Project Tycho

Preliminary data for the state of Georgia

Tycho database beta test version

The data presented in this report are of preliminary nature and should not be used for publication or other types of official use

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University of Pittsburgh Graduate School of Public Health

University of Pittsburgh

VMI
Vaccine Modeling Initiative

Table of Content

Disease specific data for Georgia, continued

Acknowledgements

Contact information

The Tycho database is currently being tested and a login account will be required to use the database and website (www.tycho.pitt.edu). All State Epidemiologists, CDC partners, other federal agencies and our research collaborators will be provided with user accounts. User accounts can also be provided upon specific request. Note that the quality of the data during the testing phase cannot be guaranteed to be sufficient for publication or official use.

Point of contact for the Tycho project:
Dr. Willem G. van Panhuis, MD PhD
Graduate School of Public Health
University of Pittsburgh
130 DeSoto Street
704 Parran Hall
Pittsburgh PA, 15261
Email: wav10@pitt.edu
Tel: 412-624-7693

Introduction

Project Tycho started in 2009 as part of the Vaccine Modeling Initiative (VMI) at the University of Pittsburgh Graduate School of Public Health, funded by the Bill & Melinda Gates foundation. This project aims to contribute to the availability of public health data for research and policy making. The vision for this project as described in the next section is a central access point for public health data of a detailed spatial and temporal scale for all countries. Currently, the Tycho database contains 10 million records that each represent a weekly report from a location for a specific disease. These records were extracted from weekly US Nationally Notifiable Disease Surveillance Reports between 1888 and 2009 (6300 reports) using double data entry (200 million keystrokes). The current database includes a total of 90 million reported cases and 4 million reported deaths due to notifiable diseases in the United States for the last 122 years.

> Project **Tycho** is named after the Danish nobleman Tycho Brahe (1546 – 1601), who meticulously collected astronomical data. After Brahe's death, his assistant Kepler used these data to develop area laws of planetary motion.

Background

"No health department, State or local, can effectively prevent or control diseases without knowledge of when, where and under what conditions cases are occurring"
(Quote stated above weekly surveillance reports published in the Public Health Reports, 1888-1951)

This quote has accompanied weekly reports on the prevalence of notifiable diseases in the United States as long as these were published in the Public Health Reports, emphasizing the importance of data for disease control policy making. In the current day and age, this statement has lost none of its significance. On the contrary, as infectious diseases continue to pose challenges to the global public health system in an increasingly interconnected global society. The public health system has responded to this challenge by evermore sophisticated disease surveillance systems. The availability of internet and information technology has facilitated collection of detailed data on infectious disease incidence, the spread of pathogens, disease determinants, health behavior, etc. New technologies such as remote sensing and mobile reporting systems have advanced measurement of these factors in both high and low resource settings. The enormous wealth of public health information that is currently being accrued also poses its own challenges for data storage, management, preservation and dissemination. Public health agencies will need to allocate resources and develop capacity to specifically address these issues.

Although the importance of public health data collection has been widely recognized, the dissemination of data has been neglected for many reasons. The above quote does not only imply data collection but also its use and dissemination as knowledge on disease occurrence can only be derived from data after processing and analysis. Not only has disease surveillance become more sophisticated, analytical tools have changed as well and now include computational models to assess disease transmission and to evaluate disease control options. These methods have introduced the opportunity for data intensive studies of fine spatial-temporal patterns using dynamic models. Disease surveillance data at such scale are often not available for analysis for multiple reasons. First, surveillance data are not collected for research purposes but for disease monitoring and planning. Secondly, public health staff often lack time or capacity to prepare these data for analysis. Third, surveillance methodology often lacks transparency and standardization, reducing options for scientific analyses. Fourth, disease surveillance data are often

kept confidential and ownership or data use requirements are often unclear. Finally, archiving and preservation of surveillance data are often not a priority and disaggregated records may get lost, losing the opportunity to ever use these data for analysis.

The Tycho project aims at overcoming some of these challenges by providing open access to large public health datasets of great spatial-temporal detail. Open access to these data will provide great opportunities for scientific analysis and better informed policy making on disease control.

The Tycho database and website
As described in the methods section, a large heterogeneity in reporting practice was observed over the past 122 years of weekly disease surveillance and substantial efforts were made to clean and standardize these data. The current online database includes all cleaned and standardized data in a format that allows comparisons across time and space. It does not include parts of the data that require additional cleaning and research such as classification of disease subcategories.

Each record in the database provides a reported number of cases or deaths due to a specific disease for a specific location, for a certain week. The database can be searched online (www.tycho.pitt.edu) by selecting a dataset, an aggregation method and an output format. Data can be viewed in tables, graphics and maps and these can be downloaded for further use.

Data availability
The data provided by the Tycho database reflect the weekly US Nationally Notifiable Disease Surveillance System between 1888 and 2009. It includes all diseases that were reported as part of this system, but it does not yet include records from other surveillance systems such as the annual system or disease specific subsystem (such as the influenza surveillance system).

The available data also reflects changes in reporting practices over time. This explains why city or state level reports are only available for a certain time period (1888-1953 for cities and 1927-2009 for states) and why morbidity and mortality reports are available for different time periods. We are currently working on inclusion of additional data as described in the section on collaboration.

Testing and release of the Tycho database
The Tycho database is currently in a beta testing phase that will start during the 2011 annual meeting of the Council of State and Territorial Epidemiologists (CSTE) in Pittsburgh June 12-16. This phase will end with a release to the general public in the fall of 2011. During the testing phase, invited users will be provided with login accounts that will enable full use of all features of the website and database. Invited users will include all state epidemiologists, partners in the CDC and other federal agencies as well as research collaborators. During this phase, data cleaning and standardization will continue. The quality of the data will not be sufficient for publication or official use during this phase.

Future developments
After optimization of the database and website during the testing phase, the first version of the Tycho database will be released to the general public. After that, efforts to clean and standardize the data will continue and more data will be released in subsequent versions. In addition, ongoing and new collaborations for inclusion of new data will allow gradual expansion of the dataset over time and increased opportunities for data driven analysis and policy making.

Vision and goal

The vision for project Tycho is based on the value of open access to detailed, disaggregated public health data for scientific analysis and policy making. Starting with 122 years of weekly US surveillance data, it is our hope that this example will convince public health authorities worldwide of the value of this resource and will stimulate similar contributions from other countries.

In the past, data sharing and archiving have not been a priority in public health or among health sciences in general. Continuous and diligent public health data collection has led to a large pool of disaggregated data scattered over the world including the internet, ranging from paper archives to basements of local health departments. The need for open access to a central repository of public health data has been recognized and both benefits and challenges of open access to data in general have been well described. Open access to data could lead to increased accountability, transparency, innovation, collaboration, cost-effectiveness, replication of results, the development of new methods and insights, and a narrower data access gap between low- and higher income countries. Ultimately, this would result in the advancement of science and technology to the benefit of all.

Challenges to open access include inconsistent formats, lack of annotation or metadata, lack of information technology (IT) capacity, a lack of incentive, and cultural norms around data ownership. Open access to public health data in particular is confronted by decentralized archiving of disease reports, lack of time and capacity for data management, degraded physical format of records and archives, and governmental level legal constraints. Multiple principles and requirements for a central open access repository for public health data have been described and include (1) capacity building for data management in low- and middle income countries, (2) feedback loops to data contributors, (3) sustainability, (4) common standards, (5) interoperability, and (6) user-friendliness.

The ultimate goal of the Tycho project is to provide a central global public health data access point. Historical as well as current public health data are of great value if archived and accessible for research and analysis. Open access will enable the use of analytical capacity from around the globe which will lead to new discoveries of disease patterns and control policies. Furthermore, a central data access point will facilitate data archiving and preservation into the future which will be an increasing need in a data rich public health environment.

Collaboration

The application of the surveillance data from the Tycho database as well as the inclusion of new data will require a wide range of collaborations with public health offices in the US and abroad. The Tycho project has currently made the first step of digitizing 122 years of weekly US surveillance reports that had already been published. The next step will be the completion of the existing dataset as well as the inclusion of new data from unpublished sources.

This report provides an overview of data available from the Tycho database for the state of Georgia. This includes all data that has ever been published at state or city level for Georgia in the weekly US Nationally Notifiable Disease Surveillance System. As you will find, the data availability will vary greatly over time, between city and state level reports, between diseases and between morbidity vs. mortality reports.

The Tycho development team would look forward to work with state health departments in the US to:

1. Better understand the current Tycho data for each state (eg. by collecting historic documentation)
2. Provide better usability and applications of current Tycho data for each state by continued joint development of website and database features.
3. Collect and/or digitize official, confirmed data to validate the current (preliminary) weekly data.
4. For each state, collect and/or digitize new data that has not yet been included. For example all city level reports discontinued in 1953 and completion of city level data until 2009 would greatly increase opportunities for analysis of disease patterns and trends.
5. Provide support to state health offices to manage, preserve and provide access to public health data.

Summary of methods

Detailed documentation on the methods used for the Tycho database has been provided on the website (www.tycho.pitt.edu). This section describes these methods in short.

Data collection

Weekly reports that contain tables on the occurrence of nationally notifiable diseases have been published since 1888 by public health authorities at the Federal level in various journals. Table 1 provides the list of publications and the responsible agency since 1888. All weekly nationally notifiable disease reports between 1888 and 1951 could be retrieved from the PubMed Central repository of the National Library of Medicine [1]. For 1995 to 2009, these reports could be retrieved from the MMWR digital archive on the CDC website [2]. Most weekly reports between 1952 and 1995 could be retrieved from the HathiTrust Digitial Library [3] [4], but many could not be found and had to be copied from hard copies of MMWR issues in the University of Pittsburgh library.

Table 1, publications and responsible Federal agencies for nationally notifiable disease reports

Time period	Publication title	Responsible federal agency
1888-1889	Weekly Abstract of Sanitary Reports	US Marine Hospital Service
1890-1895	Abstract of Sanitary Reports	US Marine Hospital Service
1896-1901	Public Health Reports	US Marine Hospital Service
1902-1911	Public Health Reports	US Public Health and Marine Hospital Service
1912-1951	Public Health Reports	US Public Health Service
1952-1960	Morbidity and Mortality Weekly Report	National Office of Vital Statistics, US Public Health Service
1961-1969	Morbidity and Mortality Weekly Report	Communicable Disease Center
1970-1991	Morbidity and Mortality Weekly Report	Center for Disease Control
1992-2009	Morbidity and Mortality Weekly Report	Centers for Disease Control and Prevention

Inclusion criteria

Weekly reports of each year were reviewed systematically to assess the diseases reported. We included all tables that provided disease specific information by week for US cities, townships, counties or states. Tables that provided summary or aggregated information by month, year or at the national level were not included. Similarly, tables that did not contain disease specific information (such as all cause mortality) were not included.

Data entry

Weekly reports were downloaded or scanned as PDF files and selected tables with notifiable disease reports were entered into computer spreadsheets in a highly standardized fashion using double data entry. During the second round of data entry, operators could not see what had been entered in the first round and could not continue if the system detected a discrepancy between the second and first entry

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[1] http://www.pubmedcentral.nih.gov/tocrender.fcgi?journal=333&action=archive
[2] http://www.cdc.gov/mmwr
[3] http://catalog.hathitrust.org/Record/003910026
[4] http://catalog.hathitrust.org/Record/003843660

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for a specific value. Such discrepancies could only be resolved by checking the PDF file and try again or discussion with the group leader and verification of a value in the source documents.

Quality control for data entry
The accuracy of data entry was checked at various levels. First, completeness of data was verified by comparing the content of entered data with PDF sources files. Secondly, accuracy of data entry was verified by multiple rounds of comparing random samples of entered files with PDF source files. Thirdly, data formatting was verified by various checks to ensure appropriate formatting for data loading.

Data loading and standardization
All data was entered in Excel spreadsheets and various components of these spreadsheets were loaded in data files. Table titles, column headers, place names and reported numbers were loaded in separate files. These files were used to extract information on each reported number, including:

1. the disease reported
2. the disease subcategory reported
3. cases or deaths reported
4. the reporting location (name, state and type of location)
5. the time period for which a number was reported
6. the date of publication of the original weekly report associated with a reported number

Integration
All reported numbers and extracted information was integrated in one database with one record per reported number and associated information.

Post-processing quality control
After integration of all data in one database, checks were performed to detect duplicate reports and data inconsistencies. Duplicate records were removed and inconsistencies resolved by verification with original PDF source files.

Data filtering
The digitized version of all historical weekly US nationally notifiable disease surveillance records is a very heterogeneous dataset. It took a substantial number of data processing protocols to standardize time and space variables as well as disease names. All standardized records have been separated from non-standard records by a filter. All remaining heterogeneity in non-standard records is inherent to the surveillance system and can only be standardized after further analysis will have been completed (eg. remaining heterogeneity in reporting periods for reports before 1953 and standardization of disease subcategories). The largest proportion of data (>4 million records) has been standardized however and has been made available in the current testing version.

Data visualization
Figures in this reports were made with the R system, version 2.9.2 and the maps were generated by the GAIA platform developed at the University of Pittsburgh Graduate School of Public Health in collaboration with the Pittsburgh Supercomputing Center (PSC). See http://midas-pitt.psc.edu/gaia for more information.
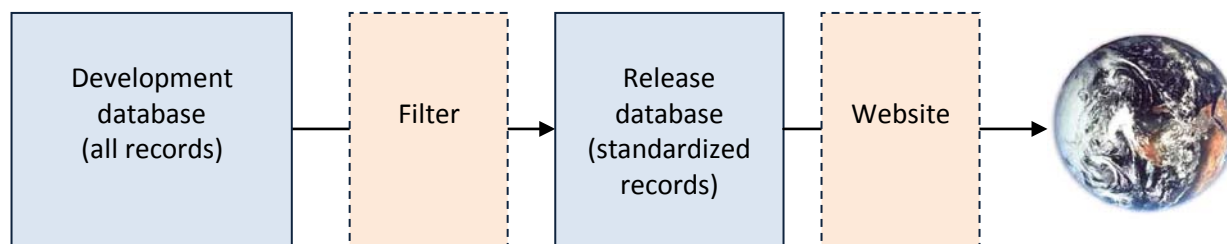
Figure 1, Schematic of the Tycho data architecture. Access to a consistent, standardized subset of the digitized US weekly surveillance reports will be provided for beta testing through a website that will allow querying and downloading of data. Data from the development database will be pushed through a filter to feed the Tycho database.

The current Tycho database will provide the reported number of cases or deaths reported by city or state health authorities to the federal health agency for all weeks between 1888 and 2009. Currently, only standardized, consistent data are being released for testing, according to the following criteria:

1. Only weekly reports are provided (reports for other periods such as 10 days, 2 weeks, 1 month, 1 year) are currently not included due to lack of comparability with the weekly reports.
2. Only reports that were published in the same year as the reporting period were included (this excludes updates or comparisons that were published more than a year after the original reporting period)
3. Only numbers were included for which information about the location, time period and disease could be extracted.
4. Only numbers or time periods for which no disease subcategories were reported were included.

Each of the steps described above have been described in detailed protocols that are posted in the documentation part of the Tycho website (www.tycho.pitt.edu).

Website
The Tycho website features simple and advanced searches of the data, visualizations and downloading of machine readable files. A dataset can be selected by specifying: 1) the disease of interest, 2) the location(s) of interest and 3) the time period. In a second step, the type of aggregation and length of increments can be specified and in a third step, the type of output (table, graphic or map) can be selected. After output has been generated, data can be downloaded.

As mentioned above, data availability varies largely by disease, time period and location. We aimed to restrict selection options by data availability to avoid "no results available.

Access to the most of the website will be password protected during the testing phase. For invited users after login, full functionality of the database and website will be available. During this phase however, the data quality will not be sufficient for publication or official use.

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Overview of data available for the state of Georgia

In this section, an overview of data available for the state of Georgia will be provided. As described earlier, data availability depends entirely on historical reporting practices in the weekly US Nationally Notifiable Disease Surveillance System between 1888 and 2009. For this report, we only included morbidity reports (cases) to improve the format and limit the size of this report. As mentioned earlier, the analysis and standardization of has not been completed yet for all records in the database and preliminary data are provided here that may not yet be available in the online database.

This section will provide a general overview of data availability. The next sections will provide disease specific data from state and city level reports of Georgia. Data for a maximum of 3 major cities were provided depending on availability (city data was only reported until 1953). Some summary data will be provided at the end of this report, for a subset of diseases for which data was fragmented over time.

Table 1 lists the number of weekly state or city reports that are available for Georgia per each disease and subcategory.

Table 1, Number of weekly state or city reports per disease and subcategory

Disease	City	State
Aids	-	936
Anthrax	-	143
Brucellosis [undulant fever]	-	626
Chickenpox [varicella]	454	127
Chlamydia	-	671
Cryptosporidiosis	-	495
Dengue	9	-
Diphtheria	1661	1950
Dysentery		
Amebic	-	256
Bacillary	-	298
Unspecified	-	207
Encephalitis		
Lethargic	381	-
Post infectious	-	168
Primary [infectious] including unspecified	342	765
Escherichia coli		
EHEC 0157	-	171
EHEC non-0157	-	156
O157:H7 NETSS	-	271
O157:H7 PHLIS	-	85
STEC	-	169
Giardiasis	-	380

Table 1, Number of weekly state or city reports per disease and subcategory, *continued*

Disease	City	State
Gonorrhea		
Civilian	-	696
Unspecified	-	1015
Haemophilus influenzae		
Age <5 non-serotype B	-	59
Age <5 unknown serotype	-	115
All ages all serotypes	-	650
Hepatitis		
Acute type A	-	381
Acute type B	-	382
Acute type C	-	127
Acute type NA NB [including C]	-	40
All types, <20 years	-	138
All types, >=20 years	-	60
All types, all ages	38	682
Type A [infectious]	-	1637
Type B [serum]	-	1100
Type NA NB [including C]	-	604
Type unspecified	-	262
Influenza	1309	1008
Legionellosis	-	917
Leprosy	1	230
Listeriosis	-	236
Lyme disease	-	556
Malaria		
Military	-	16
Unspecified	-	1864
Measles		
Imported	-	275
Indigenous	-	371
Unspecified	1624	2472
Meningitis		
Aseptic	-	736
Meningococcus	771	1213
Unspecified	215	5
Meningococcal disease		
All serogroups	-	48
Invasive all serogroups	-	190
Invasive serogroup unknown	-	45
Serogroup unspecified	20	2308

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Table 1, Number of weekly state or city reports per disease and subcategory, *continued*

Disease	City	State
Mumps	454	1319
Pellagra	381	-
Pneumonia		
Lobar	28	-
Unspecified	194	169
Poliomyelitis		
Non paralytic	-	109
Paralytic	-	462
Total	960	1786
Psittacosis	-	13
Rabies in animals	3	2831
Rocky mountain spotted fever	1	1714
Rubella	-	677
Salmonellosis		
NETSS	-	120
PHLIS	-	120
Unspecified	-	384
Scarlet fever		
Including streptococcal sore throat	68	528
Unspecified	1628	1266
Shigellosis		
NETSS	-	119
PHLIS	-	122
Unspecified	-	388
Streptococcal disease, invasive group a	-	385
Streptococcal sore throat	-	53
Streptococcus pneumoniae invasive disease		
Drug resistant <5 years	-	121
Drug resistant A	-	6
Drug resistant all ages	-	370
Drug resistant B	-	6
Non drug resistant <5 years	-	125
Syphilis		
Civilian primary and secondary	-	675
Congenital	-	103
Primary and secondary	-	1078
Tetanus	-	390
Toxic shock syndrome	-	148
Trichiniasis	-	3

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Table 1, Number of weekly state or city reports per disease and subcategory, *continued*

Disease	City	State
Tuberculosis [phthisis pulmonalis]		
New active	-	152
Unspecified	404	1407
Tularemia	1	1388
Typhoid fever [enteric fever]		
Including paratyphoid fever	339	692
Unspecified	1289	2108
Typhus fever		
Endemic	4	236
Unspecified	29	204
West nile disease		
Neuroinvasive	-	119
Non-neuroinvasive	-	67
Whooping cough [pertussis]	1279	2239

The diseases included in the weekly US Nationally Notifiable Disease Surveillance System varied largely over time and reflected the historical social-political priorities of each time period. Note that the diseases in the weekly system were a subset of all diseases included in the annual Notifiable Disease Surveillance System (that was not entered as part of this project).

The number of locations reporting diseases also varied over time depending on the type of reports submitted. Figure 1 on the next page provides an overview of the number of unique locations reporting each disease per week between 1888 and 2009. For the remainder of this report, the state of Georgia was considered a unique reporting location in addition to the individual city reports. Figure 1 indicates that many locations (mostly cities) were included in the reporting system before 1925, after which the number of cities dropped substantially. After 1953, only state reports were included and city reports were discontinued. These patterns were observed nationwide.
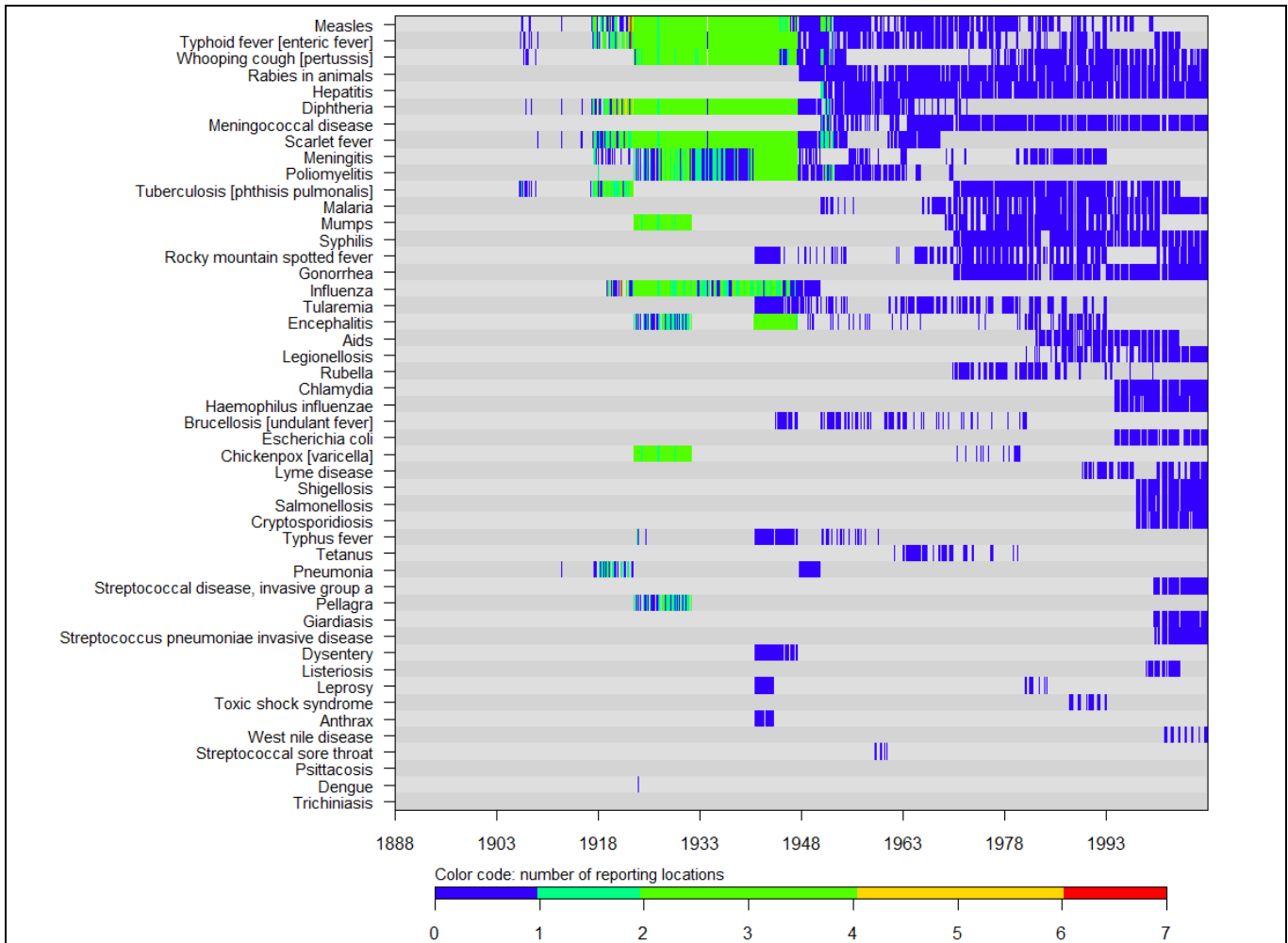
Figure 1, The number of locations (in color code) reporting on each disease per week between 1888 and 2009

For the majority of the time period between 1888 and 2009, only state level reports were available. It would be of great interest to complete the collection of city data after 1953 and we will seek collaboration with state health offices for this.

The map in figure 2 (next page) illustrates the geographical distribution of the available city data. It displays the number of weekly reports for any disease available per location that was included (and for which coordinates could be derived)

Tycho data report for the state of Georgia
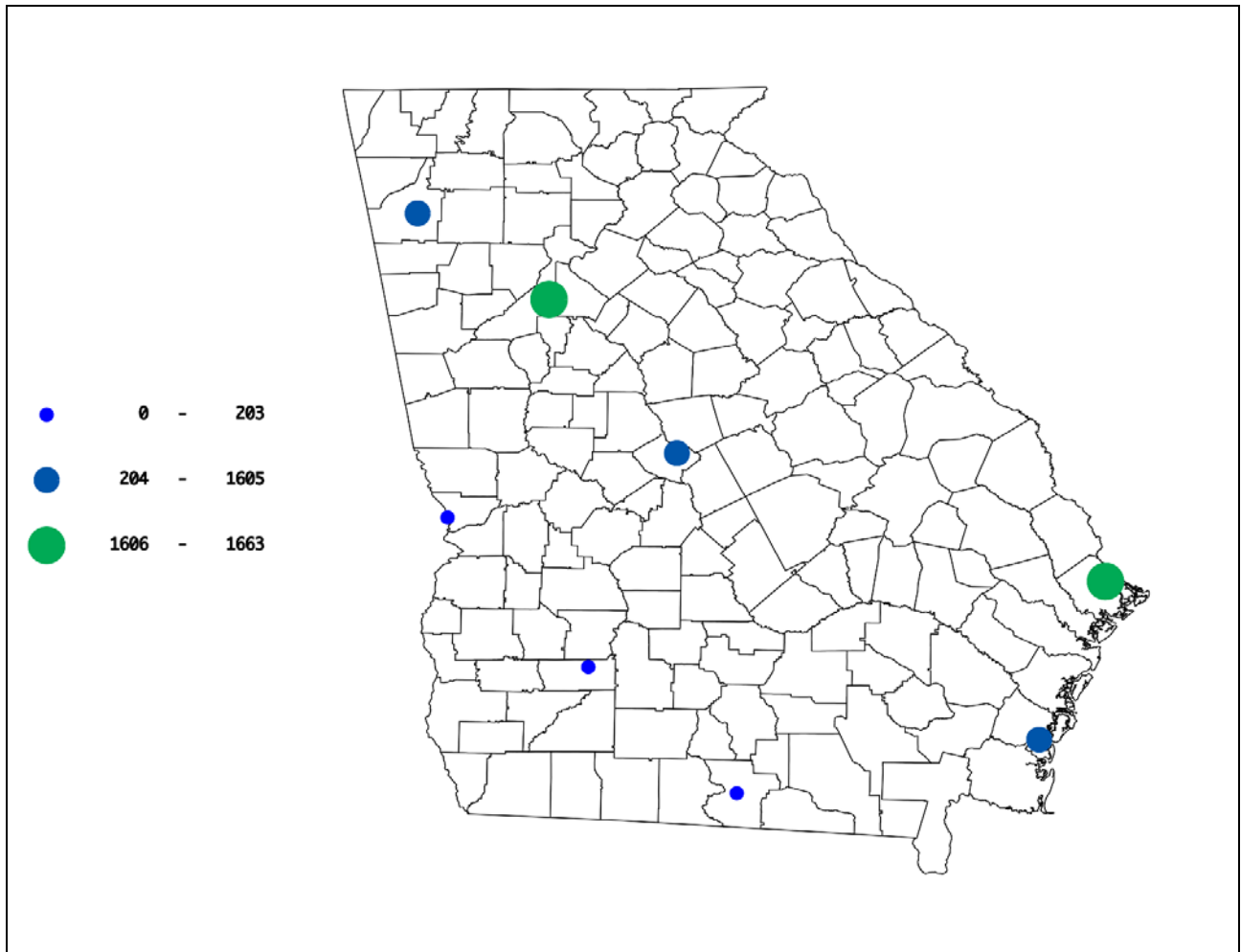
Figure 2, This map displays the number of weekly reports available for any disease per city (note that city reports were only available until 1953)

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Figure 3 below provides an overview of the number of diseases for which a weekly report was included at the state state level and for individual cities. All cities for which at least 100 weekly reports are available have been listed. For most states, it shows a major drop in the number of cities after 1925 and after 1953, city reports were discontinued except for New York City, which became its own reporting jurisdiction.
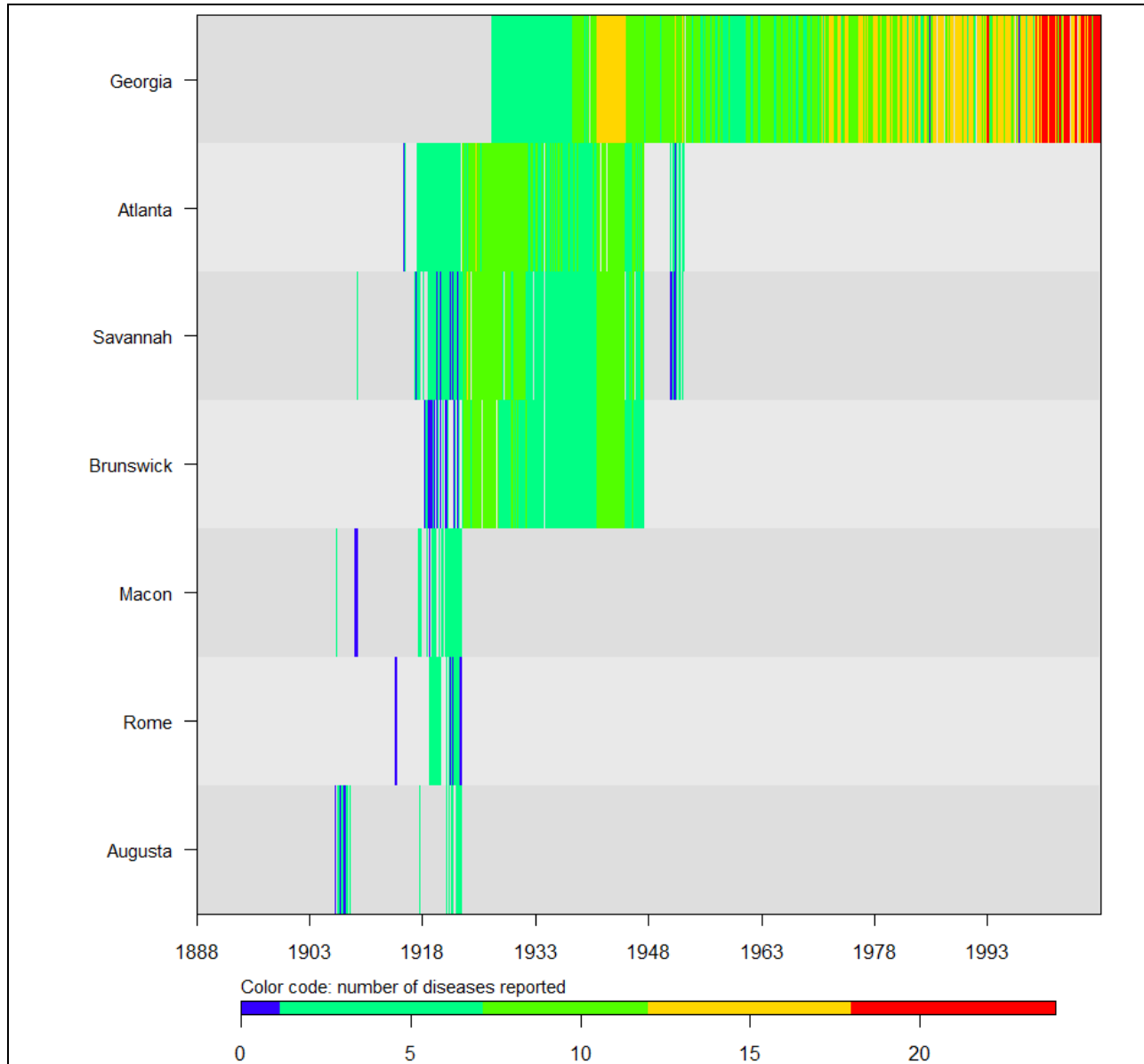
Figure 3, The number of diseases (in color code) that were reported for the state and city level (state on top row) for each week between 1888 and 2009
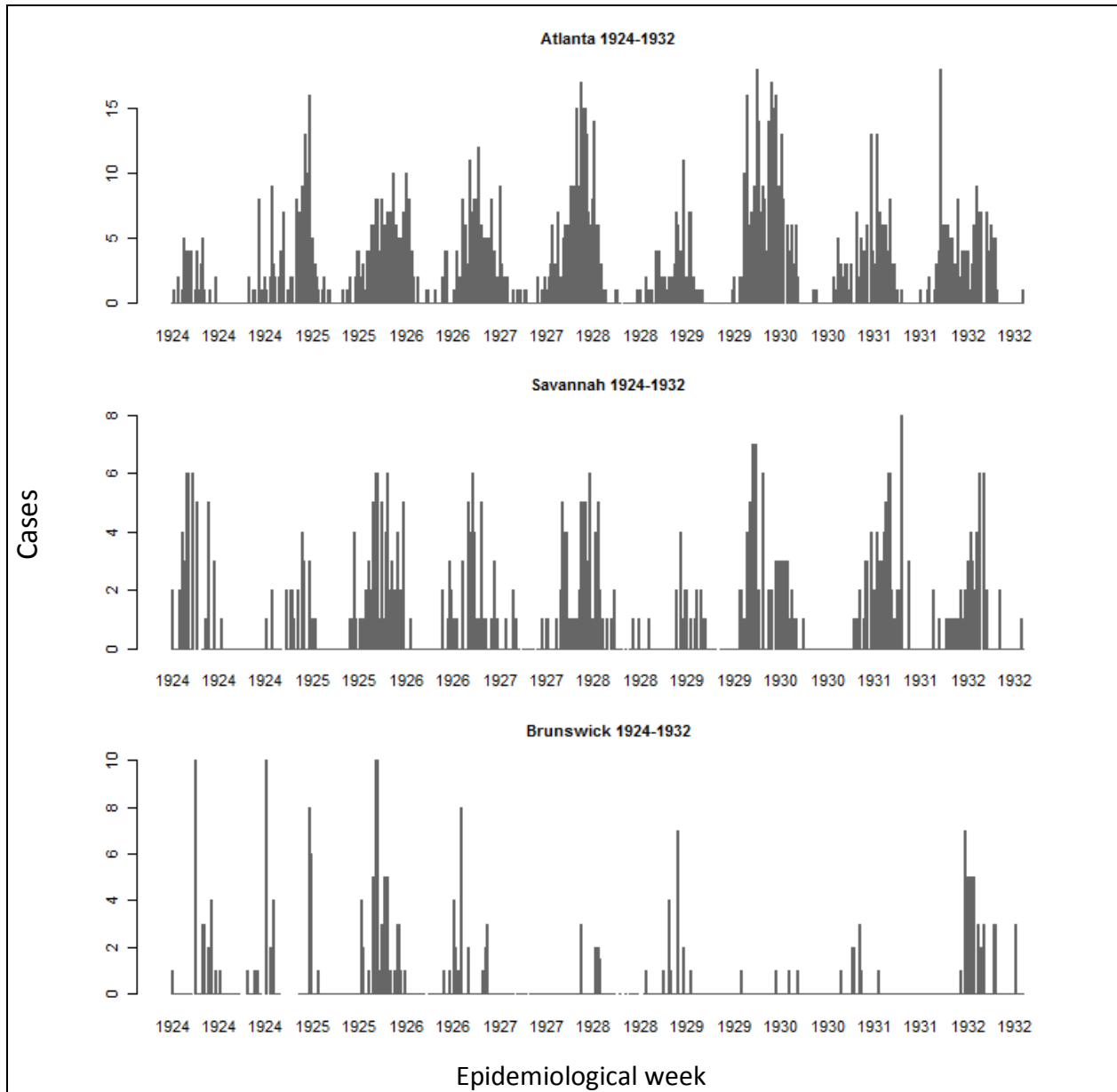
Disease specific data for Georgia

AIDS
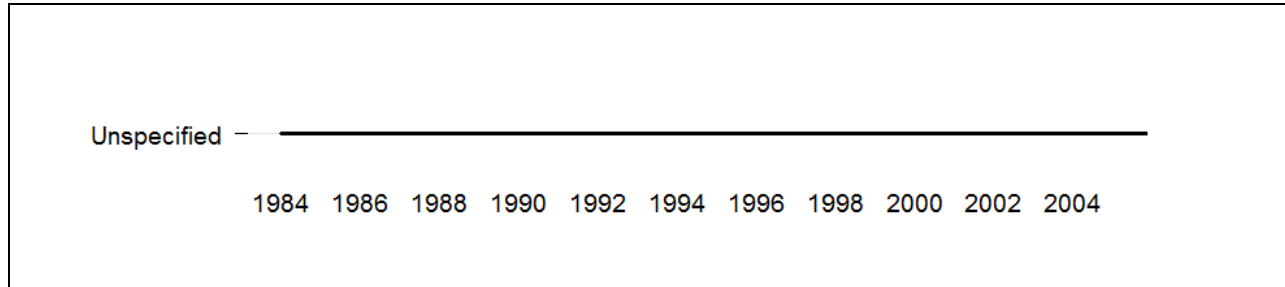
Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
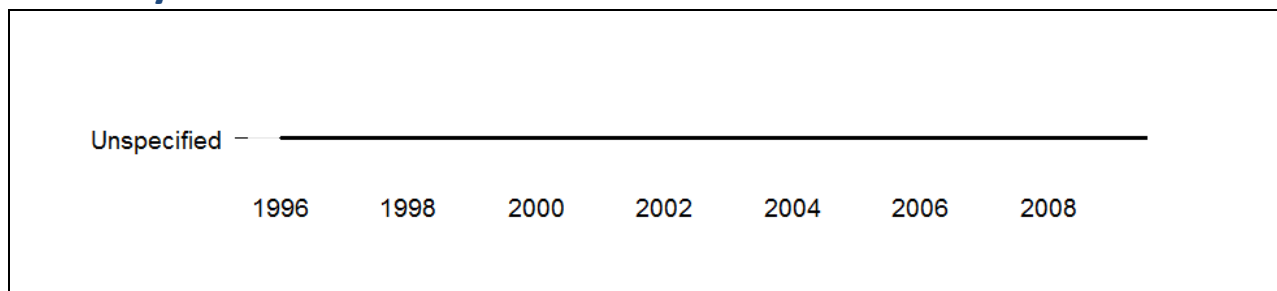
Table D1, Summary information for AIDS

Indicator	Georgia
Report period	1984-2005
Total weeks	936
Total cases	34,176
Max. cases per year	8,054
Year (max)	2003
Max. cases per week	6,569
Week (max)	2003, wk 42
Average cases per year	1,553
95%CI	(841-2,265)
Average cases per week	37
95%CI	(22-52)
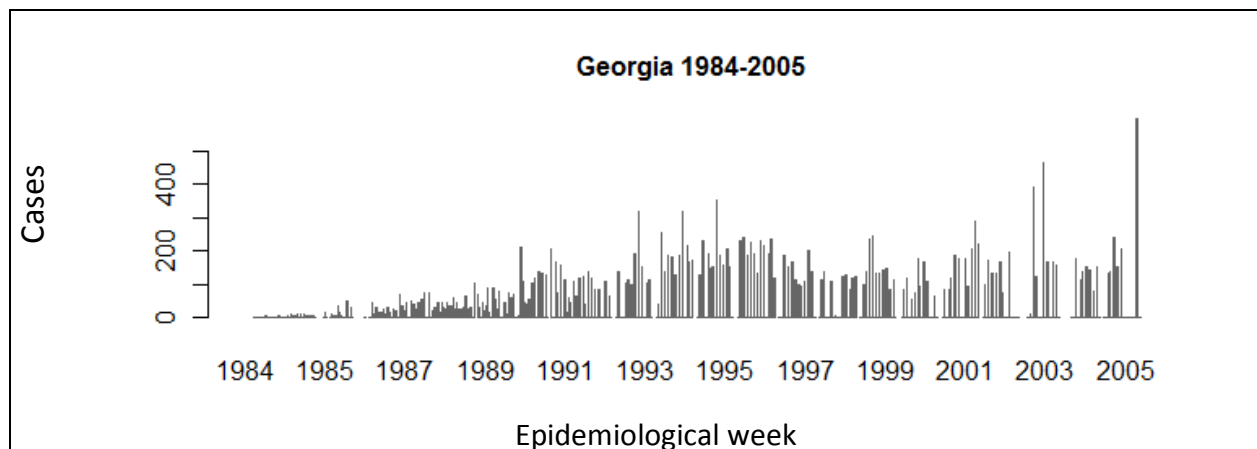
Figure D2, Number of cases reported for AIDS per epidemiological week

Chickenpox
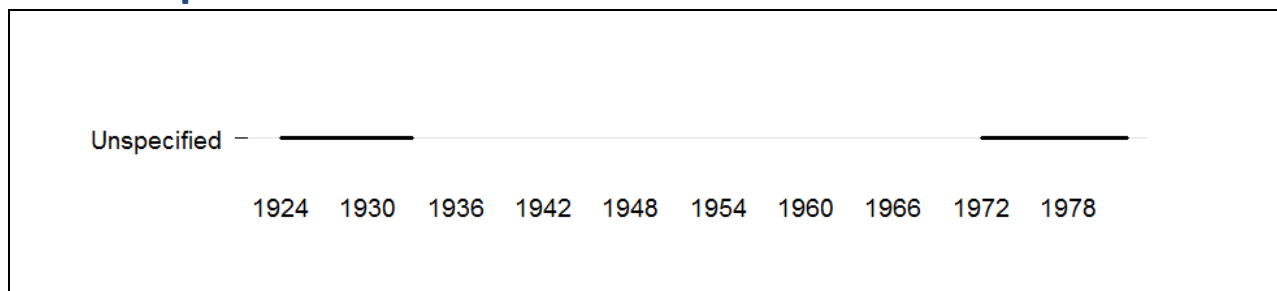
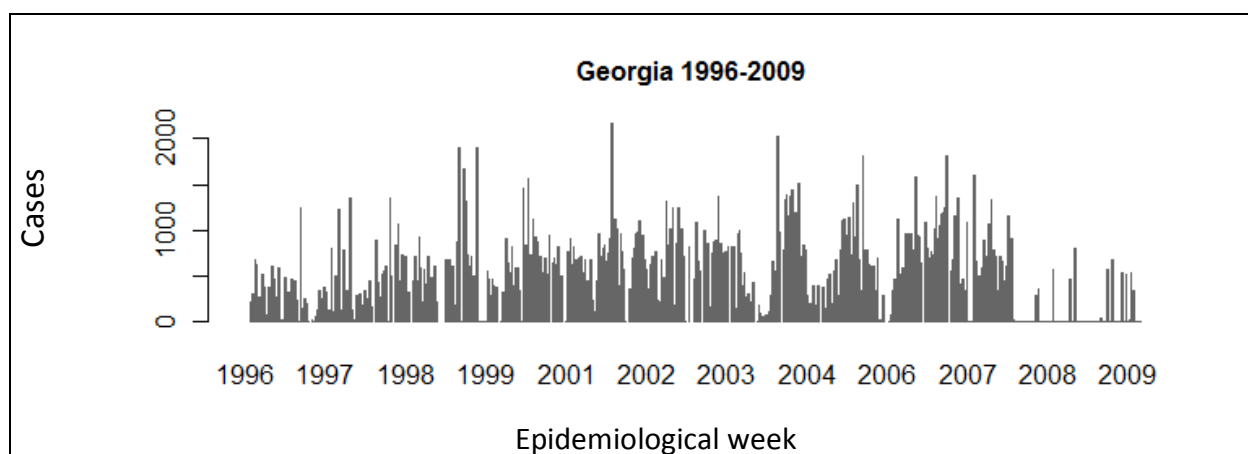Unspecified –

1924 1930 1936 1942 1948 1954 1960 1966 1972 1978

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
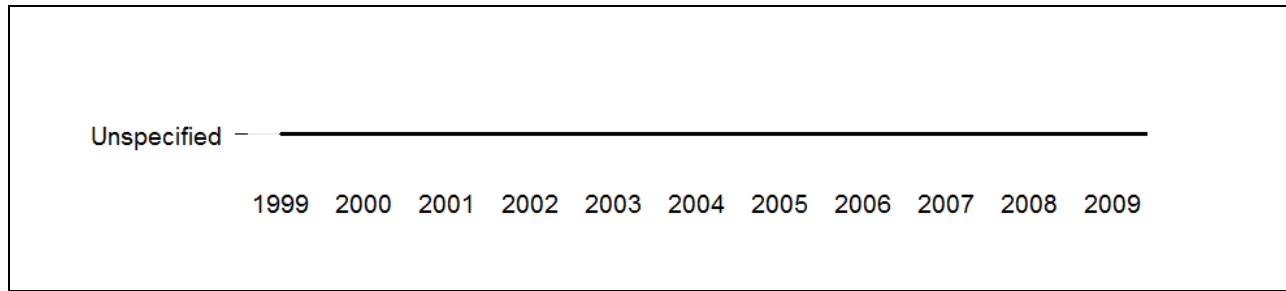
Table D1, Summary information for Chickenpox

Indicator	Atlanta	Savannah	Brunswick
Report period	1924-1932	1924-1932	1924-1932
Total weeks	447	439	422
Total cases	1,407	490	271
Max. cases per year	237	85	104
Year (max)	1930	1926	1926
Max. cases per week	24	12	21
Week (max)	1925, wk 19	1932, wk 14	1926, wk 09
Average cases per year			
before 1995	156	54	30
95%CI	(113-199)	(40-68)	(6-54)
after 1995	-	-	-
95%CI	-	-	-
Average cases per week			
before 1995	3	1	1
95%CI	(3-3)	(1-1)	(1-1)
after 1995	-	-	-
95%CI	-	-	-

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Figure D2, Number of cases reported for Chickenpox per epidemiological week
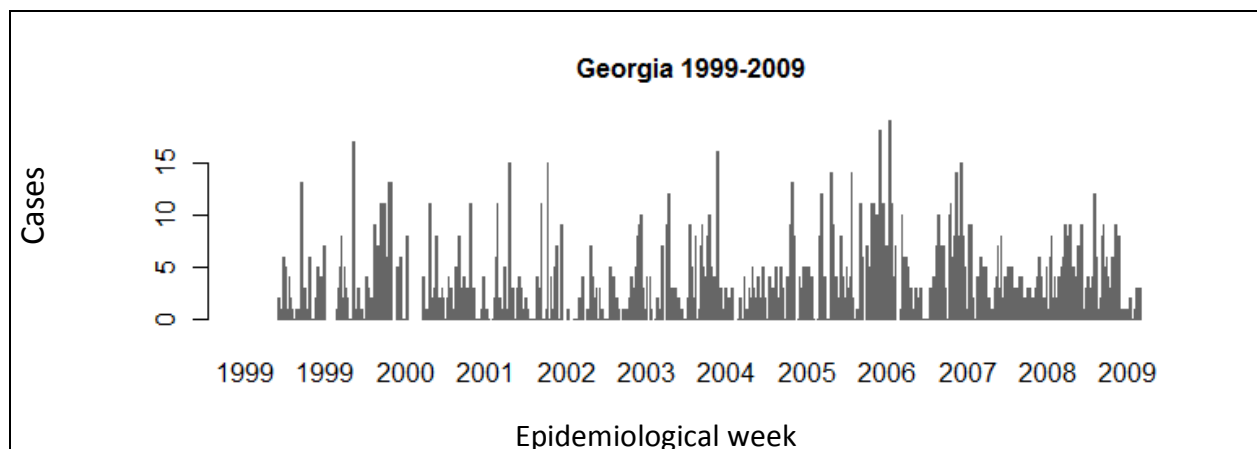
Chlamydia

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
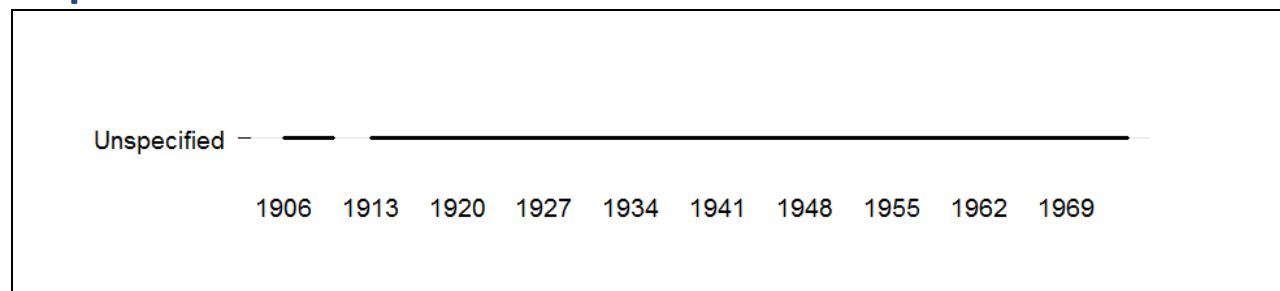
Table D1, Summary information for Chlamydia

Indicator	Georgia
Report period	1996-2009
Total weeks	670
Total cases	300,615
Max. cases per year	33,150
Year (max)	2006
Max. cases per week	7,150
Week (max)	1999, wk 43
Average cases per year	21,472
95%CI	(15,675-27,269)
Average cases per week	449
95%CI	(411-487)

Figure D2, Number of cases reported for Chlamydia per epidemiological week

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Cryptosporidiosis

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

Table D1, Summary information for Cryptosporidiosis

Indicator	Georgia
Report period	1999-2009
Total weeks	495
Total cases	1,785
Max. cases per year	282
Year (max)	2006
Max. cases per week	30
Week (max)	2007, wk 40
Average cases per year	162
95%CI	(121-203)
Average cases per week	4
95%CI	(4-4)

Figure D2, Number of cases reported for Cryptosporidiosis per epidemiological week

23

Diphtheria

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

Table D1, Summary information for Diphtheria

Indicator	Georgia	Atlanta	Savannah	Brunswick
Report period	1927-1973	1916-1953	1909-1953	1918-1948
Total weeks	1,950	1,540	1,433	1,266
Total cases	18,683	4,894	1,497	95
Max. cases per year	1,217	410	165	13
Year (max)	1933	1922	1919	1921
Max. cases per week	88	39	18	6
Week (max)	1932, wk 44	1926, wk 46	1919, wk 46	1935, wk 26
Average cases per year				
before 1940	848	189	58	4
95%CI	(685-1,011)	(147-231)	(44-72)	(2-6)
after 1940	207	18	4	1
95%CI	(130-284)	(11-25)	(1-7)	(0-2)
Average cases per week				
before 1940	18	4	1	0
95%CI	(17-19)	(4-4)	(1-1)	(0-0)
after 1940	5	0	0	0
95%CI	(5-5)	(0-0)	(0-0)	(0-0)

24
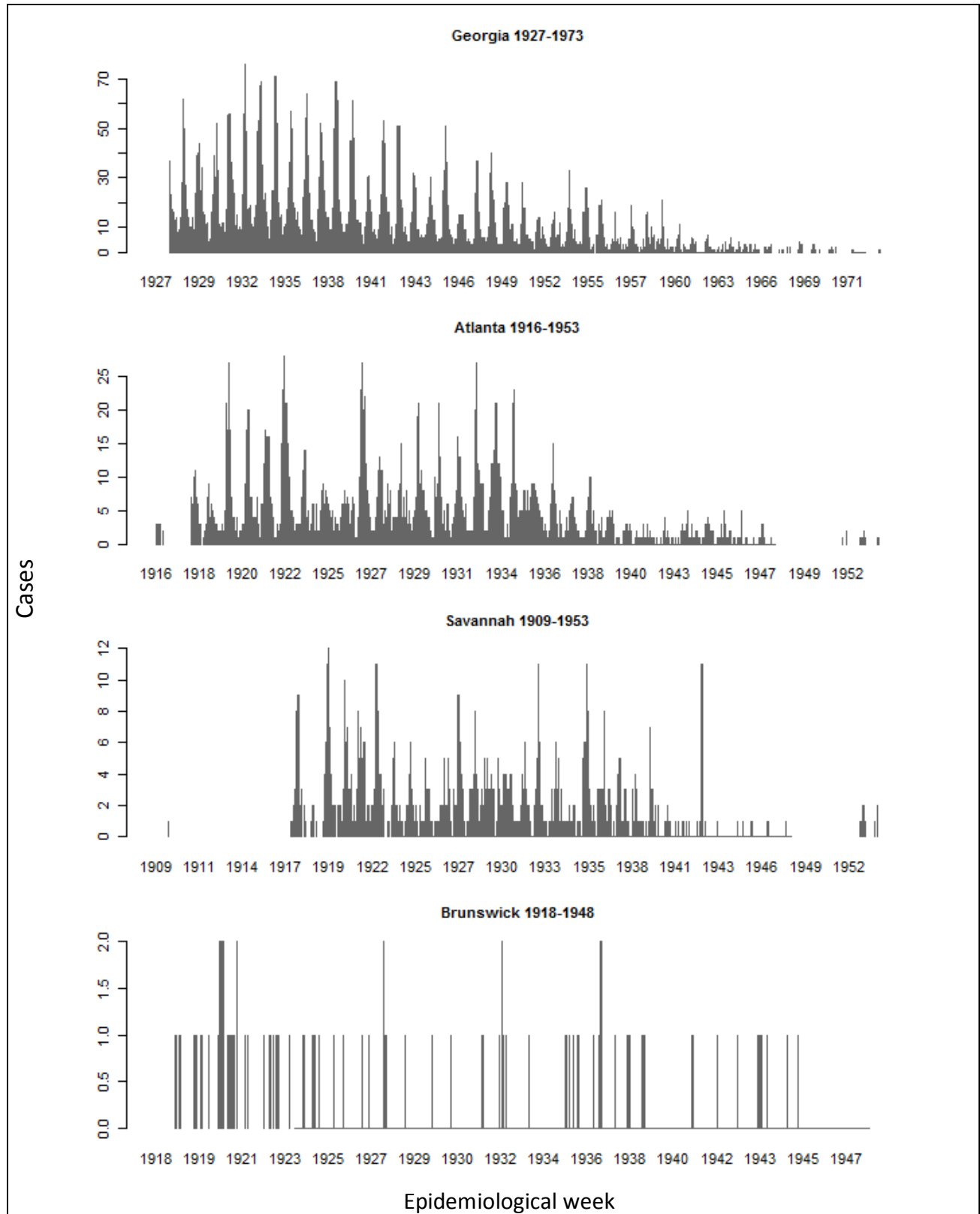
Figure D2, Number of cases reported for Diphtheria per epidemiological week
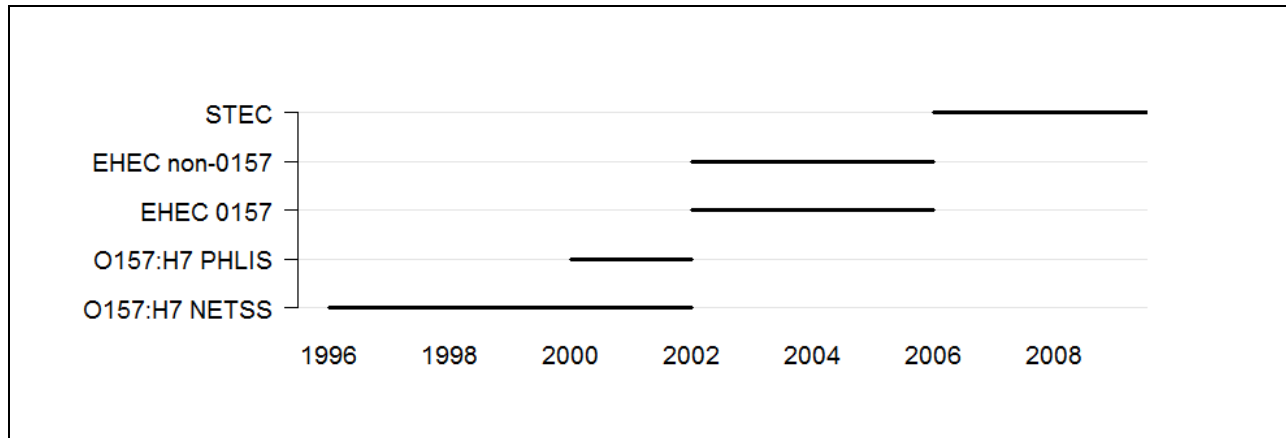
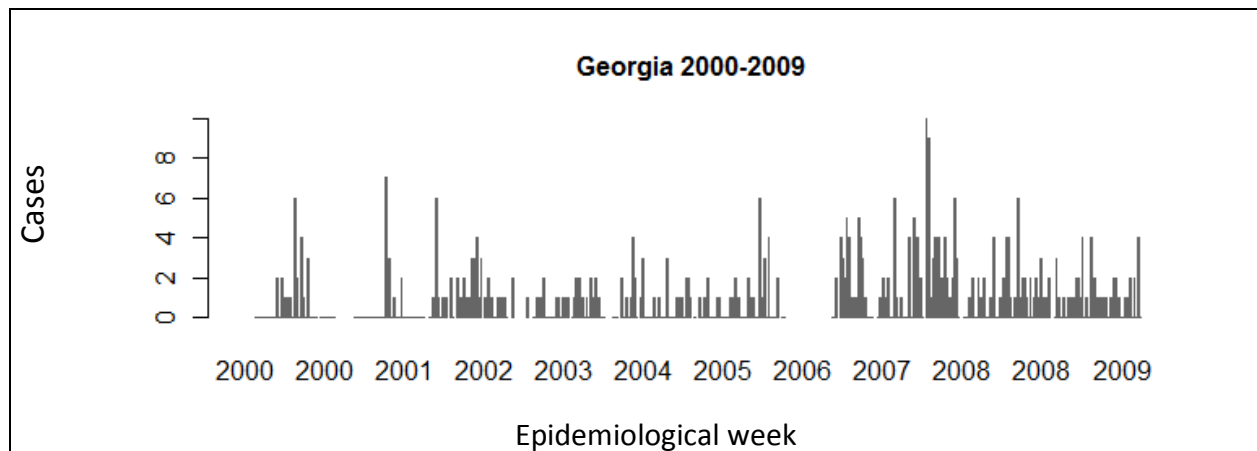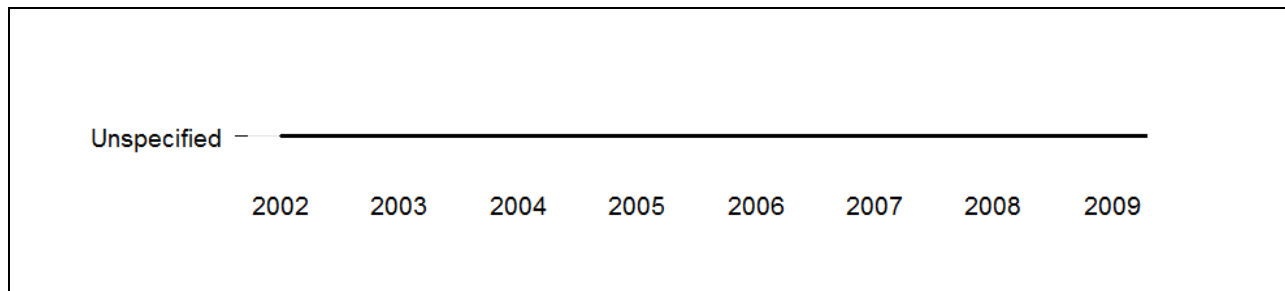*Tycho data report for the state of Georgia*

Escherichia Coli
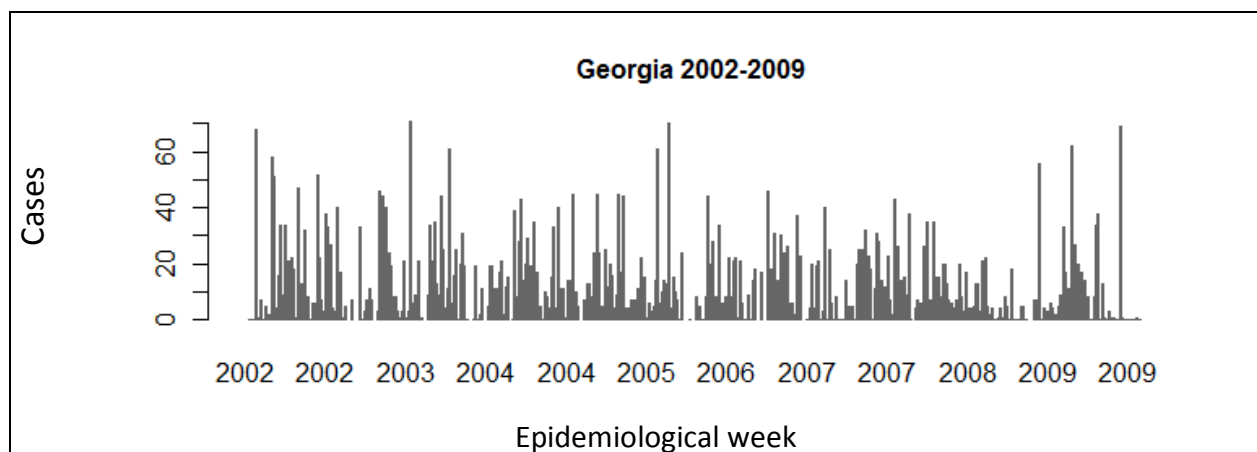

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
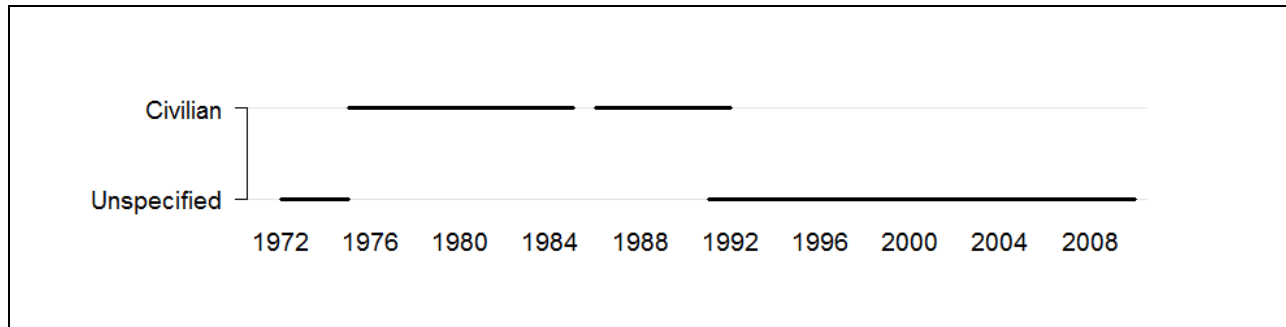
Table D1, Summary information for Escherichia Coli (0157:H7 PHLIS, EHEC 0157, and STEC)

Indicator	Georgia
Report period	2000-2009
Total weeks	425
Total cases	434
Max. cases per year	109
Year (max)	2007
Max. cases per week	14
Week (max)	2006, wk 31
Average cases per year	43
95%CI	(23-63)
Average cases per week	1
95%CI	(1-1)

Figure D2, Number of cases reported for Escherichia Coli per epidemiological week
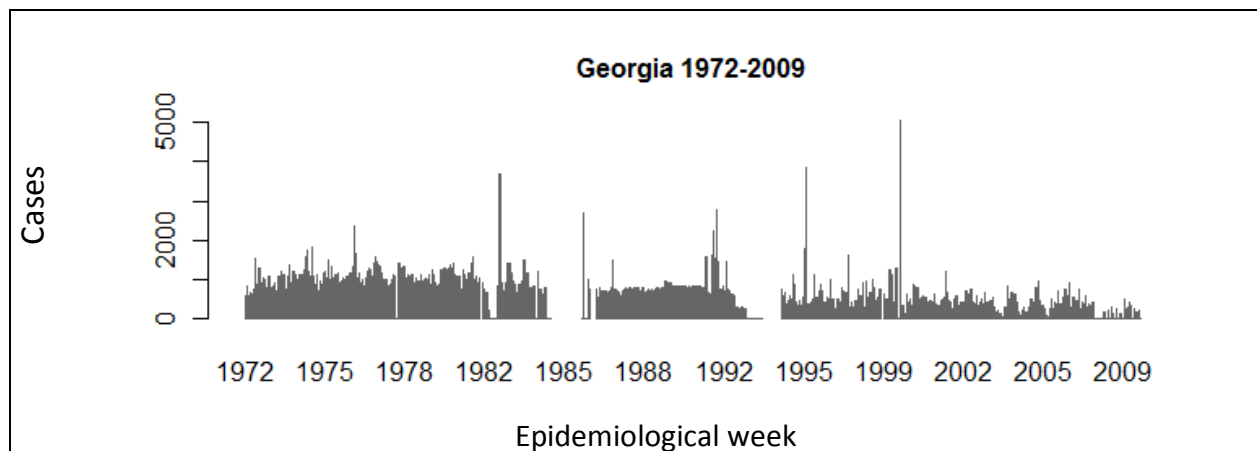
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Giardiasis

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
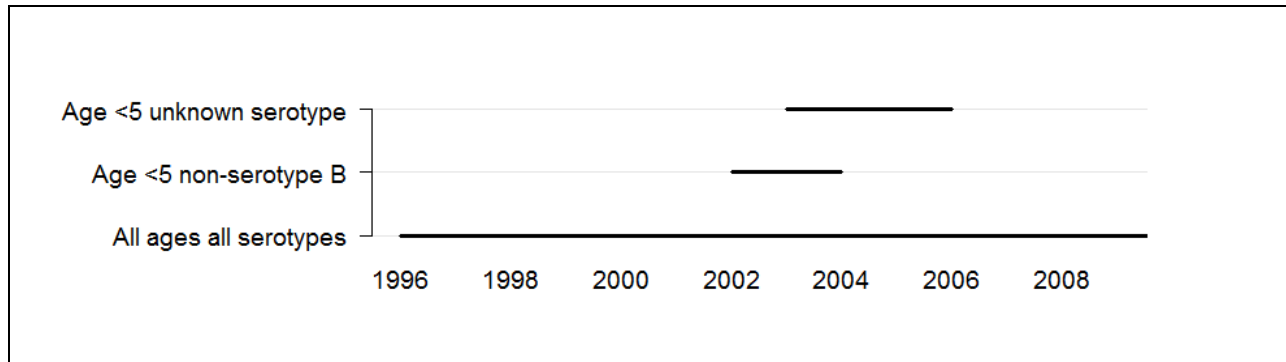
Table D1, Summary information for Giardiasis

Indicator	Georgia
Report period	2002-2009
Total weeks	379
Total cases	5,217
Max. cases per year	824
Year (max)	2002
Max. cases per week	120
Week (max)	2004, wk 36
Average cases per year	652
95%CI	(528-776)
Average cases per week	14
95%CI	(12-16)

Figure D2, Number of cases reported for Giardiasis per epidemiological week
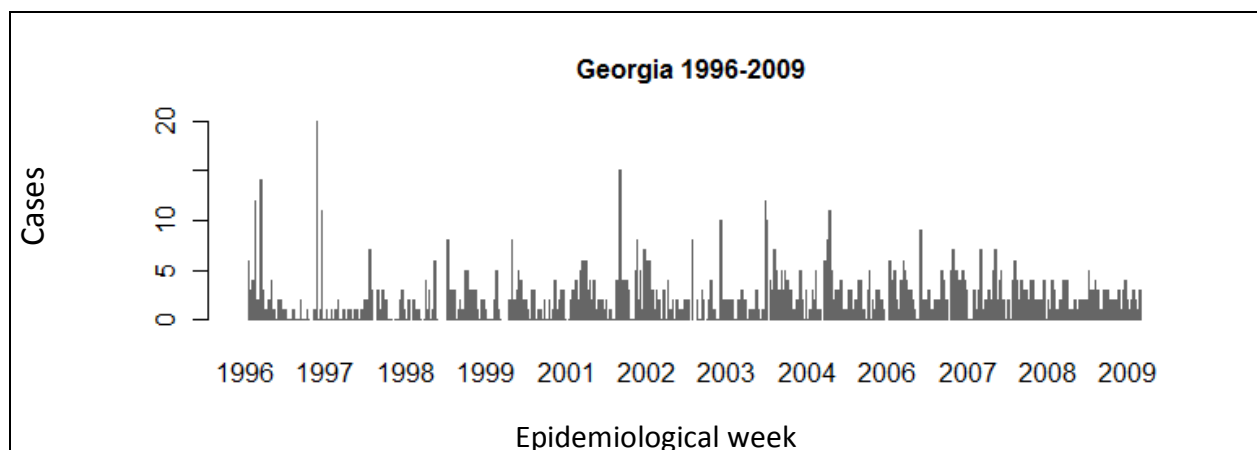
Tycho data report for the state of Georgia

Gonorrhea

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
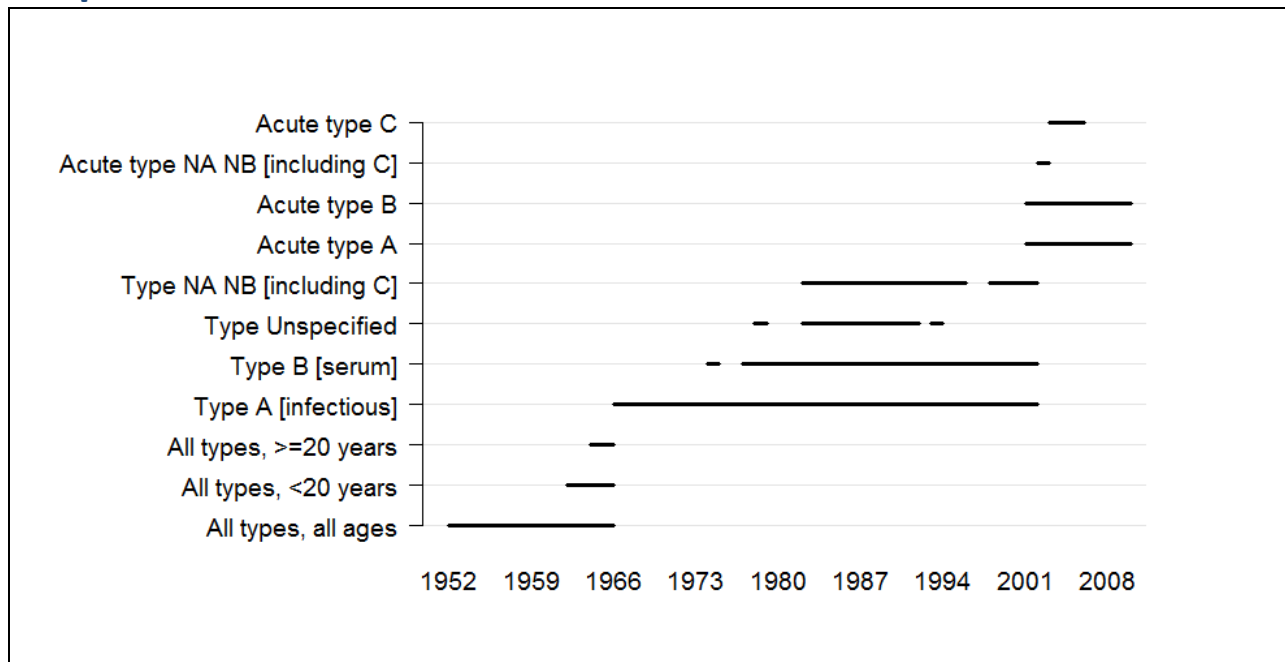
Table D1, Summary information for Gonorrhea (Unspecified and Civilian)

Indicator	Georgia
Report period	1972-2009
Total weeks	1,709
Total cases	961,655
Max. cases per year	49,089
Year (max)	1980
Max. cases per week	7,450
Week (max)	1986, wk 32
Average cases per year	25,991
95%CI	(21,059-30,923)
Average cases per week	563
95%CI	(540-586)

Figure D2, Number of cases reported for Gonorrhea per epidemiological week

Haemophilus Influenzae

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

Table D1, Summary information for Haemophilus Influenzae (All ages all serotypes)

Indicator	Georgia
Report period	1996-2009
Total weeks	650
Total cases	1,304
Max. cases per year	148
Year (max)	2005
Max. cases per week	50
Week (max)	2006, wk 35
Average cases per year	93
95%CI	(73-113)
Average cases per week	2
95%CI	(2-2)

Figure D2, Number of cases reported for Haemophilus Influenzae per epidemiological week

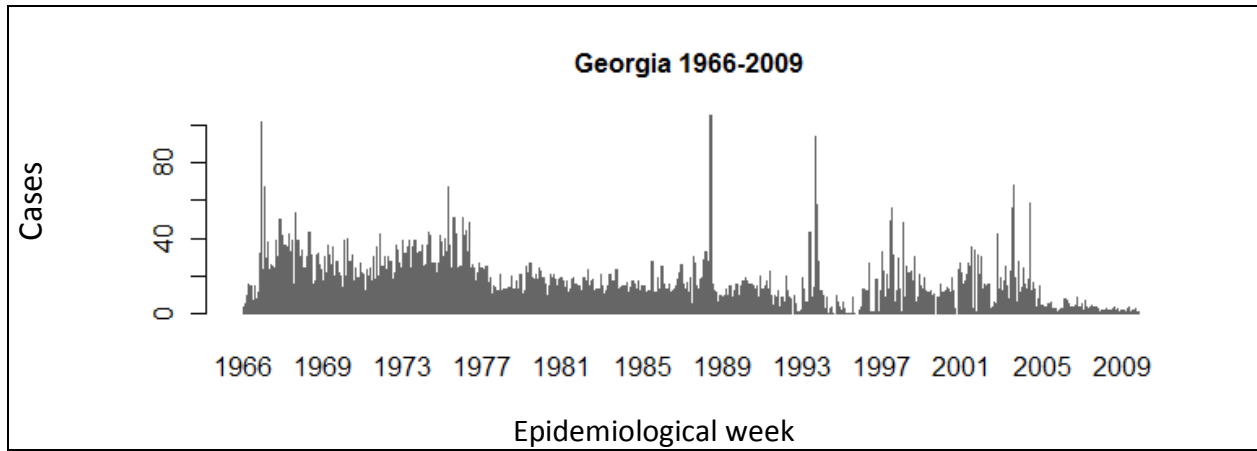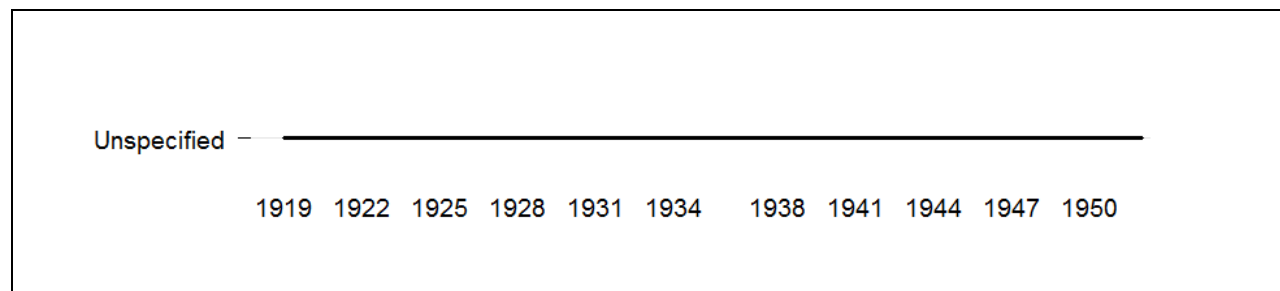*Tycho data report for the state of Georgia*

Hepatitis

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

Table D1, Summary information for Hepatitis (Type A [Infectious], Acute type A, Type B [Serum], and Acute type B)

| Indicator	Georgia
Report period	1966-2009
Total weeks	2,054
Total cases	22,842
Max. cases per year	1,368
Year (max)	1976
Max. cases per week	472
Week (max)	1983, wk 01
Average cases per year	
before 1990	698
95%CI	(592-804)
after 1990	283
95%CI	(186-380)
Average cases per week	
before 1990	15
95%CI	(14-16)
after 1990	6
95%CI	(5-7)

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Figure D2, Number of cases reported for Hepatitis per epidemiological week

Influenza

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

Table D1, Summary information for Influenza

| Indicator	Georgia	Atlanta	Savannah
Report period	1919-1951	1920-1948	1920-1948
Total weeks	1,006	1,208	961
Total cases	207,158	47,895	25,834
Max. cases per year	23,905	6,395	4,012
Year (max)	1941	1920	1920
Max. cases per week	9,031	2,258	1,588
Week (max)	1941, wk 04	1920, wk 06	1920, wk 06
Average cases per year	7,673	1,652	891
95%CI	(4,937-10,409)	(1,043-2,261)	(535-1,247)
Average cases per week	206	40	27
95%CI	(165-247)	(31-49)	(21-33)
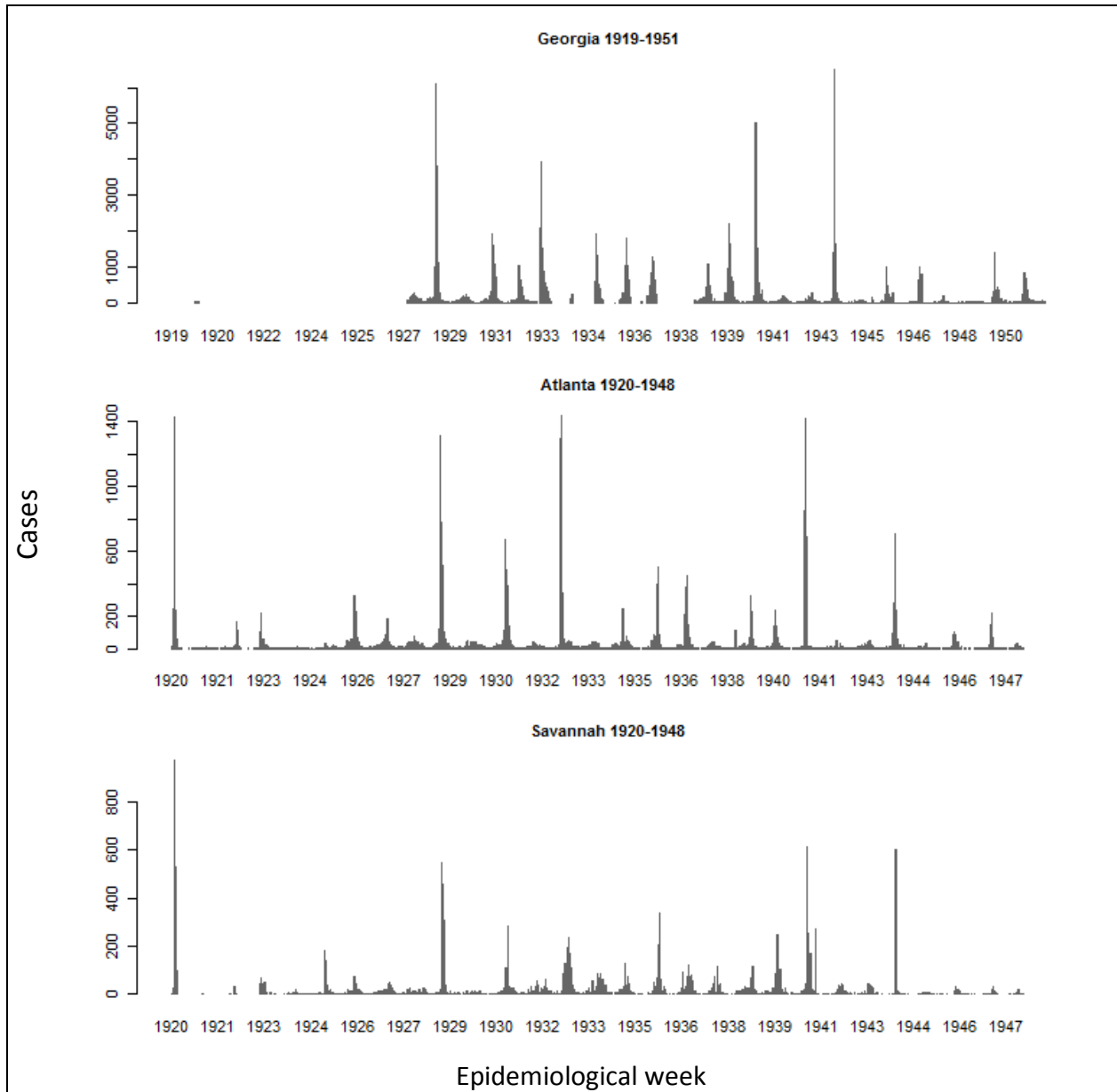
Figure D2, Number of cases reported for Influenza per epidemiological week
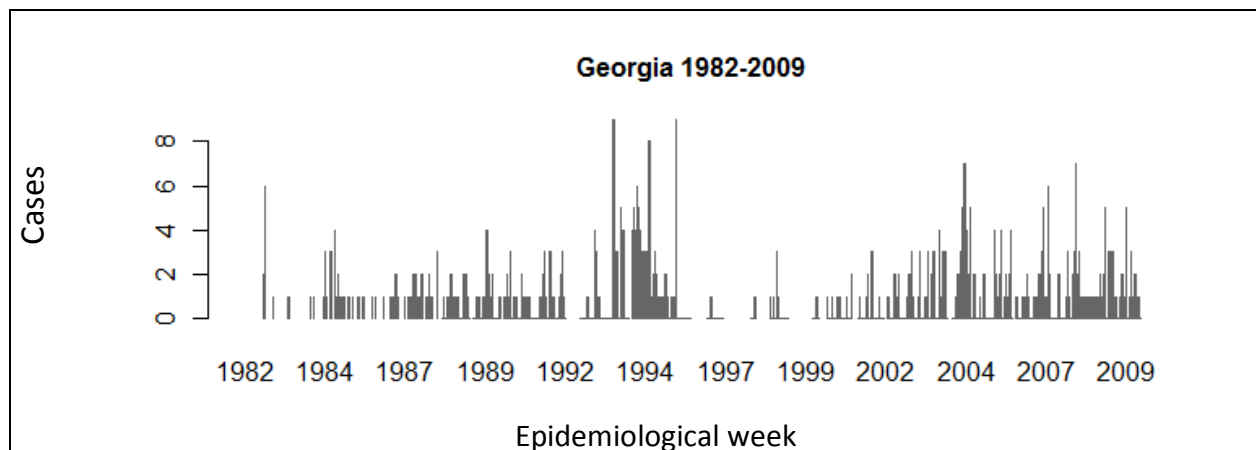
Legionellosis
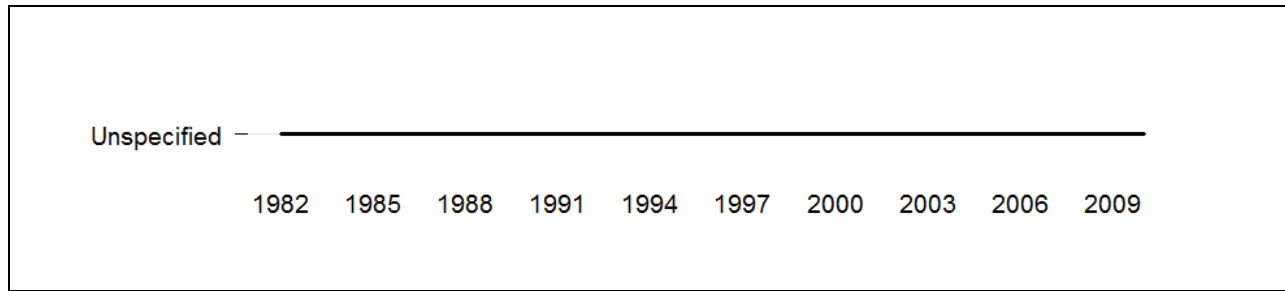
Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
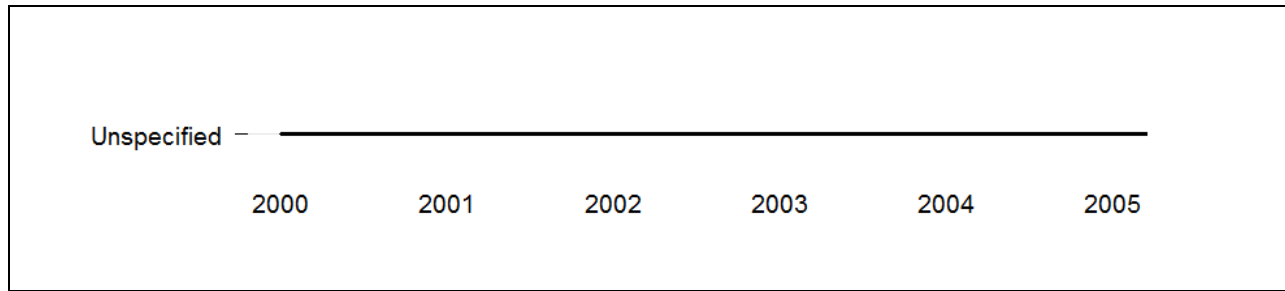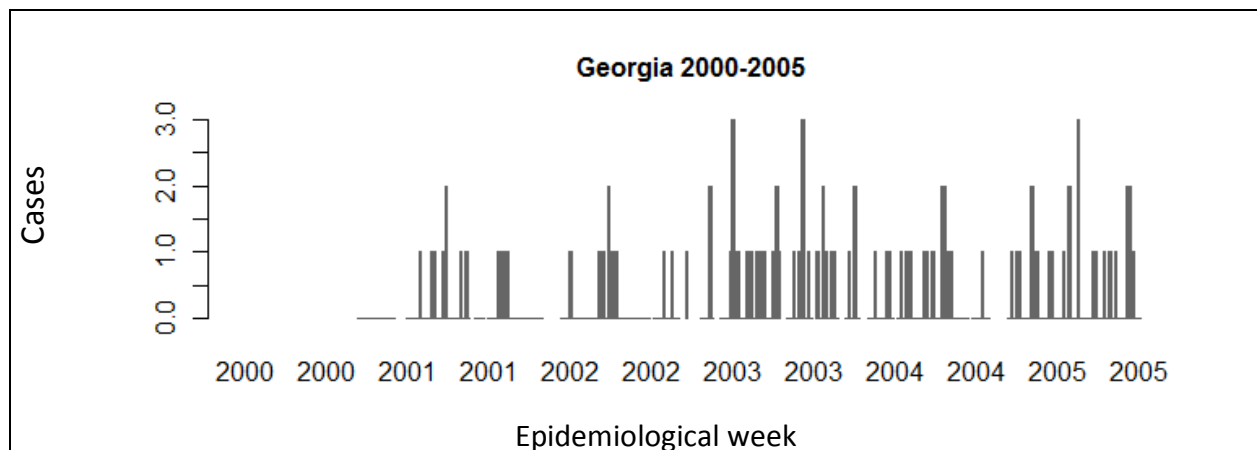
Table D1, Summary information for Legionellosis

Indicator	Georgia
Report period	1982-2009
Total weeks	917
Total cases	605
Max. cases per year	99
Year (max)	1994
Max. cases per week	16
Week (max)	1994, wk 16
Average cases per year	22
95%CI	(14-30)
Average cases per week	1
95%CI	(1-1)

Figure D2, Number of cases reported for Legionellosis per epidemiological week

Listeriosis

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
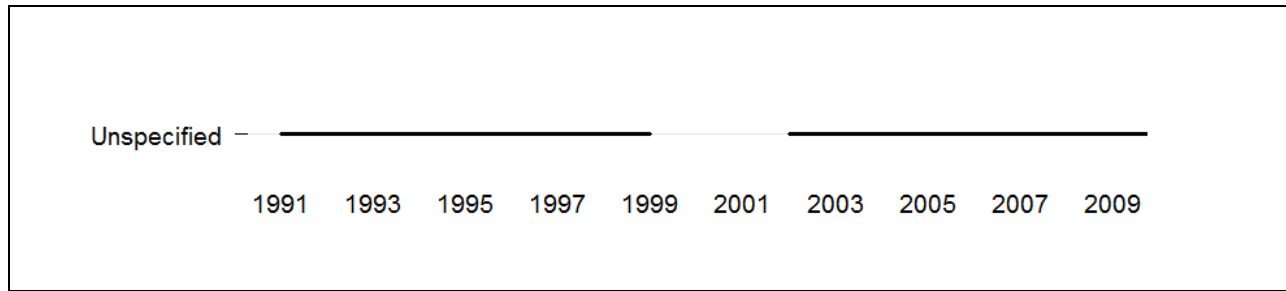
Table D1, Summary information for Listeriosis

Indicator	Georgia
Report period	2000-2005
Total weeks	236
Total cases	108
Max. cases per year	35
Year (max)	2003
Max. cases per week	5
Week (max)	2003, wk 43
Average cases per year	18
95%CI	(6-30)
Average cases per week	0
95%CI	(0-0)

Figure D2, Number of cases reported for Listeriosis per epidemiological week
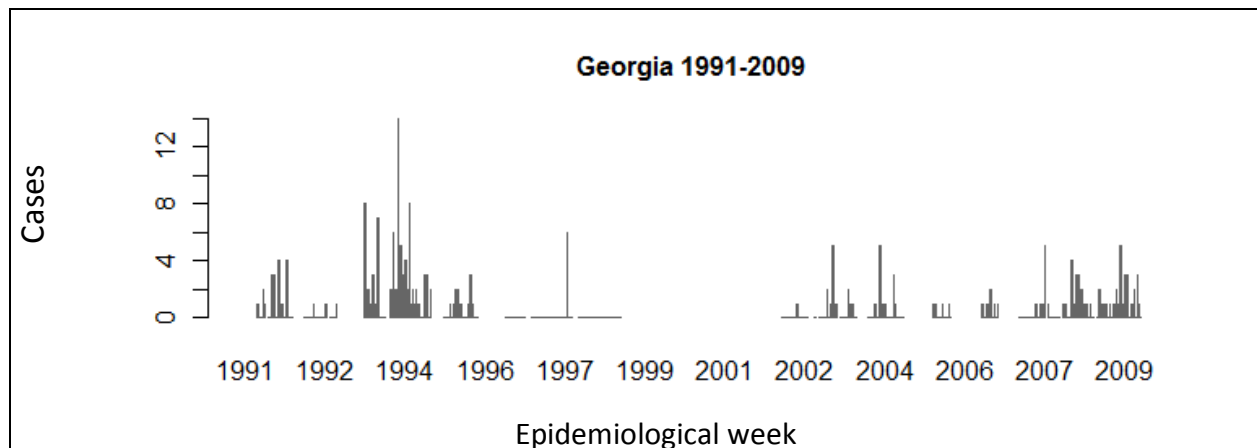
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Lyme Disease

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
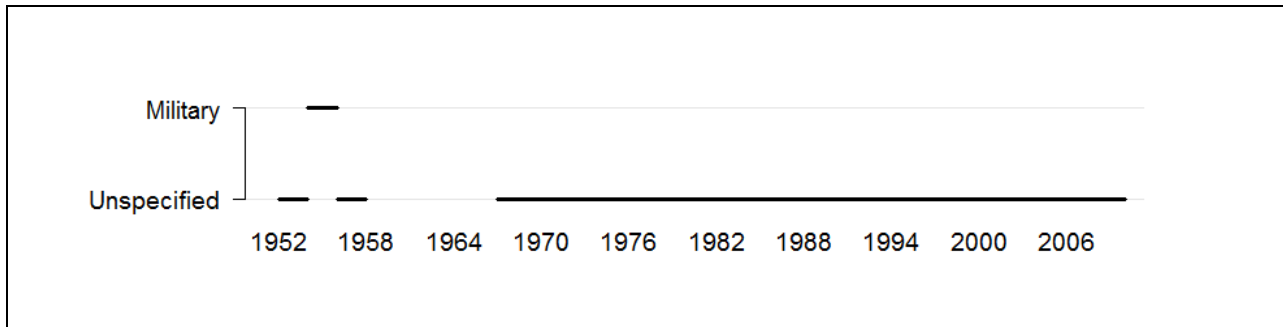
Table D1, Summary information for Lyme Disease

Indicator	Georgia
Report period	1991-2009
Total weeks	556
Total cases	306
Max. cases per year	104
Year (max)	1994
Max. cases per week	18
Week (max)	1992, wk 48
Average cases per year	19
95%CI	(6-32)
Average cases per week	1
95%CI	(1-1)

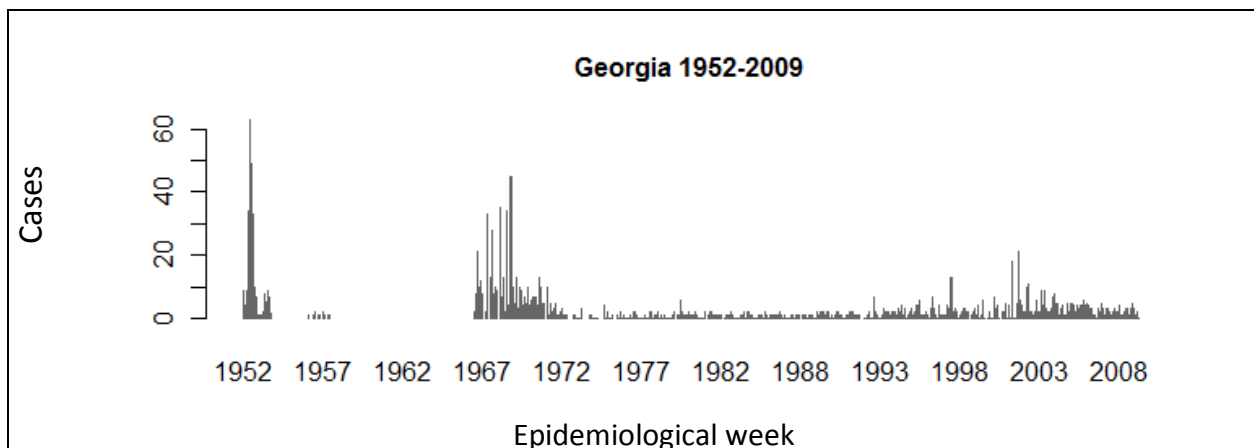**Figure D2,** Number of cases reported for Lyme Disease per epidemiological week

Malaria

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
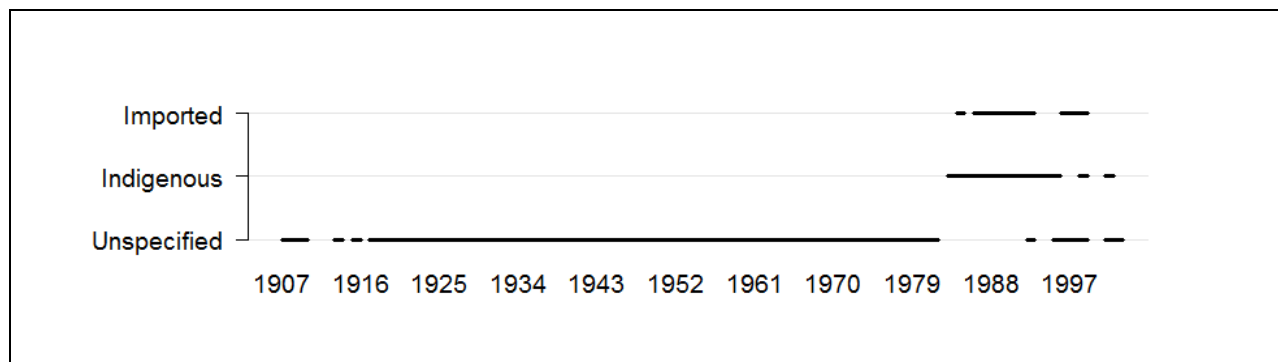
Table D1, Summary information for Malaria (Unspecified and Military)

Indicator	Georgia
Report period	1952-2009
Total weeks	1,864
Total cases	2,601
Max. cases per year	639
Year (max)	1952
Max. cases per week	134
Week (max)	1952, wk 14
Average cases per year	55
95%CI	(25-85)
Average cases per week	1
95%CI	(1-1)

Figure D2, Number of cases reported for Malaria per epidemiological week
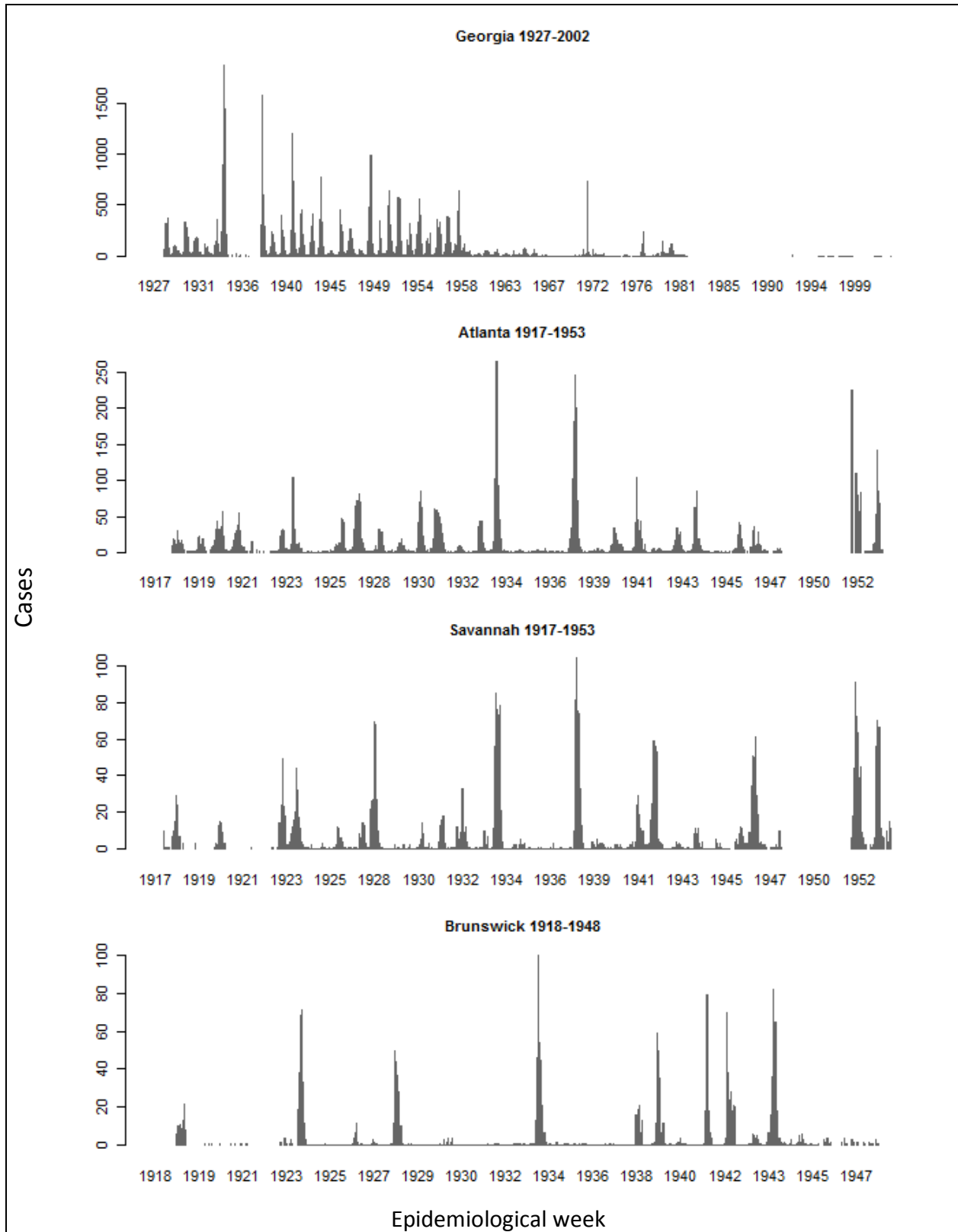
Tycho data report for the state of Georgia

Measles

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
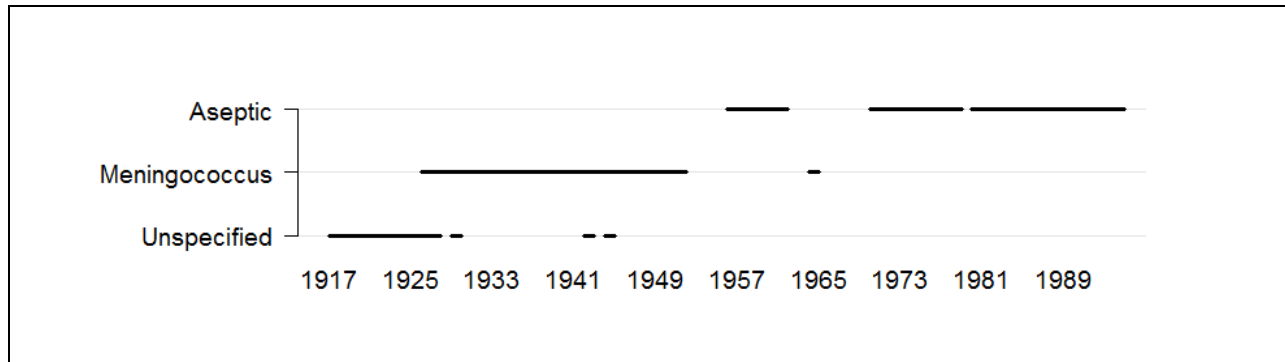
Table D1, Summary information for Measles (Unspecified)

Indicator	Georgia	Atlanta	Savannah	Brunswick
Report period	1927-2002	1917-1953	1917-1953	1918-1948
Total weeks	2,472	1,445	1,319	1,172
Total cases	156,631	16,429	7,533	4,197
Max. cases per year	22,965	2,666	1,246	1,141
Year (max)	1934	1934	1934	1934
Max. cases per week	2,122	351	153	182
Week (max)	1934, wk 06	1934, wk 10	1934, wk 10	1934, wk 07
Average cases per year				
before 1970	3,555	483	222	140
95%CI	(2,238-4,872)	(283-683)	(119-325)	(48-232)
after 1970	209	-	-	-
95%CI	(32-386)	-	-	-
Average cases per week				
before 1970	83	11	6	4
95%CI	(75-91)	(10-12)	(5-7)	(3-5)
after 1970	6	-	-	-
95%CI	(3-9)	-	-	-

Figure D2, Number of cases reported for Measles per epidemiological week

Tycho data report for the state of Georgia
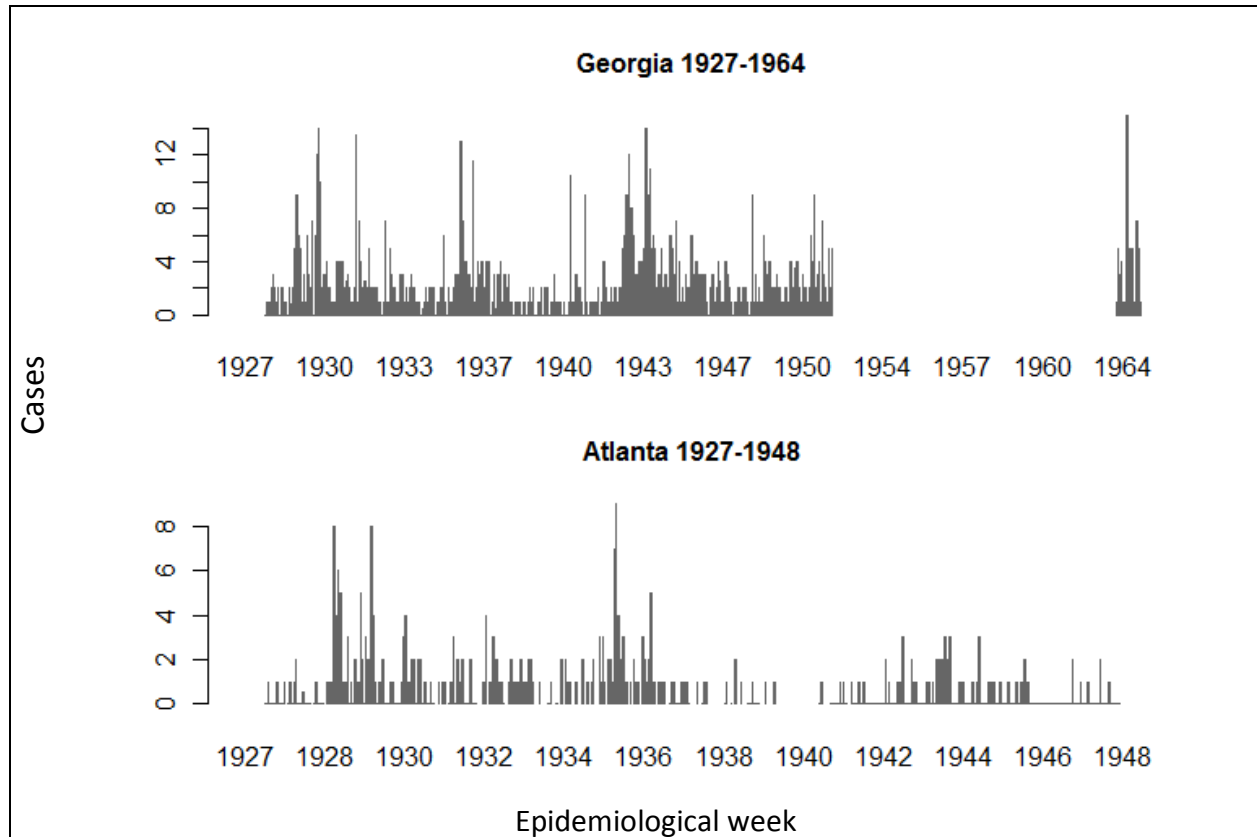
Meningitis

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

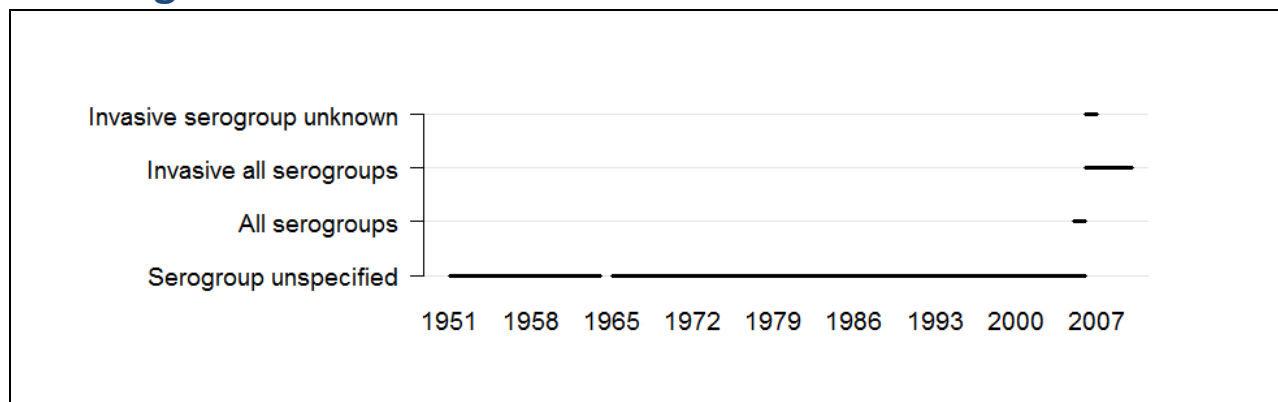**Table D1,** Summary information for Meningitis (Meningococcus)

Indicator	Georgia	Atlanta
Report period	1927-1964	1927-1948
Total weeks	1,213	677
Total cases	1,736	449
Max. cases per year	184	70
Year (max)	1943	1930
Max. cases per week	19	12
Week (max)	1930, wk 53	1930, wk 05
Average cases per year	67	20
95%CI	(47-87)	(11-29)
Average cases per week	1	1
95%CI	(1-1)	(1-1)

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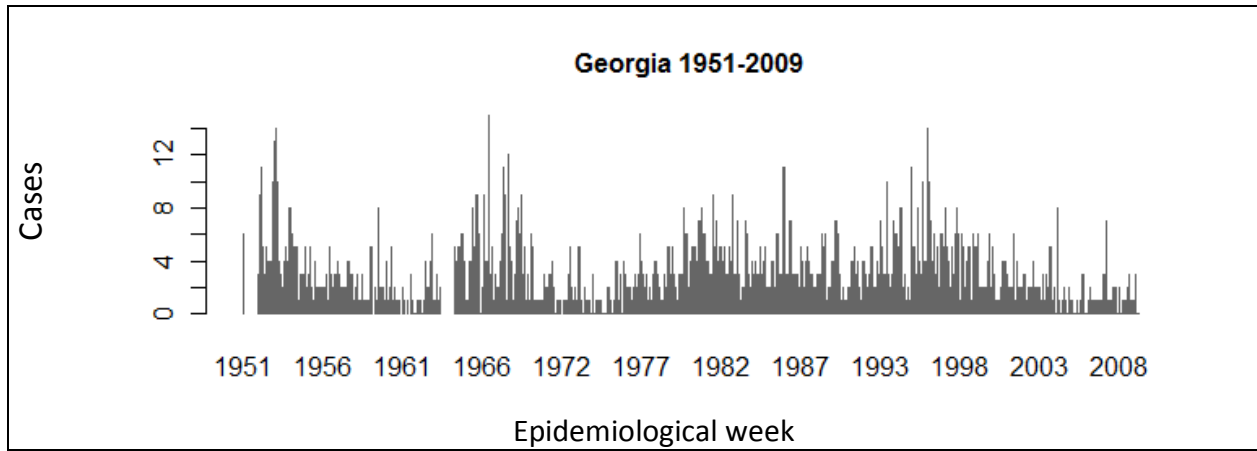**Figure D2,** Number of cases reported for Meningitis per epidemiological week

Meningococcal Disease

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
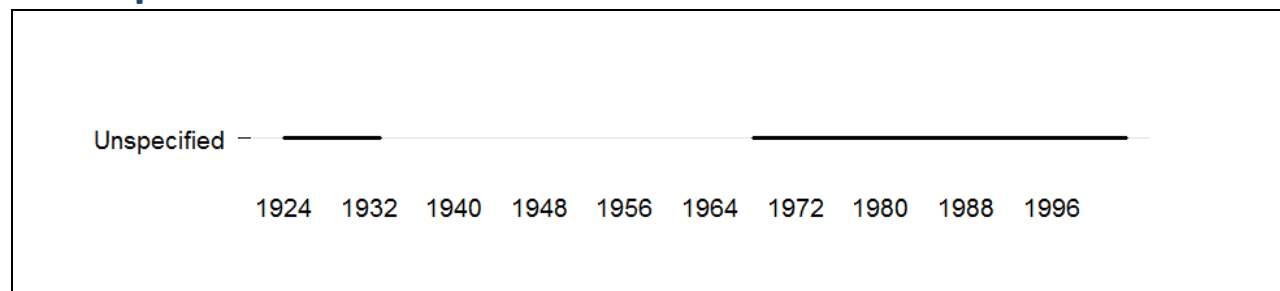
Table D1, Summary information for Meningococcal Disease (Serogroup unspecified and Invasive all serogroups)

Indicator	Georgia
Report period	1951-2009
Total weeks	2,498
Total cases	3,716
Max. cases per year	278
Year (max)	1952
Max. cases per week	141
Week (max)	1952, wk 53
Average cases per year	
before 1980	62
95%CI	(39-85)
after 1980	66
95%CI	(53-79)
Average cases per week	
before 1980	2
95%CI	(2-2)
after 1980	1
95%CI	(1-1)

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Figure D2, Number of cases reported for Meningococcal Disease per epidemiological week

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Mumps

Unspecified

1924 1932 1940 1948 1956 1964 1972 1980 1988 1996
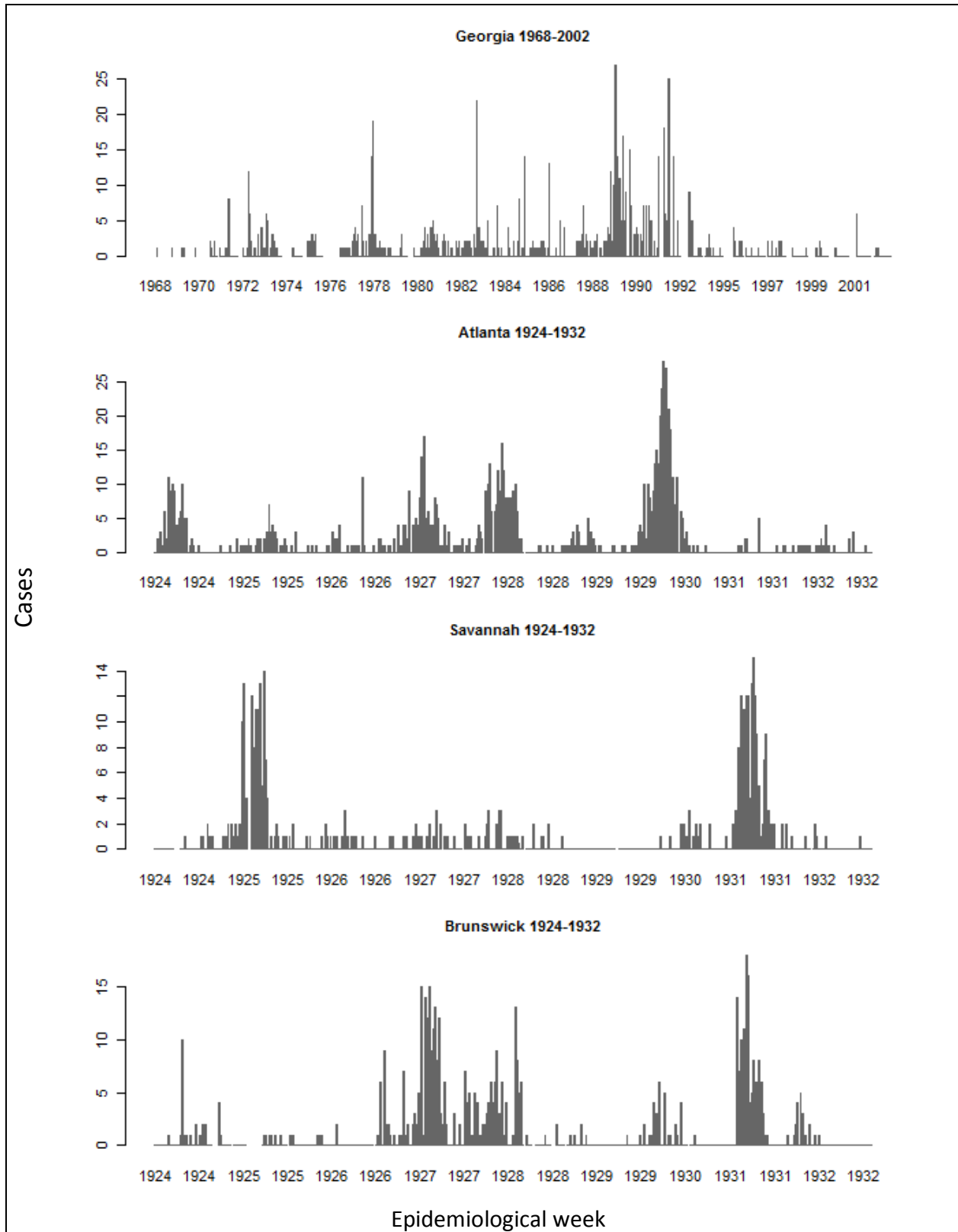
Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
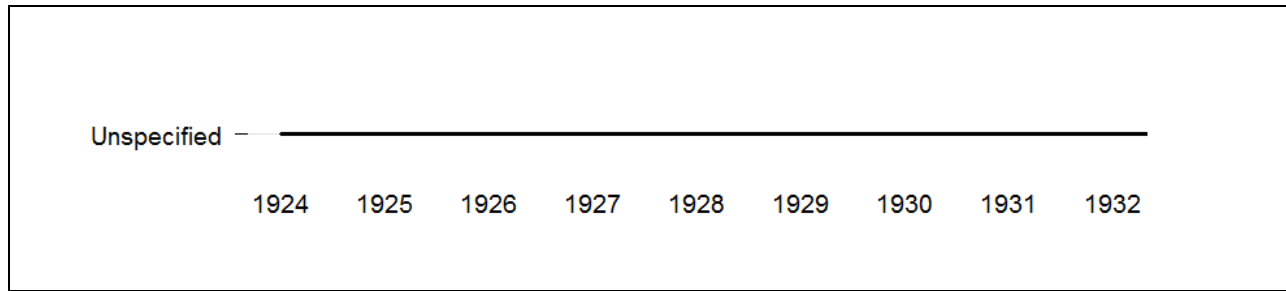
Table D1, Summary information for Mumps

Indicator	Georgia	Atlanta	Savannah	Brunswick
Report period	1968-2002	1924-1932	1924-1932	1924-1932
Total weeks	1,319	447	438	423
Total cases	1,025	1,039	479	621
Max. cases per year	103	355	212	216
Year (max)	1989	1930	1931	1927
Max. cases per week	90	37	21	26
Week (max)	1968, wk 04	1930, wk 16	1931, wk 17	1931, wk 10
Average cases per year				
before 1980	25	115	53	69
95%CI	(8-42)	(30-200)	(-4-110)	(5-133)
after 1980	32	-	-	-
95%CI	(18-46)	-	-	-
Average cases per week				
before 1980	1	2	1	1
95%CI	(1-1)	(2-2)	(1-1)	(1-1)
after 1980	1	-	-	-
95%CI	(1-1)	-	-	-

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Figure D2, Number of cases reported for Mumps per epidemiological week

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Pellagra

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

Table D1, Summary information for Pellagra

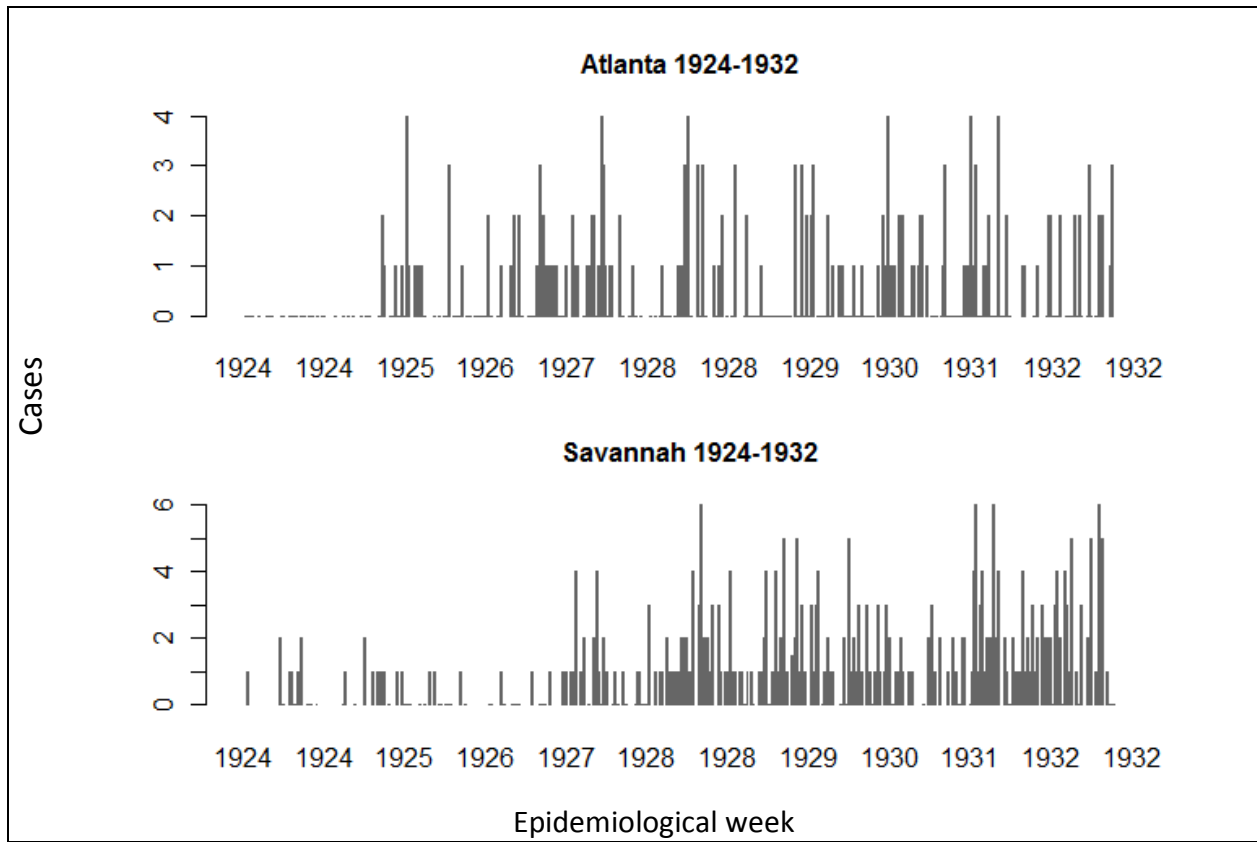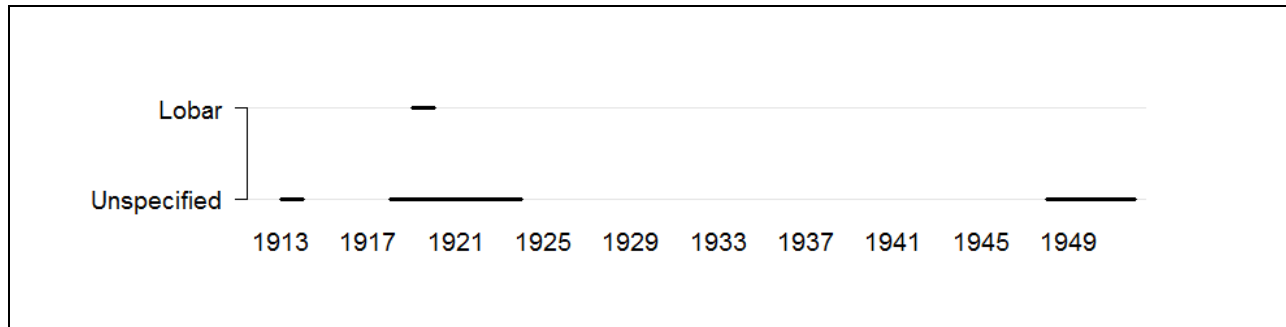| Indicator	Atlanta	Savannah
Report period	1924-1932	1924-1932
Total weeks	290	253
Total cases	198	371
Max. cases per year	33	91
Year (max)	1927	1931
Max. cases per week	5	13
Week (max)	1928, wk 46	1931, wk 30
Average cases per year	22	41
95%CI	(14-30)	(18-64)
Average cases per week	1	1
95%CI	(1-1)	(1-1)

Figure D2, Number of cases reported for Pellagra per epidemiological week
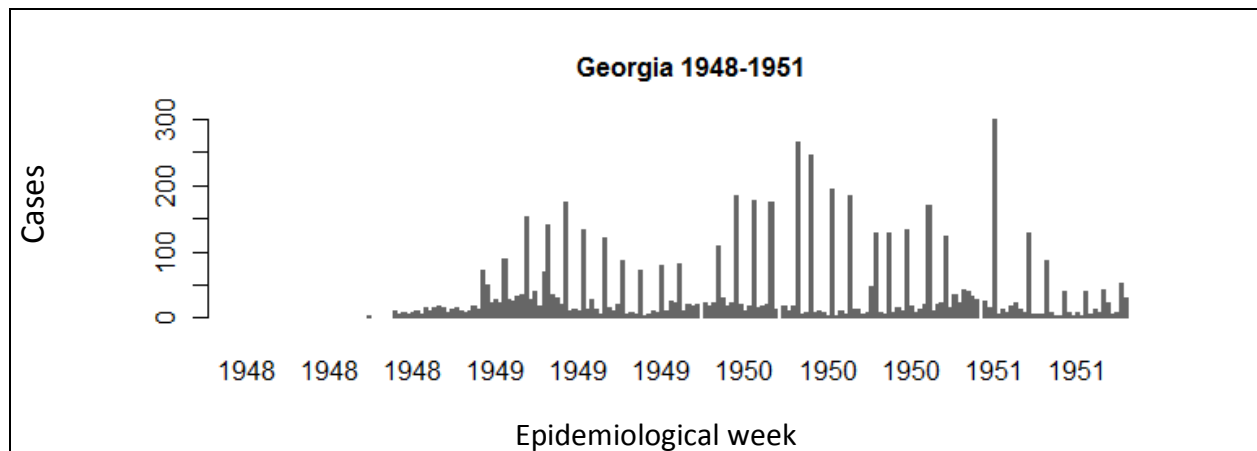
Pneumonia

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

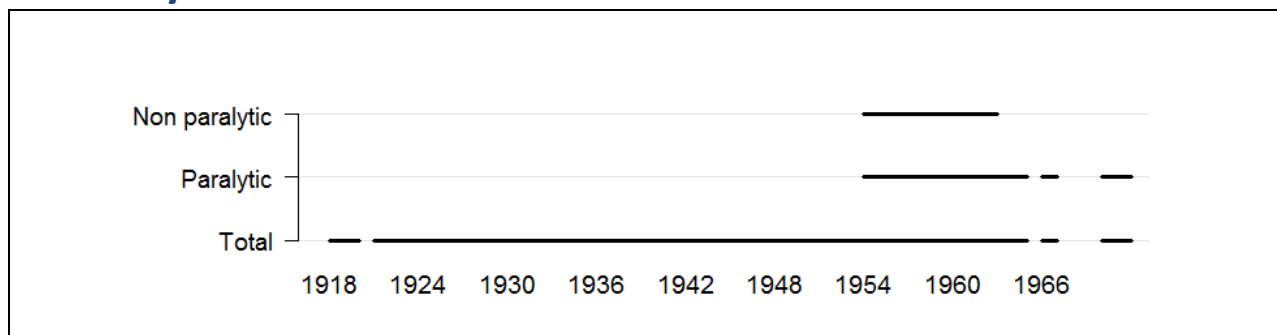**Table D1,** Summary information for Pneumonia (Unspecified)

Indicator	Georgia
Report period	1948-1951
Total weeks	169
Total cases	7,189
Max. cases per year	2,478
Year (max)	1951
Max. cases per week	322
Week (max)	1951, wk 09
Average cases per year	1,797
95%CI	(65-3,529)
Average cases per week	43
95%CI	(33-53)

Figure D2, Number of cases reported for Pneumonia per epidemiological week
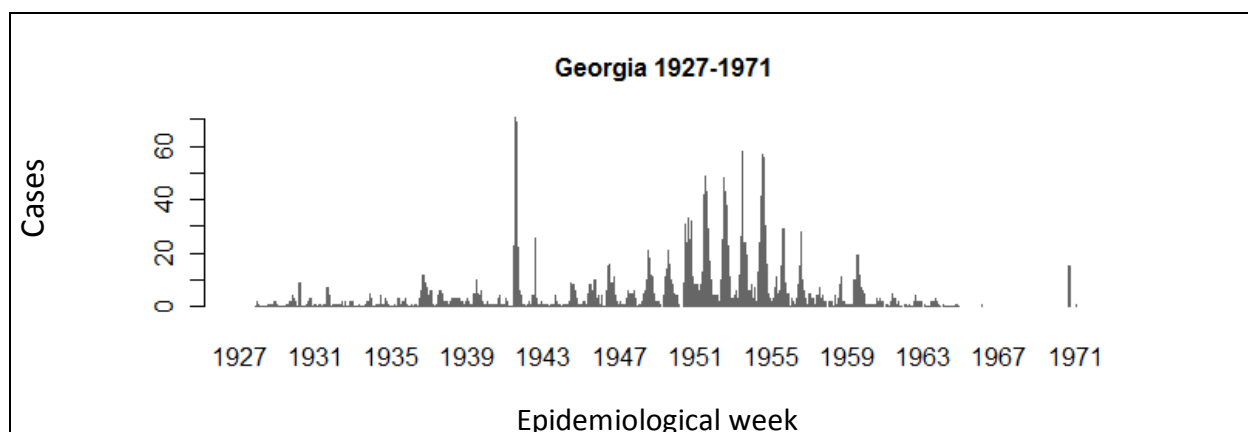
Tycho data report for the state of Georgia

Poliomyelitis

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
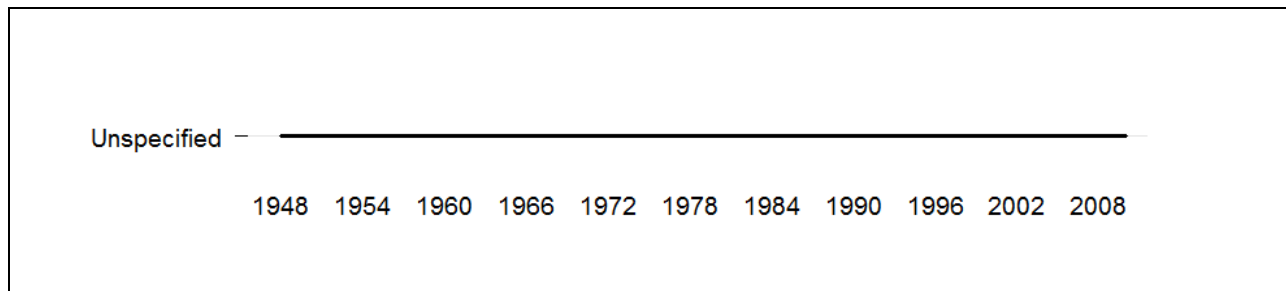
Table D1, Summary information for Poliomyelitis (Total)

Indicator	Georgia
Report period	1927-1971
Total weeks	1,786
Total cases	6,131
Max. cases per year	781
Year (max)	1941
Max. cases per week	91
Week (max)	1941, wk 29
Average cases per year	
before 1960	178
95%CI	(101-255)
after 1960	13
95%CI	(2-24)
Average cases per week	
before 1960	4
95%CI	(4-4)
after 1960	1
95%CI	(1-1)

Figure D2, Number of cases reported for Poliomyelitis per epidemiological week

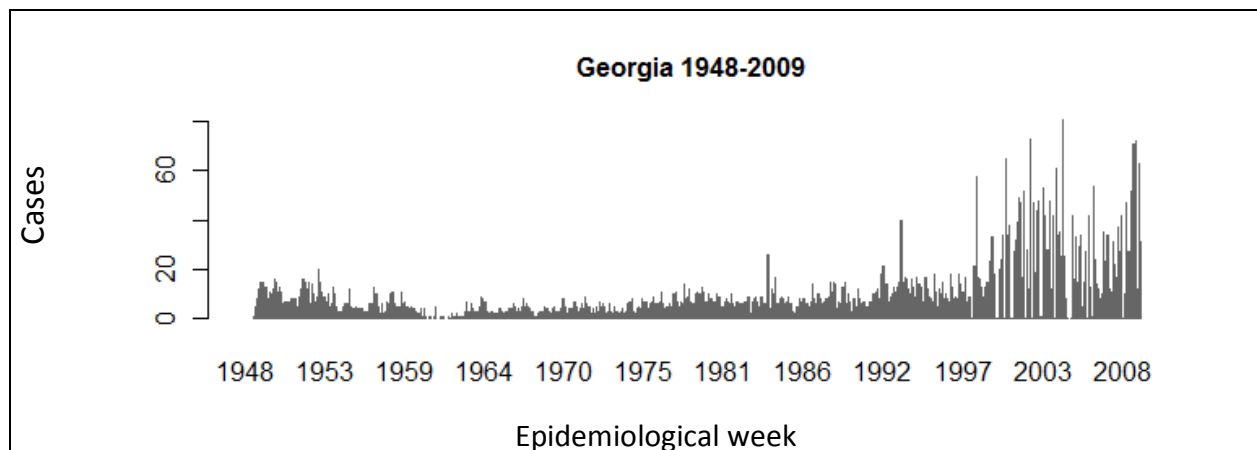*Tycho data report for the state of Georgia*

Rabies in Animals

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
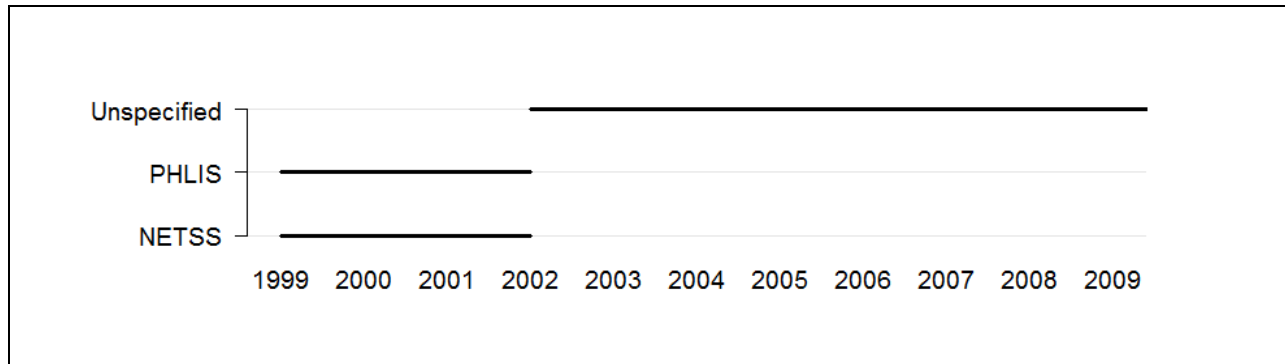
Table D1, Summary information for Rabies in Animals

Indicator	Georgia
Report period	1948-2009
Total weeks	2,831
Total cases	13,713
Max. cases per year	445
Year (max)	1949
Max. cases per week	191
Week (max)	1988, wk 39
Average cases per year	221
95%CI	(193-249)
Average cases per week	5
95%CI	(5-5)

Figure D2, Number of cases reported for Rabies in Animals per epidemiological week
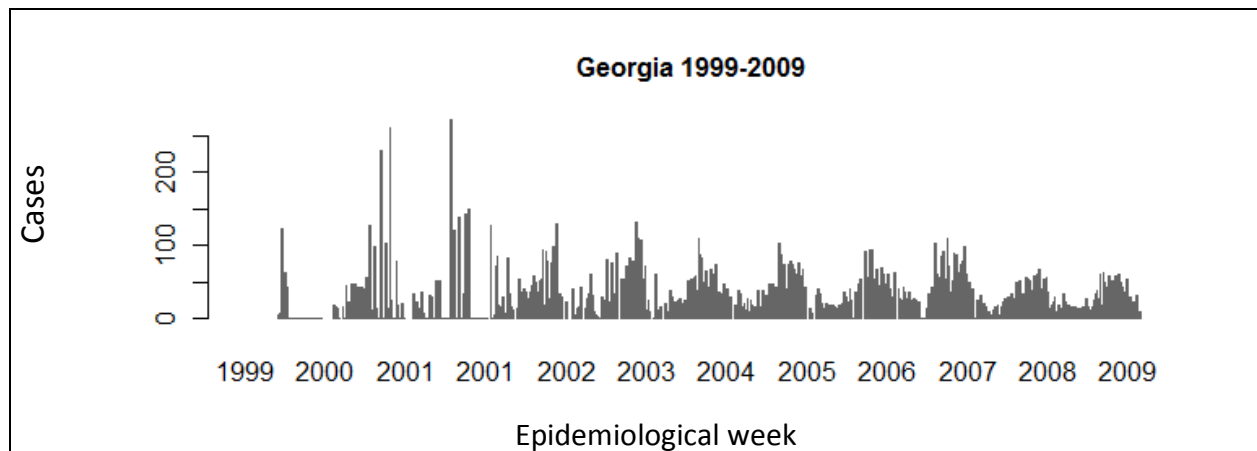
Salmonellosis

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
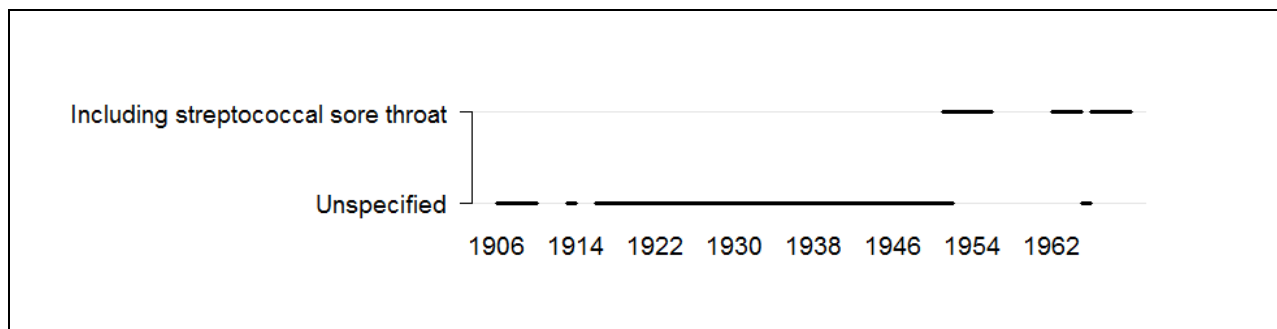
Table D1, Summary information for Salmonellosis (PHLIS and Unspecified)

Indicator	Georgia
Report period	1999-2009
Total weeks	504
Total cases	18,300
Max. cases per year	2,013
Year (max)	2007
Max. cases per week	993
Week (max)	1999, wk 49
Average cases per year	1,664
95%CI	(1,480-1,848)
Average cases per week	36
95%CI	(31-41)

Figure D2, Number of cases reported for Salmonellosis per epidemiological week

Scarlet Fever

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

Table D1, Summary information for Scarlet Fever (Including streptococcal sore throat and Unspecified)

| Indicator	Georgia	Atlanta	Savannah	Brunswick
Report period	1927-1969	1916-1953	1909-1953	1920-1948
Total weeks	1,793	1,638	1,403	1,256
Total cases	30,440	8,936	1,330	184
Max. cases per year	1,937	1,320	97	32
Year (max)	1955	1931	1921	1945
Max. cases per week	114	89	11	16
Week (max)	1952, wk 12	1931, wk 14	1941, wk 21	1941, wk 53
Average cases per year	823	255	38	6
95%CI	(690-956)	(182-328)	(30-46)	(3-9)
Average cases per week	17	5	1	0
95%CI	(16-18)	(5-5)	(1-1)	(0-0)
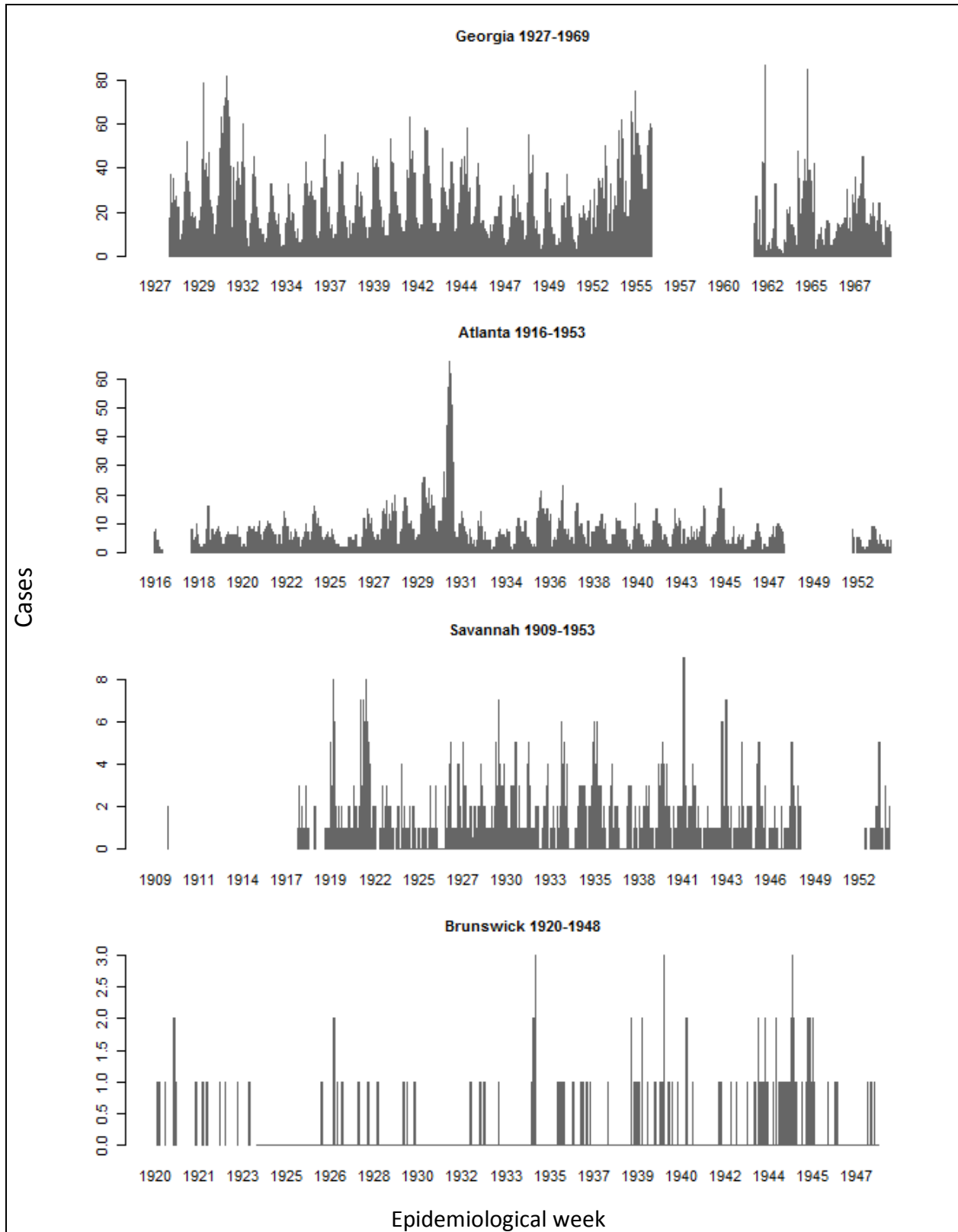
Figure D2, Number of cases reported for Scarlet Fever per epidemiological week
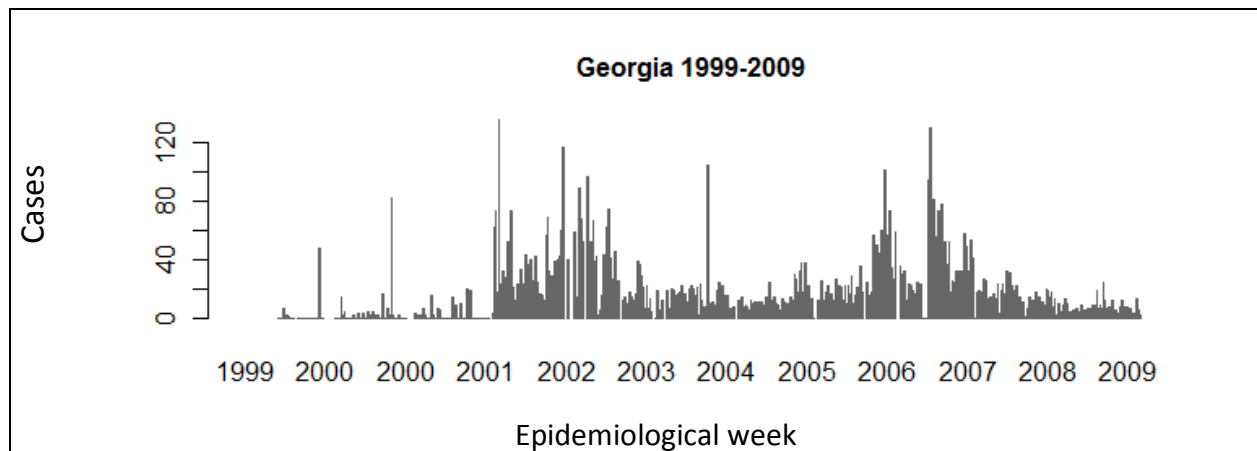
Shigellosis
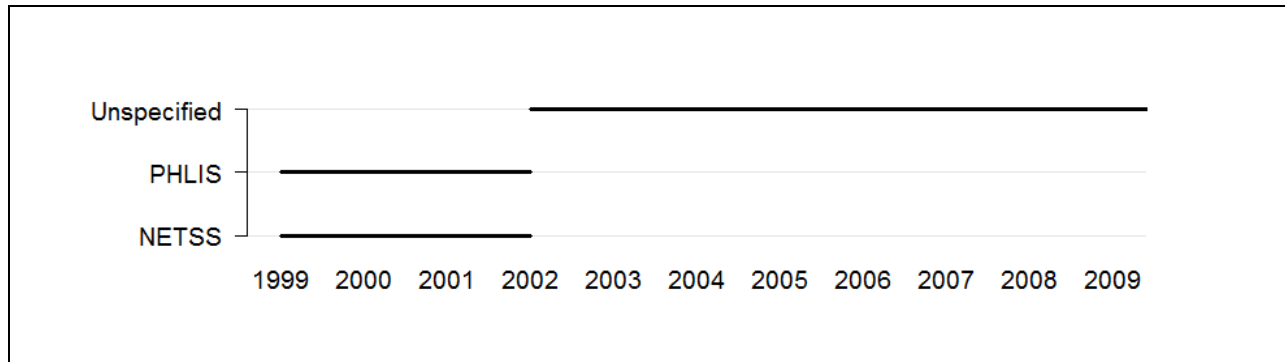
Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

Table D1, Summary information for Shigellosis (Unspecified and PHLIS)

Indicator	Georgia
Report period	1999-2009
Total weeks	510
Total cases	9,708
Max. cases per year	1,609
Year (max)	2007
Max. cases per week	614
Week (max)	1999, wk 33
Average cases per year	883
95%CI	(521-1,245)
Average cases per week	19
95%CI	(15-23)

Figure D2, Number of cases reported for Shigellosis per epidemiological week

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Streptococcal Disease, Invasive Group A

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
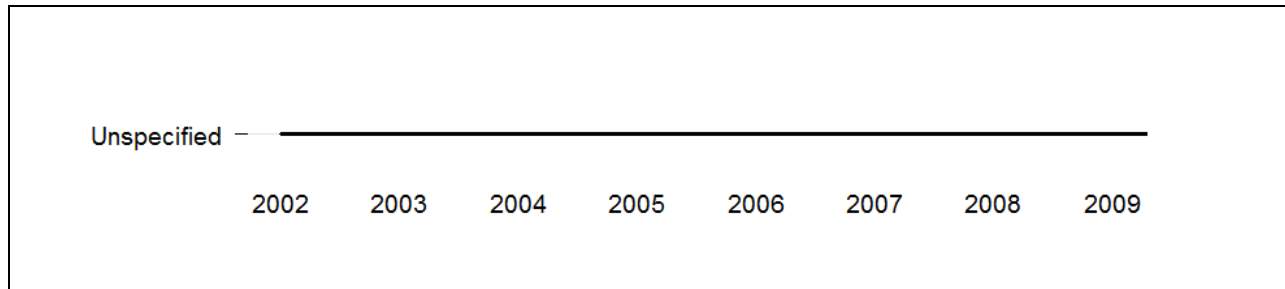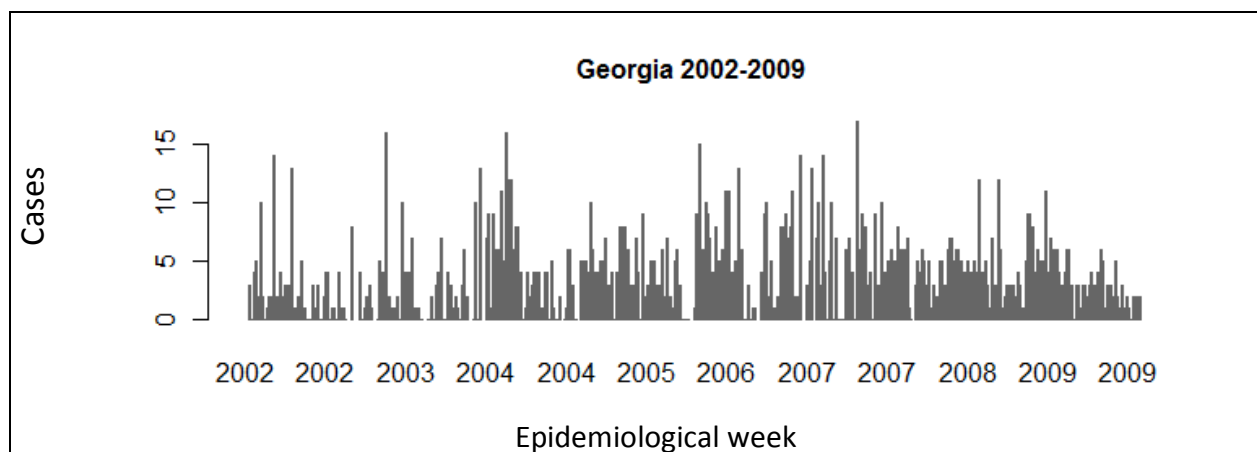
Table D1, Summary information for Streptococcal Disease, Invasive Group A

Indicator	Georgia
Report period	2002-2009
Total weeks	385
Total cases	1,613
Max. cases per year	323
Year (max)	2004
Max. cases per week	110
Week (max)	2004, wk 36
Average cases per year	202
95%CI	(146-258)
Average cases per week	4
95%CI	(3-5)

Figure D2, Number of cases reported for Group A Streptococcal disease per epidemiological week
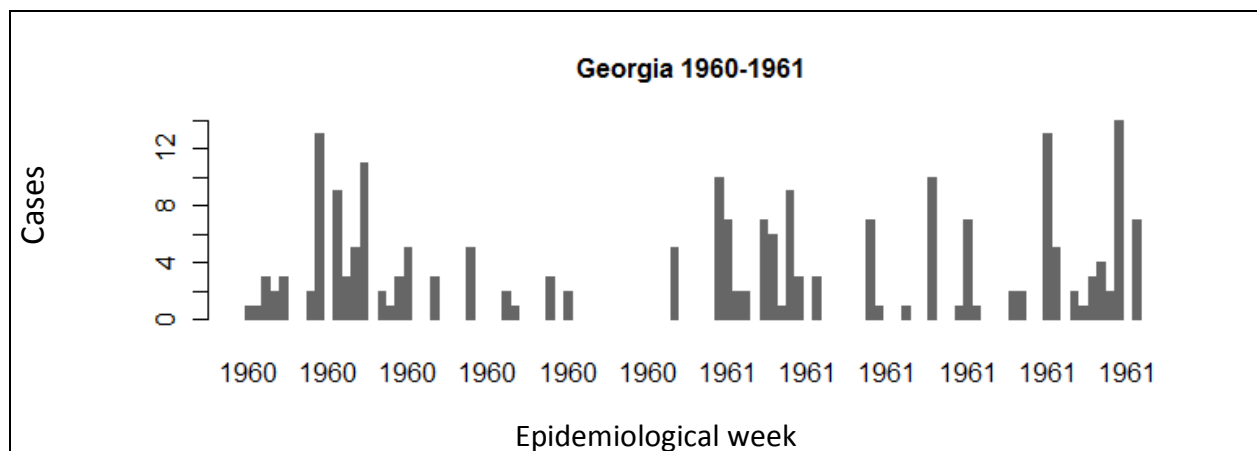
Streptococcal Sore Throat

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

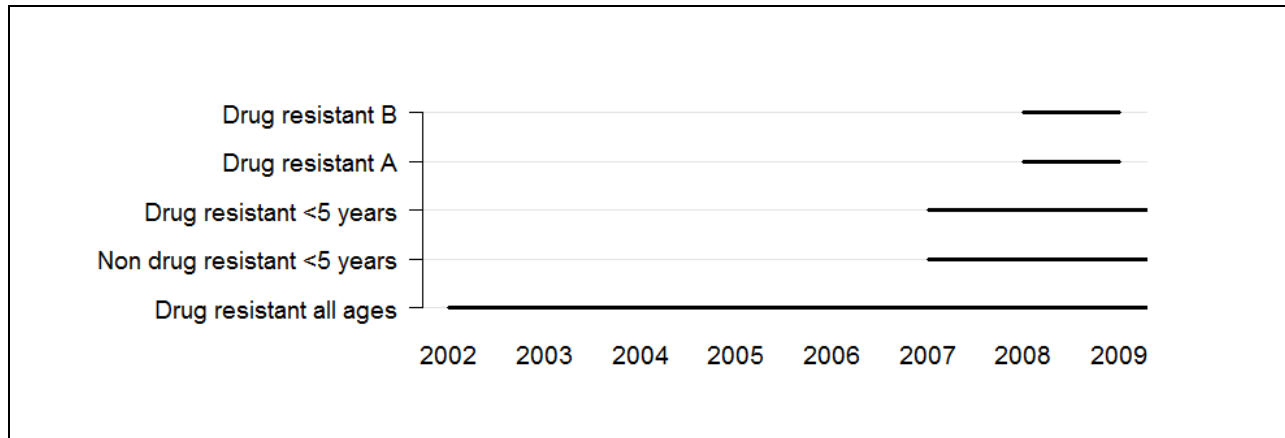**Table D1,** Summary information for Streptococcal Sore Throat

Indicator	Georgia
Report period	1960-1961
Total weeks	53
Total cases	291
Max. cases per year	156
Year (max)	1961
Max. cases per week	35
Week (max)	1960, wk 18
Average cases per year	146
95%CI	(13-279)
Average cases per week	5
95%CI	(3-7)

Figure D2, Number of cases reported for Streptococcal Sore Throat per epidemiological week
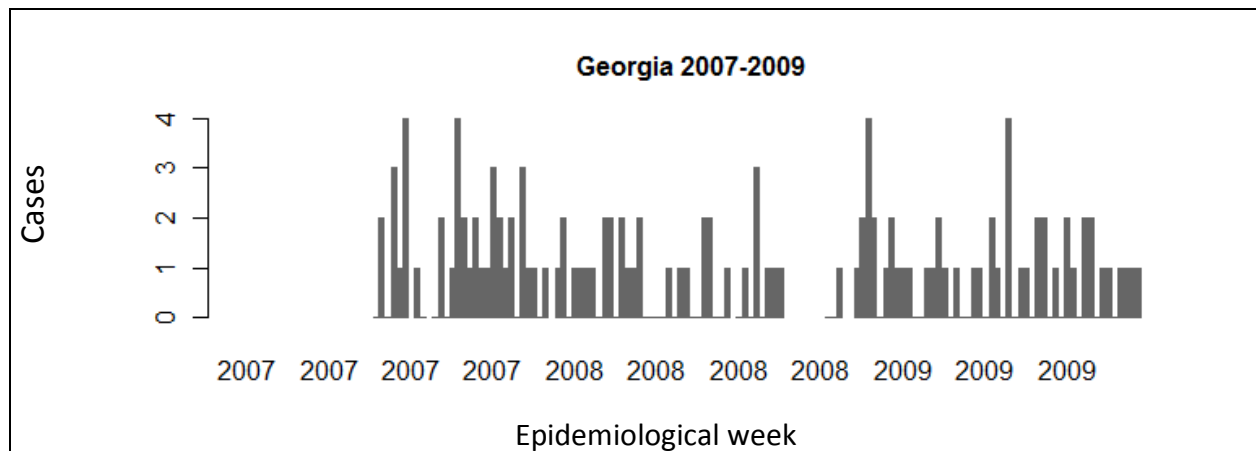
Streptococcus Pneumonia, Invasive Disease

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

Table D1, Summary information for Streptococcus Pneumonia, Invasive Disease (Drug resistant <5 years)

Indicator	Georgia
Report period	2007-2009
Total weeks	121
Total cases	139
Max. cases per year	56
Year (max)	2009
Max. cases per week	6
Week (max)	2007, wk 52
Average cases per year	46
95%CI	(24-68)
Average cases per week	1
95%CI	(1-1)

Figure D2, Number of cases reported for Streptococcus Pneumonia, Invasive Disease per epidemiological week

Syphilis

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
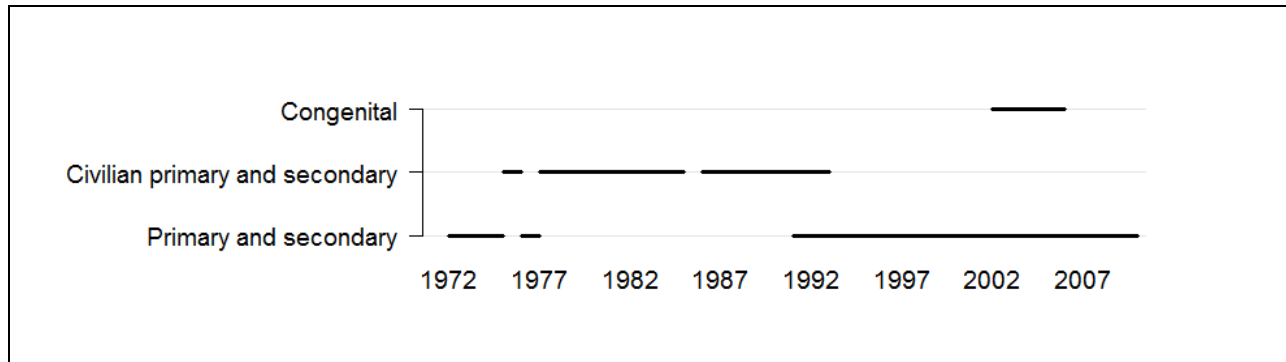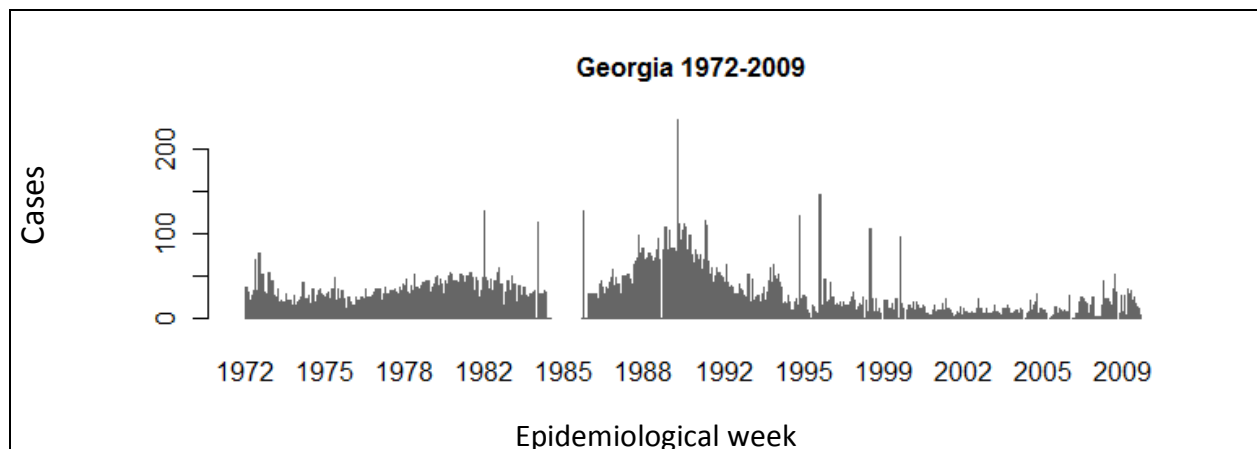
Table D1, Summary information for Syphilis (Primary and secondary and Civilian primary and secondary)

Indicator	Georgia
Report period	1972-2009
Total weeks	1,754
Total cases	40,550
Max. cases per year	3,557
Year (max)	1990
Max. cases per week	290
Week (max)	1986, wk 32
Average cases per year	1,096
95%CI	(837-1,355)
Average cases per week	23
95%CI	(22-24)

Figure D2, Number of cases reported for Syphilis per epidemiological week

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Tuberculosis

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
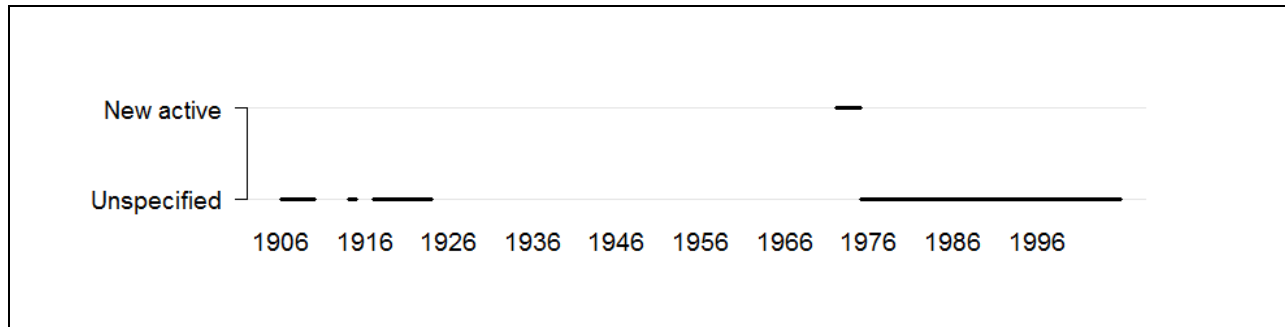
Table D1, Summary information for Tuberculosis (Unspecified)

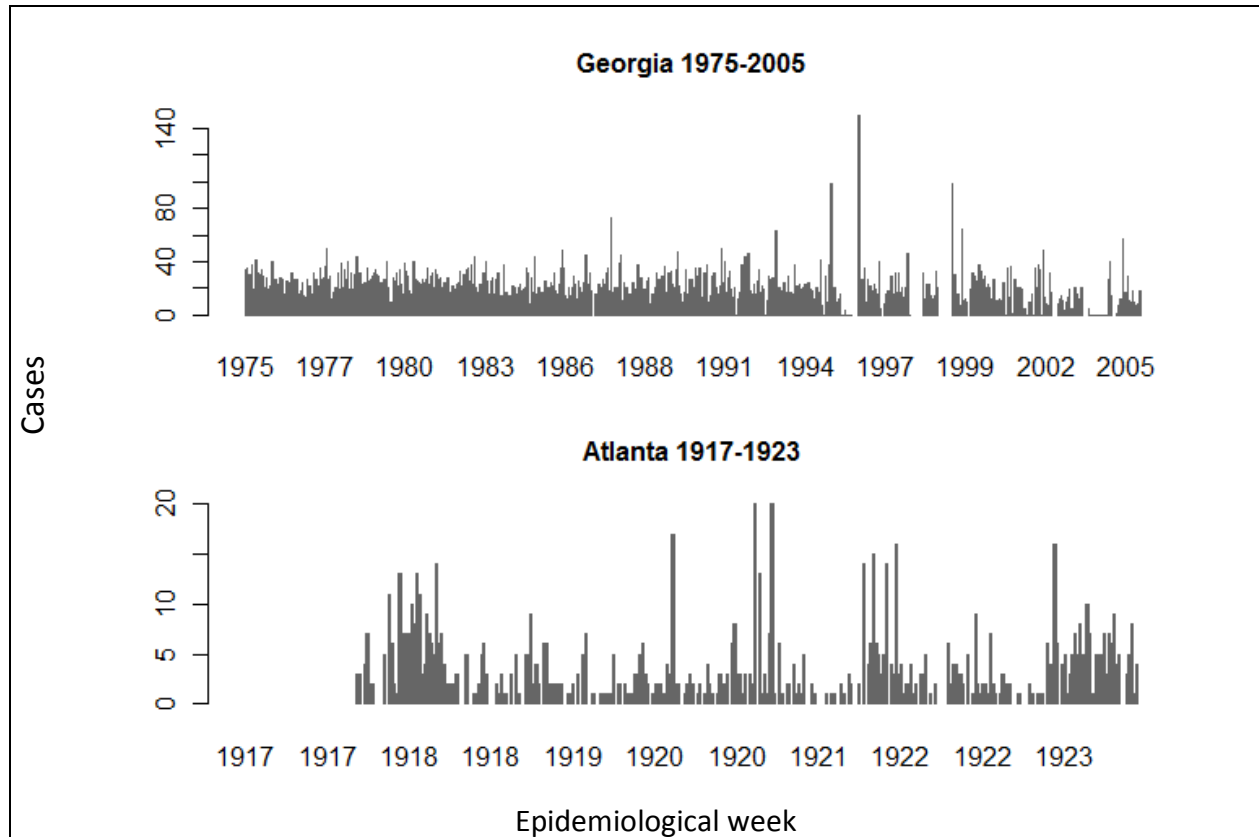| Indicator	Georgia	Atlanta
Report period	1975-2005	1917-1923
Total weeks	1,407	239
Total cases	20,990	989
Max. cases per year	1,042	220
Year (max)	1975	1918
Max. cases per week	304	31
Week (max)	2004, wk 46	1921, wk 15
Average cases per year	677	141
95%CI	(598-756)	(79-203)
Average cases per week	15	4
95%CI	(14-16)	(3-5)

Figure D2, Number of cases reported for Tuberculosis per epidemiological week
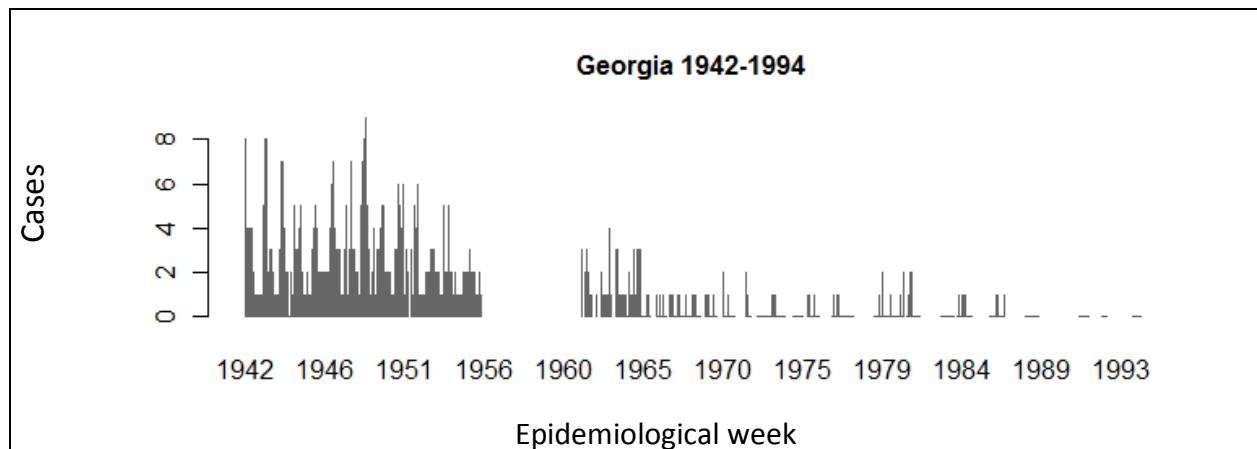
Tularemia
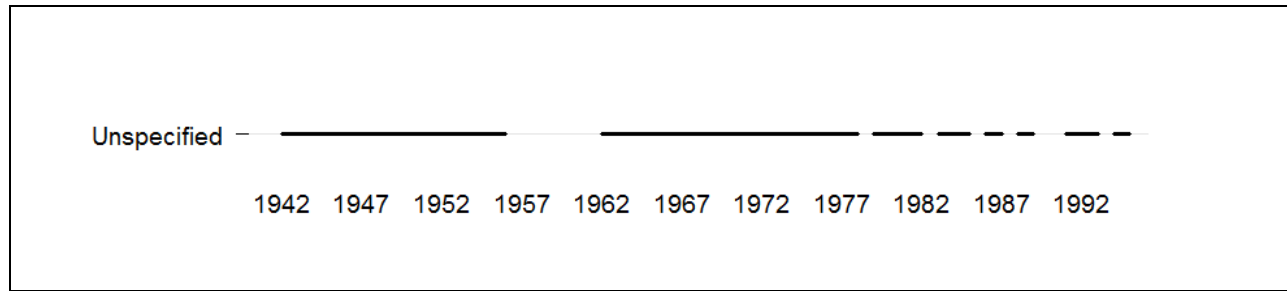
Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

Table D1, Summary information for Tularemia

Indicator	Georgia
Report period	1942-1994
Total weeks	1,388
Total cases	1,047
Max. cases per year	126
Year (max)	1947
Max. cases per week	19
Week (max)	1947, wk 50
Average cases per year	26
95%CI	(15-37)
Average cases per week	1
95%CI	(1-1)

Figure D2, Number of cases reported for Tularemia per epidemiological week

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Typhoid Fever

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.
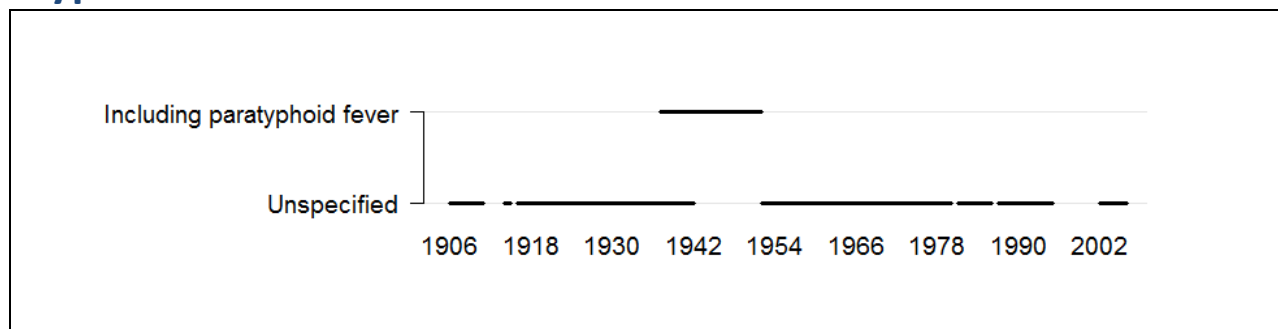
Table D1, Summary information for Typhoid Fever (Unspecified and Including paratyphoid fever)

Indicator	Georgia	Atlanta	Savannah	Brunswick
Report period	1927-2005	1916-1953	1909-1952	1919-1948
Total weeks	2,800	1,428	1,421	1,297
Total cases	15,071	1,872	984	185
Max. cases per year	1,370	177	86	22
Year (max)	1932	1926	1932	1921
Max. cases per week	93	20	9	4
Week (max)	1931, wk 28	1925, wk 26	1917, wk 23	1922, wk 21
Average cases per year				
before 1950	587	57	30	6
95%CI	(420-754)	(40-74)	(22-38)	(4-8)
after 1950	21	3	1	-
95%CI	(12-30)	(-22-28)	-	-
Average cases per week				
before 1950	12	1	1	0
95%CI	(11-13)	(1-1)	(1-1)	(0-0)
after 1950	1	1	1	-
95%CI	(1-1)	(0-2)	-	-

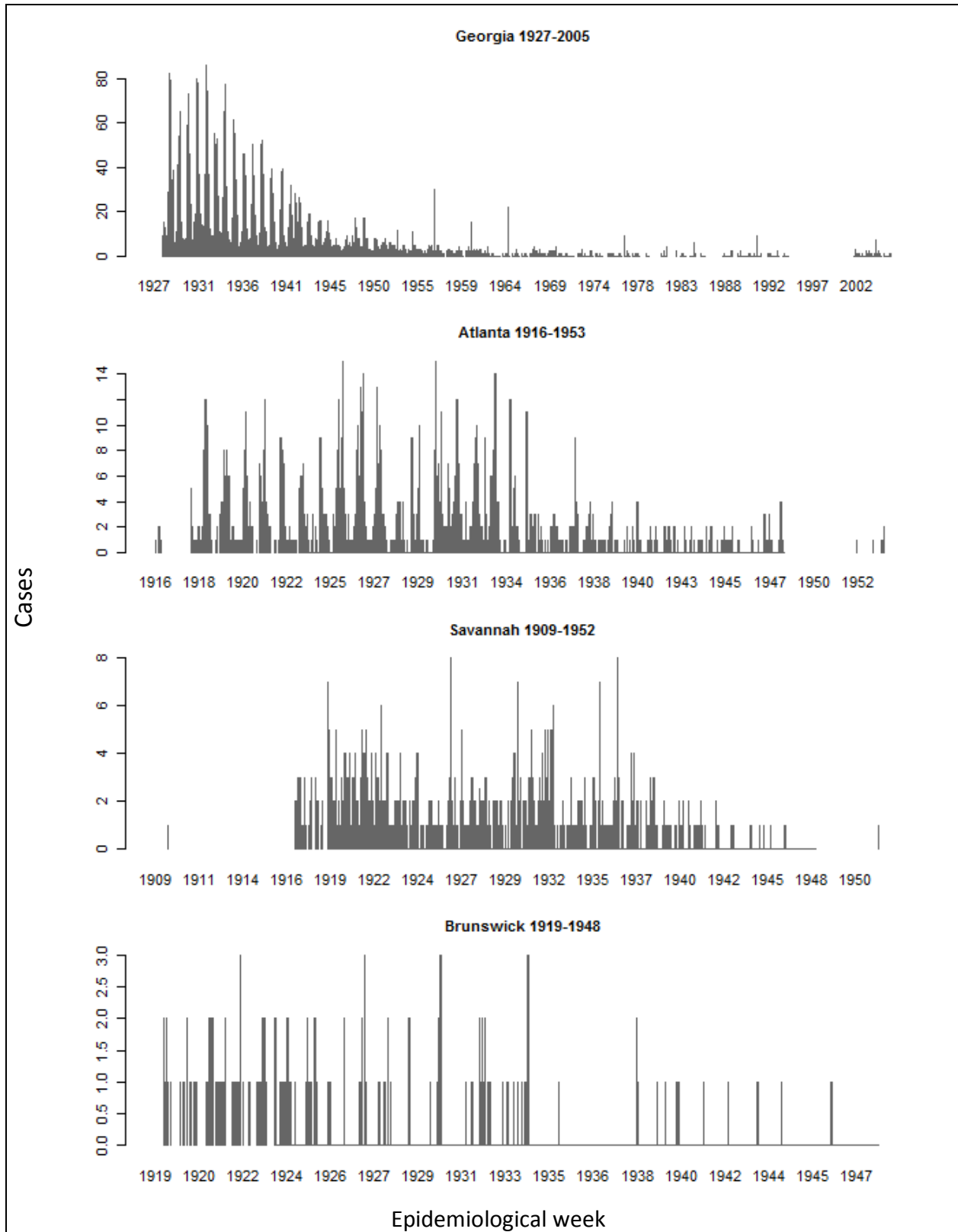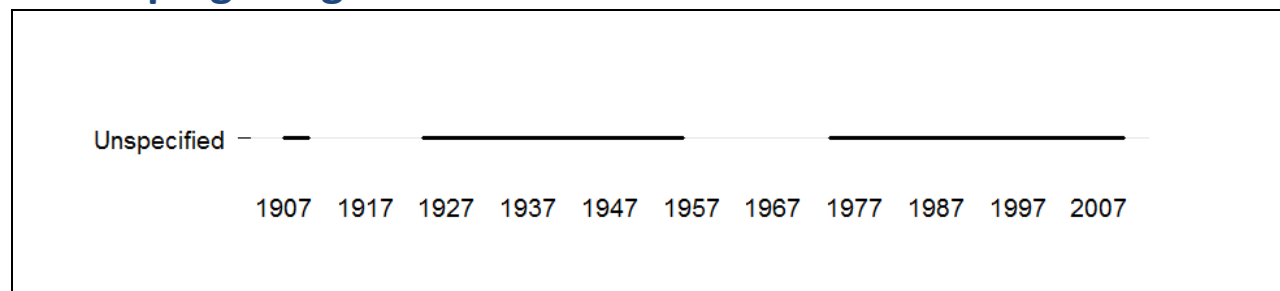*Tycho data report for the state of Georgia*

Figure D2, Number of cases reported for Typhoid Fever per epidemiological week
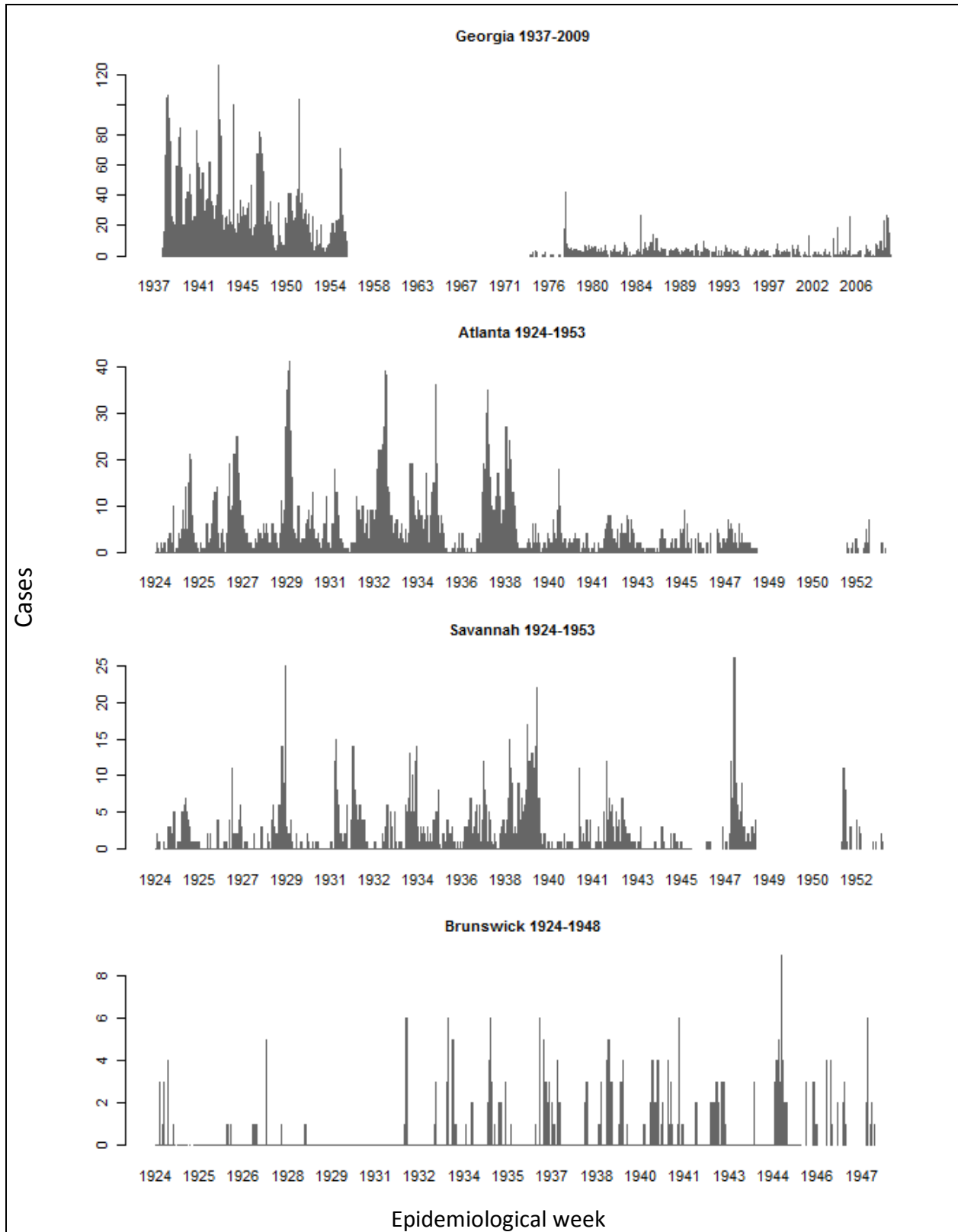
Whooping Cough

Figure D1, Weeks between 1888 and 2009 for which data on the disease and subcategories (if applicable) are available in the Tycho database. If no subcategory was reported, a subcategory of "Unspecified" was assigned.

Table D1, Summary information for Whooping Cough

Indicator	Georgia	Atlanta	Savannah	Brunswick
Report period	1937-2009	1924-1953	1924-1953	1924-1948
Total weeks	2,239	1,176	1,169	1,106
Total cases	18,199	4,506	1,811	338
Max. cases per year	1,866	635	257	50
Year (max)	1938	1933	1939	1937
Max. cases per week	300	48	59	13
Week (max)	1955, wk 16	1930, wk 29	1947, wk 32	1937, wk 25
Average cases per year				
before 1960	866	167	67	14
95%CI	(620-1,112)	(103-231)	(41-93)	(8-20)
after 1960	48	-	-	-
95%CI	(35-61)	-	-	-
Average cases per week				
before 1960	19	4	2	0
95%CI	(18-20)	(4-4)	(2-2)	(0-0)
after 1960	1	-	-	-
95%CI	(1-1)	-	-	-

Figure D2, Number of cases reported for Whooping Cough per epidemiological week

Diseases with fragmented data over time

For a number of diseases, only fragmented data was available for Georgia. This was due to the inclusion of these diseases in the weekly surveillance system for short periods or widely dispersed periods of time. Due to these wide gaps or limited data, data for these diseases were not presented in separate sections but in the table below. Work will continue to include more data in the Tycho database and complete data sets for each disease where possible. Collaborations with local, state and federal public health agencies will be made to explore data availability and opportunities to include these in the Tycho database.

Table 2, Summary information on the occurrence of diseases with fragmented data in Georgia

Disease	Report type	Report period	Number of reports	Total cases
Anthrax	State	1942-1945	143	4
Brucellosis [undulant fever]	State	1943-1982	626	1152
Dengue	City	1924-1925	11	5
Dysentery	State	1942-1948	310	731
Encephalitis	City	1941-1952	988	5
Encephalitis	State	1942-1994	765	317
Leprosy	City	1924-1924	1	0
Leprosy	State	1942-1985	230	6
Psittacosis	State	1956-1959	13	25
Rocky mountain spotted fever	City	1953-1953	1	1
Rocky mountain spotted fever	State	1942-2009	1714	2565
Rubella	State	1971-2001	677	420
Tetanus	State	1962-1981	390	63
Toxic shock syndrome	State	1984-1994	148	15
Trichiniasis	State	1952-1952	3	4
Typhus fever	City	1924-1953	43	12
Typhus fever	State	1942-1961	439	5829
West nile disease	State	2003-2009	124	98

Tycho data report for the state of Georgia

Project Tycho

This report provides preliminary data for the state of Georgia available in the Tycho database. This database is currently being beta tested and these data cannot be used for publication or other official use at this time. An open access release to the general public is planned for later in 2011.

Please visit the Tycho website for more information and to query the database at: www.tycho.pitt.edu. For further information regarding the Tycho project, contact Dr. Wilbert van Panhuis at the University of Pittsburgh Graduate School of Public Health.

Dr. Wilbert van Panhuis, MD PdD
Graduate School of Public Health
University of Pittsburgh
130 DeSoto Street
704 Parran Hall
Pittsburgh, 15261 PA
Tel: 412-624-7693
Email: wav10@pitt.edu