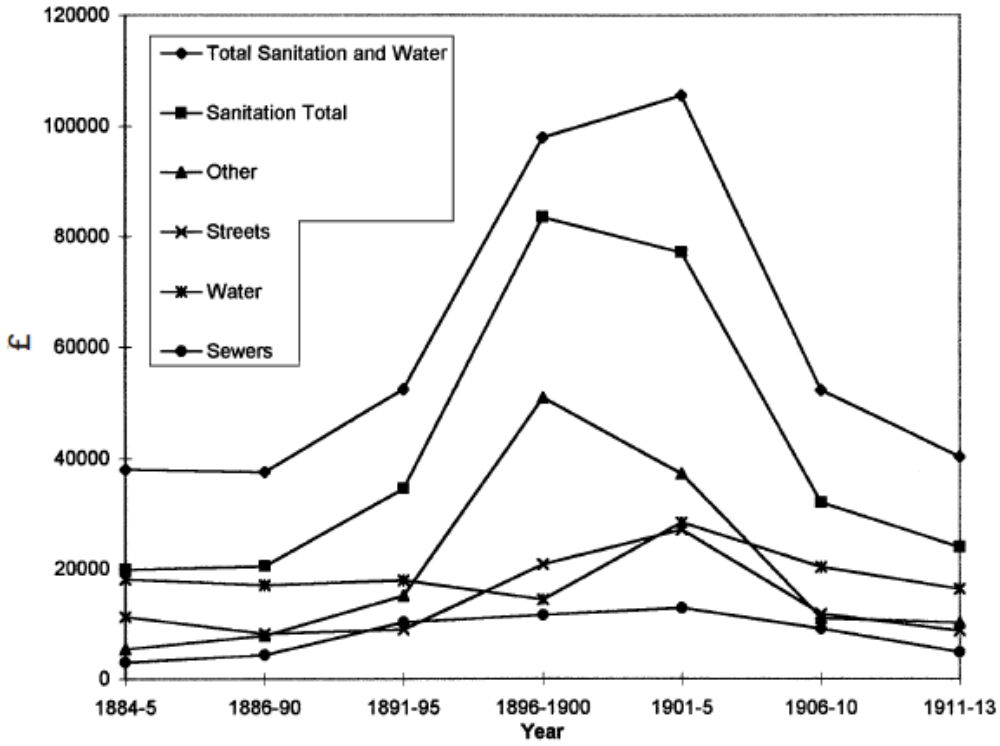

FIGURE 3. Capital expenditure at constant prices: sample of 36 towns in England and Wales, 1884–1913 (annual average expenditure per town in £). (Source: Annual local tax returns for England and Wales, 1884–1913, PP 1885–1915.) The nominal expenditures are multiplied by 100 and divided by the Rousseaux price index (average 1865 and 1885 = 100), from B. R. Mitchell, *British Historical Statistics* (Cambridge, 1988).

Image Source Bell & Millward 1998

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From Stagnation to Reform

Drinking Water:

1825 <10% houses supplied by piped water intake below sewage outlet/ wells remain popular.
1856 Switch to spring- and river fed gravel pond.
1883 Sand-filtration beds at waterworks, pumped filtered water stored in underground tanks.
1885 New Water intake upstream of city
1886 All houses connected to pressurized mains (end of separate town/gown supplies.
1930 New river- and spring fed reservoirs constructed – chlorination introduced
1934 Switch to upstream supply.

Sewerage:

1873–1880 City sewerage system and sewage farm
1884-1920 Expansion to new areas.

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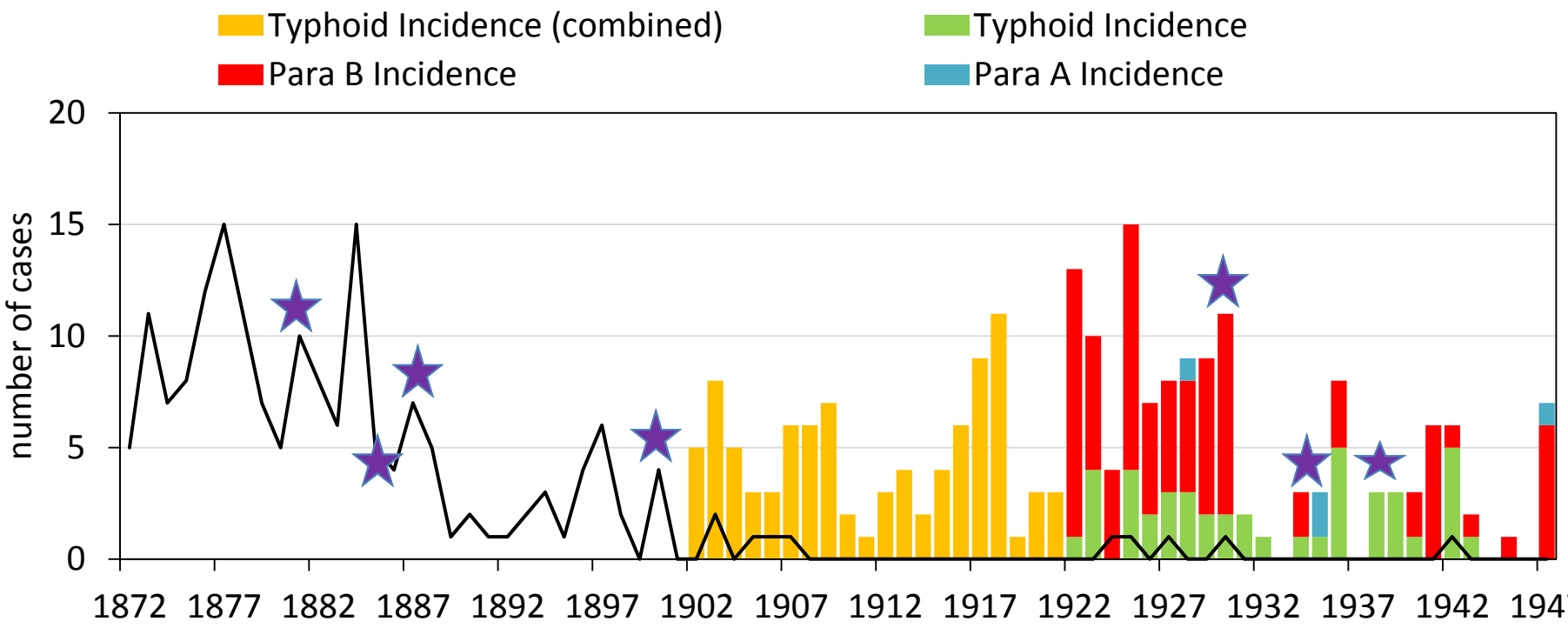
Typhoid in Oxford 1872-1947



1880 Sewage works completed

1885 – new intake & filtration
1887 – All houses connected to water mains

1900 Widal Testing

1930 New Headington Reservoir and chlorination
1934 Closure Lake Street
1938 Mandatory Chlorination

Image Source Kirchhelle & Vanderslott (2018)

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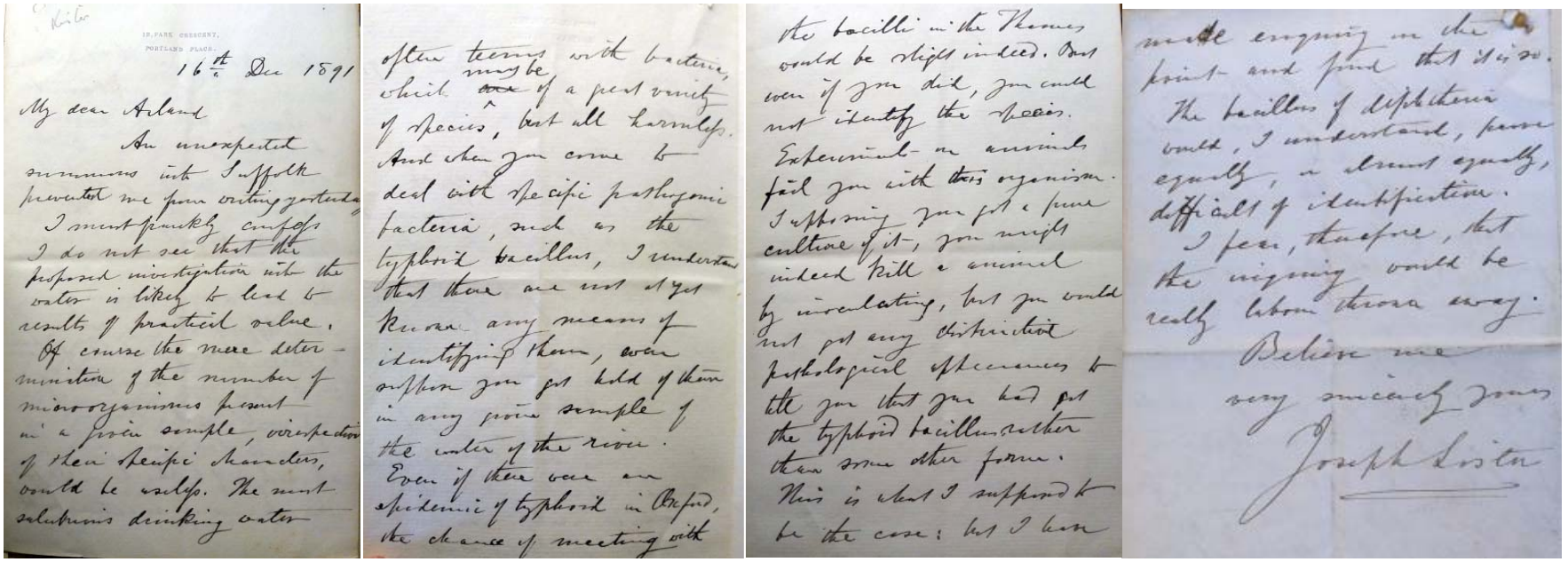
Which interventions make a difference?



Contemporaries do not conclusively know but still implement reforms!

Joseph Lister to Henry Acland 1891:
“I do not see that the proposed investigation (of typhoid bacteria) with the water is likely to lead to results of practical value.”

Image Source Monthly Bulletin of the EPHLS, CDC

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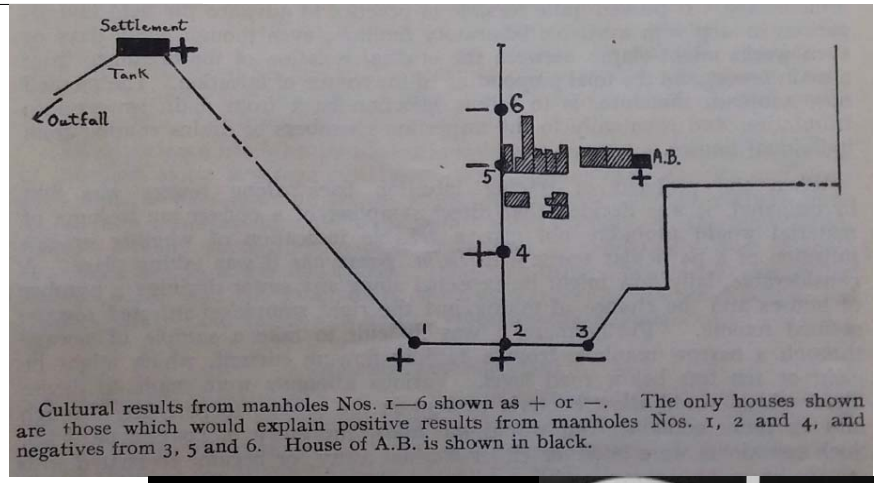
Epilogue: 1940-1960 – Towards Eradication



Cultural results from manholes Nos. 1—6 shown as + or —. The only houses shown are those which would explain positive results from manholes Nos. 1, 2 and 4, and negatives from 3, 5 and 6. House of A.B. is shown in black.

Image Source Monthly Bulletin of the EPHLS, CDC

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Conclusion: Non-linear multi-pronged reform

The history of typhoid in Oxford reveals a story of evolving hit and miss strategies for typhoid control (no linear correlation knowledge and action).

Importance of cheap credit/debt for:

- creating effective local reform alliances;
- making government interference acceptable to local powers;
- allowing cities to construct, finance, and service water supply systems;

➢ **In the absence of clear knowledge of causation pathways, creating capacity for tailored multi-layered local strategies is key.**

Revisiting past interventions is useful: parallels to control challenges in current endemic settings (urbanisation, inequality, fragmented coalitions, lack of resources).

Use typhoid's history to engage current publics…

Image Source Oxfordshire History Centre

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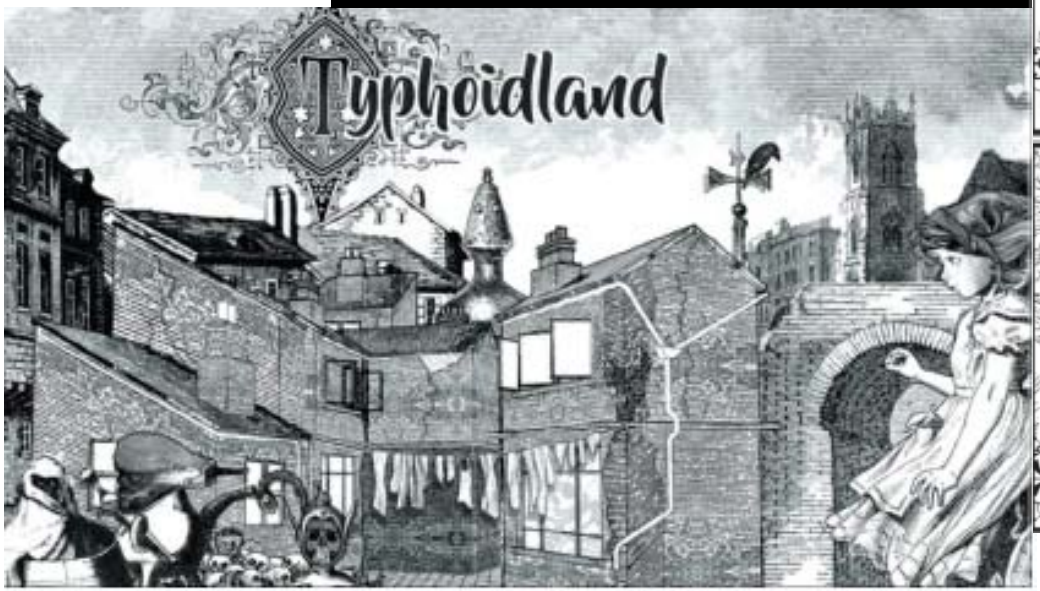
Coming to Oxford & Atlanta in 2020

www.typhoidland.org

@typhoidland



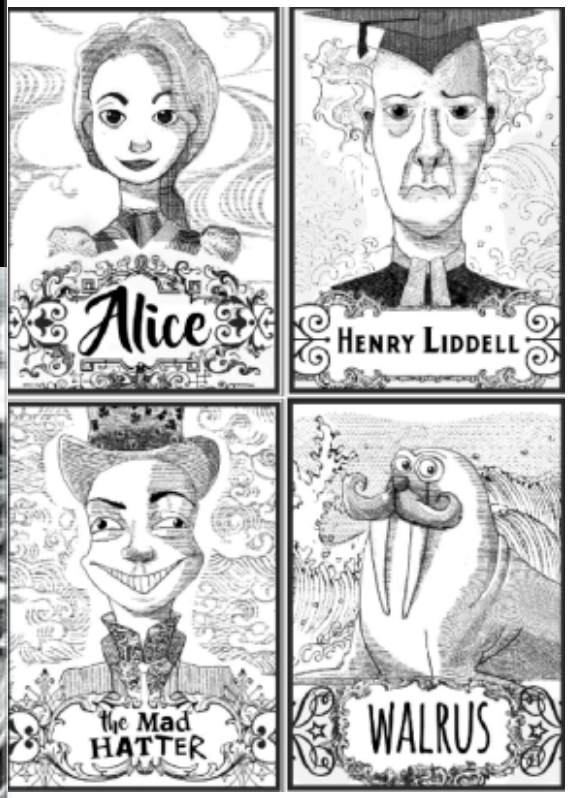


Image Source Oxfordshire History Centre

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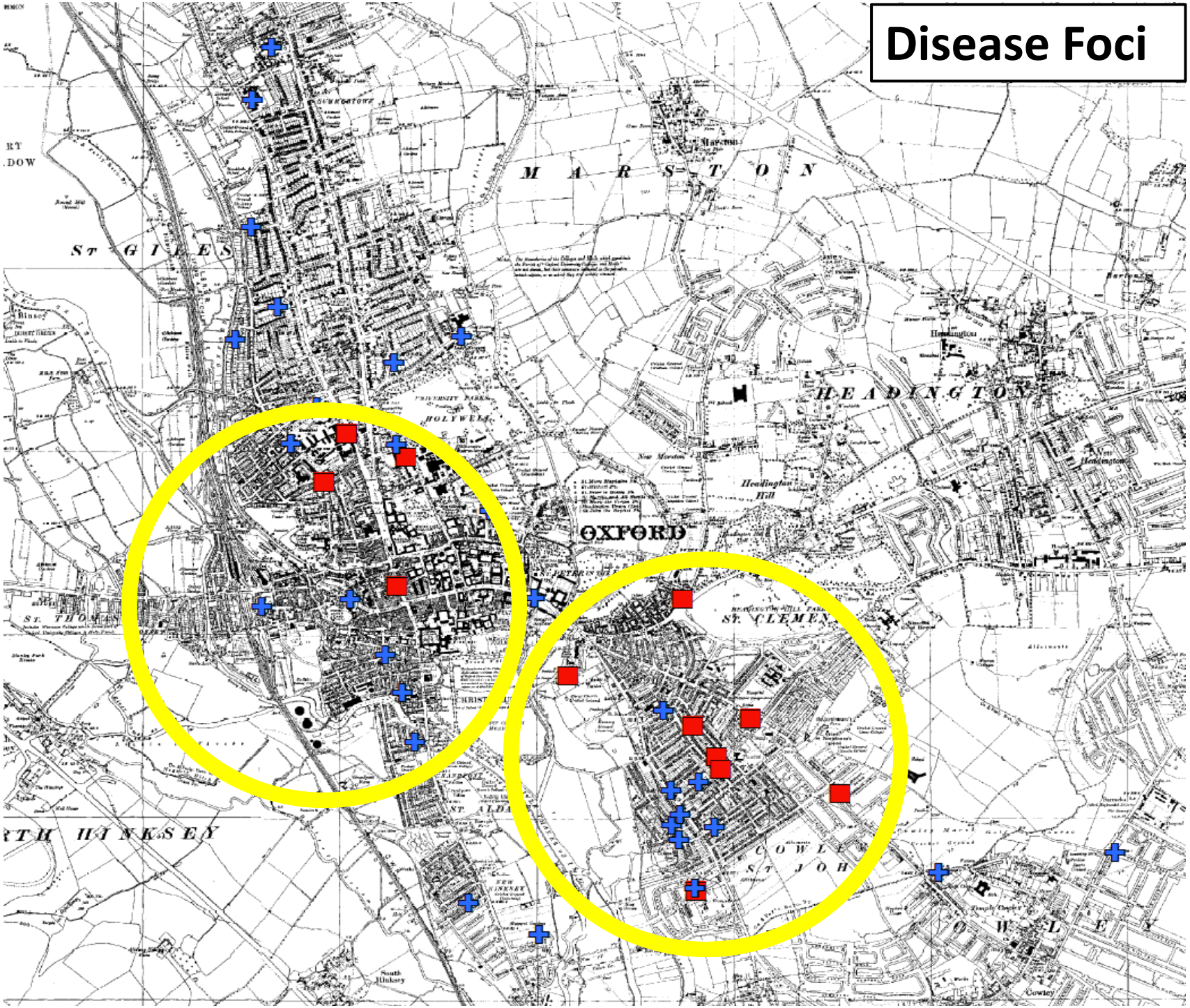
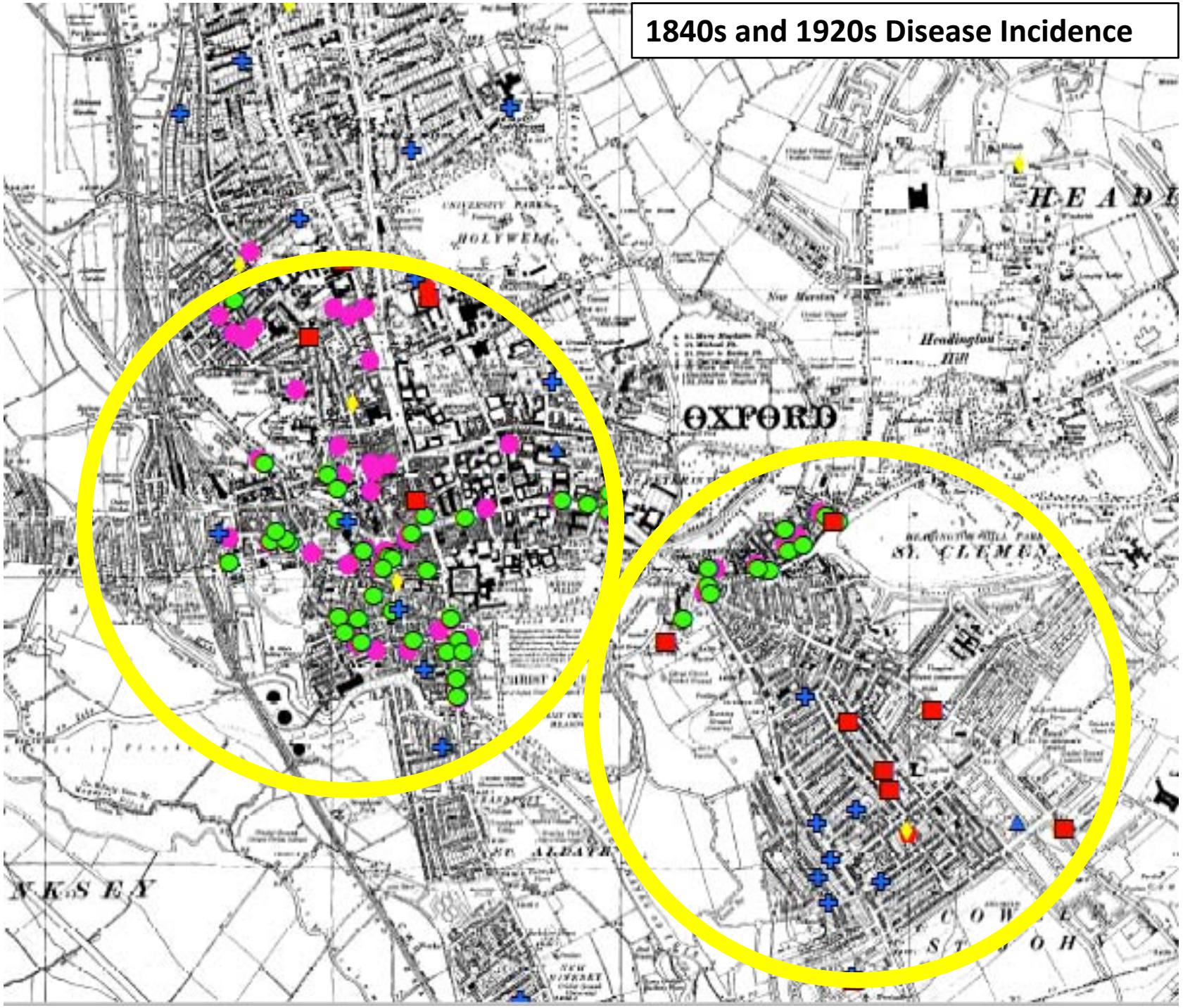
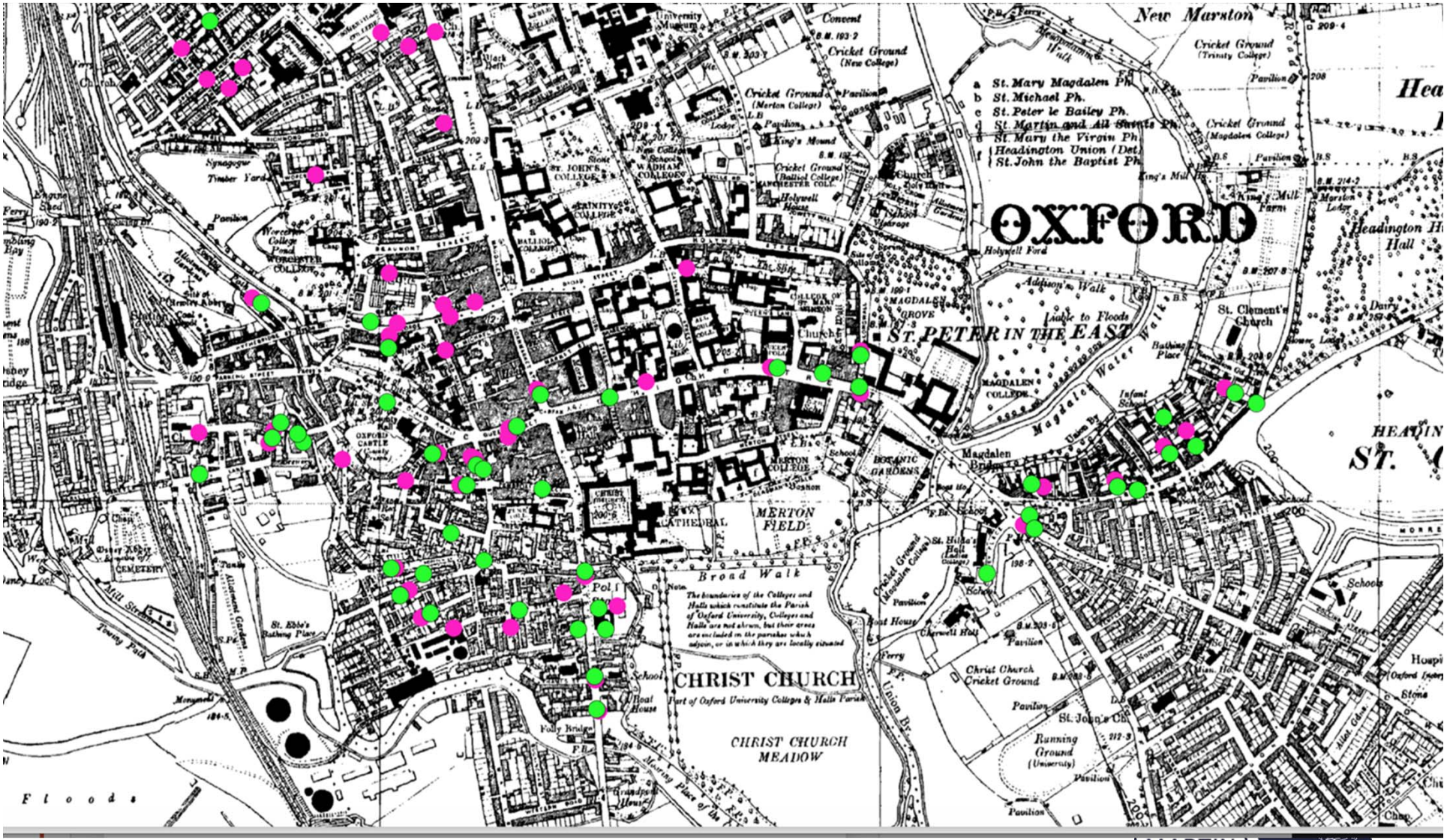

Disease Foci
M A R S T O N
S T G I L E S
HEADINGTON
OXFORD
ST. CLEMEN
COWLE
ST JOH
H I N K S E Y
O W L E Y


1840s and 1920s Disease Incidence
OXFORD

Mapping disease today



Source: Kirchhelle & Vanderslott 2019.

Typhoid Mortality 1872-1947

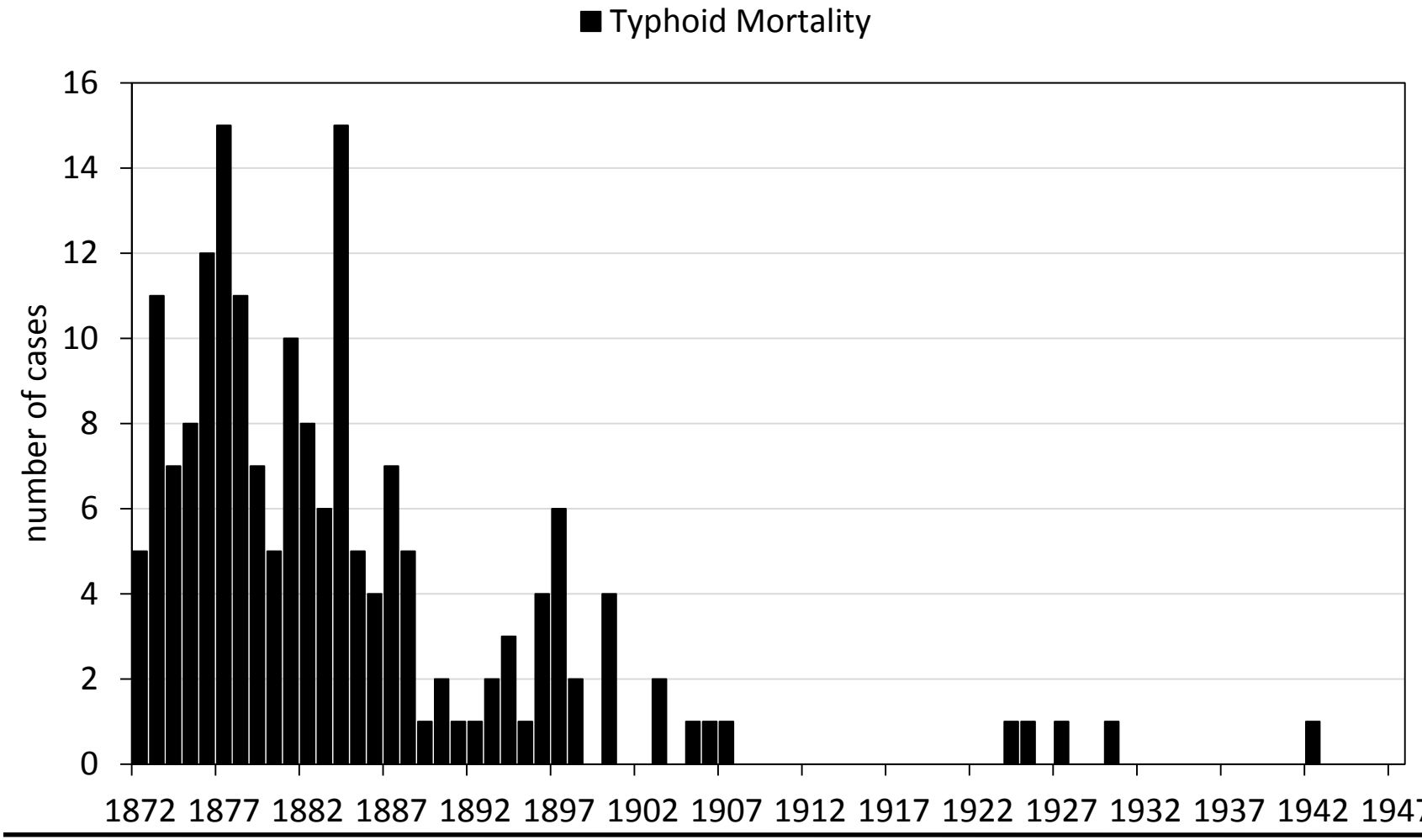


Image Source Kirchhelle & Vanderslott (2018)

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Typhoid Fever Incidence 1902-1947

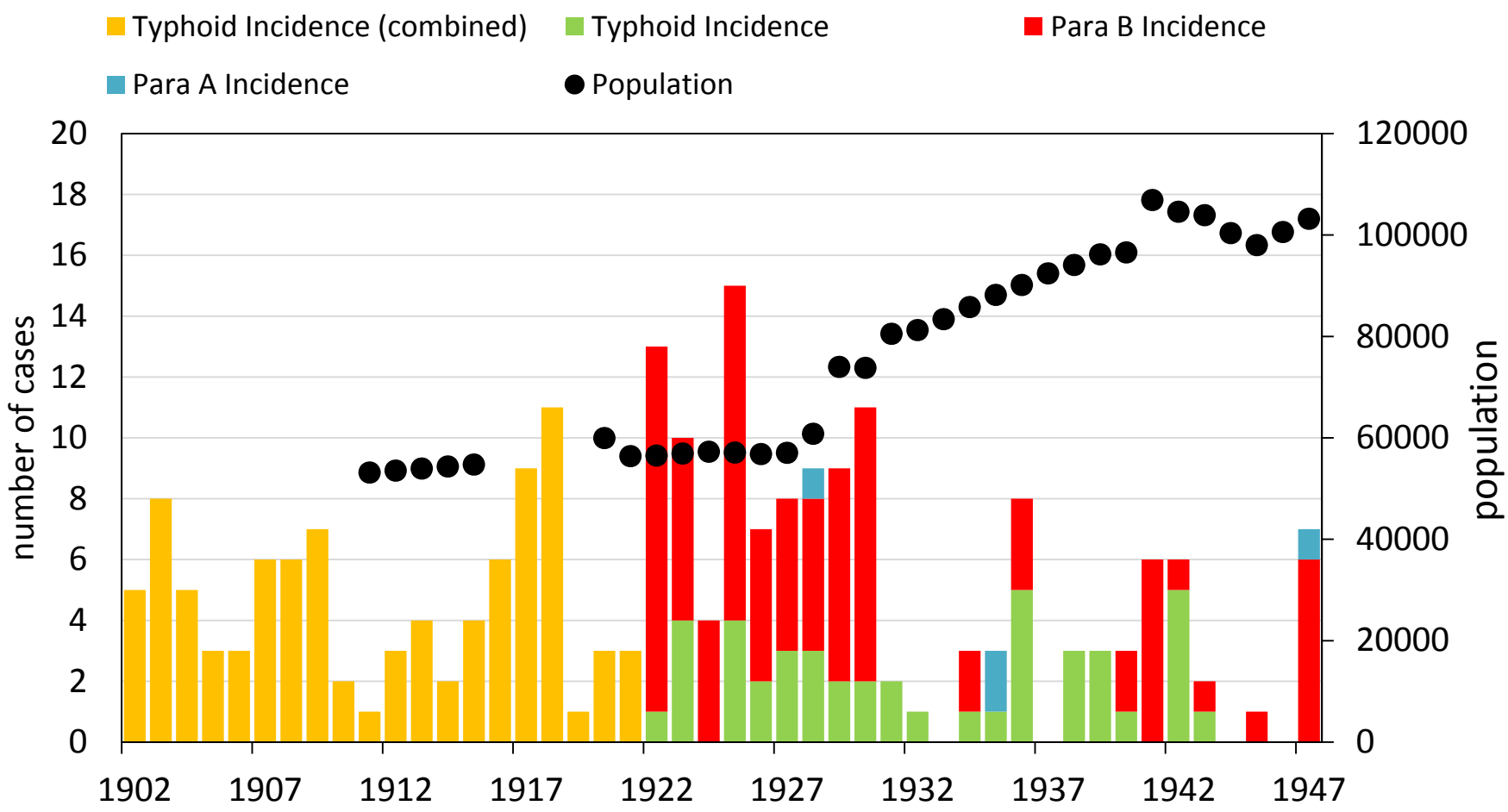

Image Source Kirchhelle & Vanderslott (2018)

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