

Mapping the Miasma; the geographies of a forgotten Irish epidemic

Fíona Gallagher*

Professional Historian & Independent Researcher

First received: March 13, 2023

Accepted for publication: May 1, 2023

Abstract: In the spring of 1832, the great cholera pandemic finally reached Ireland. This was the most virulent pestilence to reach European shores since the Black Death. Cholera was to kill at least 30,000 in Britain, 100,000 in France and Hungary, and a similar number in Russia. Eclipsed by the tragedy of the Great Famine and now almost forgotten, the cholera's final death toll in Ireland has been variously estimated to have been between 25,000 and 50,000 people. Primarily an urban disease, it struck hard, but also erratically, attacking some towns, while leaving others close by unaffected. The impact and legacy of the cholera on Irish towns and society remains under-studied, despite the significant amount of contemporary data available. In this article, daily and weekly numerical data collected during 1832 by the Central Board of Health and preserved in the National Archives, is analysed using a modern GIS system. For the first time, the details of the incidence of the epidemic in individual towns is mapped. By mapping this data and setting it within the context of the complex political and social events of the period, the significant impact which the disease had on the urban sphere in pre-famine Ireland is revealed.

Keywords: *cholera epidemic, pre-famine Ireland, historical geography, health geography.*

The contagion came from the East... gradually the terror grew on us... we heard of it nearer and nearer... it was in Germany, it was in England, and then, – with wild affright – it was in Ireland! (Stoker, 1873)

These words reflect public fears expressed in Ireland over 190 years ago, as the Asiatic cholera pandemic swept through Europe to these shores in 1832. Cholera spread to almost every corner of the country during 1832 and 1833, claiming at least 50,000 lives before it finally abated in the late Spring of 1833. Frequently, death rates in Irish towns were higher than in large English cities; provincial urban centres with comparatively low populations such as Sligo and Drogheda, had mortality rates equal to that of large

*fionagallaghersligo@gmail.com (Corresponding Author)

urban areas in Europe. For example, Amsterdam (population 200,000) had 1,200 cases and 687 deaths and Berlin (population 240,000) had 1,400 deaths, (Van Der Kuyl, 2021, p.98).

Little analytical work has been done on this Irish epidemic, and historical geographers have ignored the wealth of numerical data which survives in the archives and parliamentary reports. The morbidity and mortality rates have never been fully collated, mapped or analysed on a national basis. The 1832 epidemic deserves particular attention, as reaction to it was more pronounced than in later outbreaks (Morris, 1976, p.17). Comparatively little has been published on the Irish cholera epidemic, and what has, is mostly narrative-based and locally focused (Hannan, 1988; Mangan, 2008; Fenning, 2003; Wilson, 1986; Law, 1996; Duffy, 1982; Gallagher, 2020).

There are only four significant modern analyses of the outbreak, since the various publications of the nineteenth century, demonstrating a long period of academic silence on this subject (O'Neill, 1973, 1974; Robins, 1995; Grace, 2011; Farrell, 2014;). O'Neill's 1973 paper on public health in the pre-famine period, re-introduced this forgotten epidemic, and is a key reference text in all papers after this date. Robin's 1995 work on the epidemics of the nineteenth century, synoptically examines the course of the 1832 outbreak in two chapters, and is mostly narrative, offering some analysis of the number of cases and deaths on a national level. Grace's 2011 study on the effects of the outbreak on county Tipperary, is one of the few local history studies that analyses the figures for cases and deaths. The abundant contemporary newspaper reports tend to magnify the dramatic and horrific nature of the disease, as well as printing weekly statistics. Farrell's 2014 doctoral dissertation focuses on Belfast, giving an insight to the reactive and preventative role of that city's health bodies during the 1832 epidemic, and later waves of cholera.

One of the consequences of urbanisation, even on a small scale, is the aggregation of dense populations with the subsequent problem of the disposal of human waste and faecal matter. In the early nineteenth century, the rapidly rising populations of both urban and rural Ireland generated large volumes of human and animal excrement, offering a home for various pathogens which caused gastrointestinal diseases. These diseases, including cholera, typhoid and dysentery, are characterised by severe diarrhoea, and the main vector of transmission was the oral-faecal route (Davenport *et al.*, 2019). The most common pathway for transmission of cholera was by water, either through the leakage of sewage into wells or rivers that are also used as public water supplies, or the deliberate disposal of 'night soil' and sewerage into rivers and streams. Transmission of cholera was possible, particularly in Ireland, by direct human to human transfer as a result of scant handwashing, non-existent domestic hygiene in the homes of the poor, and the transferral of contaminated faeces to food and clothes. Severe overcrowding and poor housing were other contributing factors to high morbidity.

Cholera is caused by the bacterium *Vibrio Cholerae*, and is a highly infectious, endemic disease, which occasionally erupts into epidemics. Epidemic cholera is a classic 'crowd' disease. The disease's physical manifestations are many and debilitating; excessive

diarrhoea, agonising vomiting, cessation of urination, rapid increase in hypotension and respirations, and collapse of the circulatory system, leaving the victim with the characteristic blue tinge to their skin. Death is often rapid, frequently as a result of cardiac arrest (Thomas, 2015, p.9). Symptoms typically appear within 48 hours of the ingestion of contaminated water, and in many patients severe dehydration can occur as little as 4 to 8 hours following copious diarrhoea (Kotar & Gessler, 2014). The water-borne nature of the disease was often guessed at by physicians and scientists of the time, but cholera spilt the nineteenth century medical world into two camps, the contagionists, and the miasmatisers; those who favoured contagious spread from person to person, and those who maintained the disease was air-borne, lingering in the miasma or 'murky haze' of insanitary places. Significantly, the miasma theory had much more influential support than the theory of contagion; this seemed to be proven by the observations that many of cholera's victims were the very poor, living in overcrowded slums where the 'air' was the most polluted. However, it was contaminated water that was the most dangerous vector of the disease. Snow's hypotheses that cholera was spread by some unknown agent in the water, was rejected by the London Board of Health in 1857, and it was not until 1883 that Koch identified the causative pathogen responsible for cholera, ushering in the germ theory of disease.

Asiatic or spasmodic cholera, spread westwards from India in 1817, in the wake of a severe outbreak in Bengal, the first of four great cholera pandemics of the nineteenth century (Morris, 1976). By 1830 it had reached Moscow, unleashing itself on western Europe the following year, spreading rapidly via the large coastal ports. Despite quarantine measures, cholera reached Britain on 23 October 1831. By the end of that year there was a notable sense of alarm that the arrival of a severe epidemic in Ireland was inevitable (Second Report to BOH).

Ireland – A fertile ground for the spread of a crowd disease

Throughout the eighteenth and nineteenth century the 'great despoiling infections' in Irish society, were bacillary dysenteries (Geary, 2004, p.70). The physical condition of the people, both rural and urban was generally poor, following the severe typhus epidemic of 1817-18, which left at least 45,000 dead. (Baker & Cheyne, 1821; Crawford, 1999, p. 121-137). This was followed by the famine of 1821-22, and a further outbreak of 'fever' in 1826-27, leaving an entire class of people 'weak for want of sustenance and easy prey to disease' (O'Neill, 1973, p.1). Successive periods of wet summers in Ireland between 1821-30 resulted in food shortages and low availability of turf, creating conditions rife for spread of infection. During periods of minor famines, thousands of people were reduced to begging and vagrancy, helping to spread disease from town to town (O'Neill, 1973, p.3). Crop failures in the countryside added to the expanding numbers of the poor in the 1820s, and accelerated levels of destitution. This impoverishment vastly increased the chances of contagion and transmission of disease. Being so transmissible, cholera struck not only the destitute and the poor, but also the better-off (Fenning, 2003).

The economic and political state of Ireland in 1830 was that of a country in great flux. The end of the Napoleonic wars was followed by a sharp depression, with full free trade between Ireland and Britain allowed from 1824, leaving Ireland's small-scale and domestic industries highly vulnerable, and many collapsed (O'Neill, 1974, p. 7). Politically, the period was dominated by O'Connell, the campaign for Catholic Emancipation, the Tithe Wars, the agrarian outrages of the Ribbonmen, and the economic crippling of the poor labourer by relentless inflation. All this resulted in a flight from the land, and a greatly increased level of poverty among the lower classes.

The Board of Health

The 1832 cholera epidemic was the second of three major events in the first half of the nineteenth century which were 'critical to the development of a more interventionist approach by government', including addressing the issue of extreme poverty (Geary, 2004, p.9). The typhus epidemic of 1817 led to the Contagious Diseases (Ireland) Act, (59 Geo. III, c.41), and the setting up of the General Board of Health in 1820. Cholera arrived a little over a decade later, followed by the Great Famine of 1845-52.

Cholera provoked greater fear and thus more intervention, as it was a hazard to all classes. In preparation for an epidemic, the government re-activated the Irish General or Central Board of Health in October 1831. The Board's main role was to act as a 'medical watchdog', and to advise where local committees of health should be set up to combat occasional epidemics. Often referred to as the 'Cholera Board', it oversaw the local boards, distributing loans and grants. Existing fever hospitals and county infirmaries were **not** to be used for infected persons. Instead, suspected cases were to be removed immediately to a temporary cholera hospital and special accommodation should be set up for that purpose in each town. If no buildings were to be found, improvised premises or tents should be erected (2 Will. 4 c. 9, 58 Geo. 3 c.47 & 58 Geo. 3 c. 41). Weekly reports and statistics of the progress of the disease were to be sent to Dublin and published in the local newspapers (McCabe, 2018, p. 141). The Central Board also sent experienced doctors to places that had severe outbreaks and not enough medical staff, in particular Sligo and Drogheda (Irwin, 1832). There was a huge emphasis on cleanliness and fumigation, and paradoxically, on the importance of 'pure water'. Manure heaps were to be removed, and streets and insanitary lanes swept and washed. Sick victims were to be reported to the medical officer, and then removed to a cholera hospital, using specially-constructed carriages. Public gatherings were discouraged, (with little success), and wakes and funeral services were halted, as authorities felt the custom of attending the wake-house would contribute to the spread of the disease. Ordinary burial rituals were abandoned as the sheer number of dead overwhelmed churchyards, and many 'cholera trenches' were opened for rapid disposal of infectious corpses (Bonsall 2021; Gallagher, 2021). Markets and fairs were banned as the death rate soared, shops shut down, and the streets of Irish towns emptied.

Large gatherings of protesters and rioters in provincial areas continued throughout the epidemic, both in opposition to the Tithes and to restrictions imposed by the Board of Health; these assemblies must certainly have enabled the spread of the disease (O'Donoghue, 1972). Ireland's huge number of highly-visible beggars – typically women and children – were suspected of carrying the cholera from town to town (McCabe, 2018, p. 141). These very mobile mendicants were prevented from travelling, and those native to a town were 'badged', or registered, so that they could be clearly identified as distinct from non-local 'beggars and mendicants', who may have been harbouring cholera. Quarantining of the sick was a standard practice by 1832, and often prevented larger-scale infection; however, this enforced incarceration and a deep mistrust of medical doctors amongst the poor, meant that any attempt at quarantine was badly received. The Central Board made grants and loans totalling £148,103 sterling to the local boards, equal to about £14 million today, illustrating that large amounts were spent on combating the pandemic in Ireland. Over 600 local Boards of Health were set up across the country, but some were more active than others, reflecting either the incidence of cholera in a particular area, or a poorly organised board (CSO/OP/1832/523; CSO/OP/26)

Sources and Methodology

This article examines original data from several separate sources, which are often at odds, and which have different bases (See note 1). The town and county data are extracted from the original returns of the Central Cholera Board, part of the papers of the Chief Secretary's Office (CSO/OP/1832/568). Population returns for counties and towns were gathered from the 1831 census, extracted at county and town level (Census, 1831). Using surviving empirical evidence and interpolating data from numbers published in the contemporary newspapers, the incidents of morbidity and mortality are graphed and mapped on a county basis. A further aim of this study is to similarly collate and analyse the weekly cases and deaths in the cities and provincial towns.

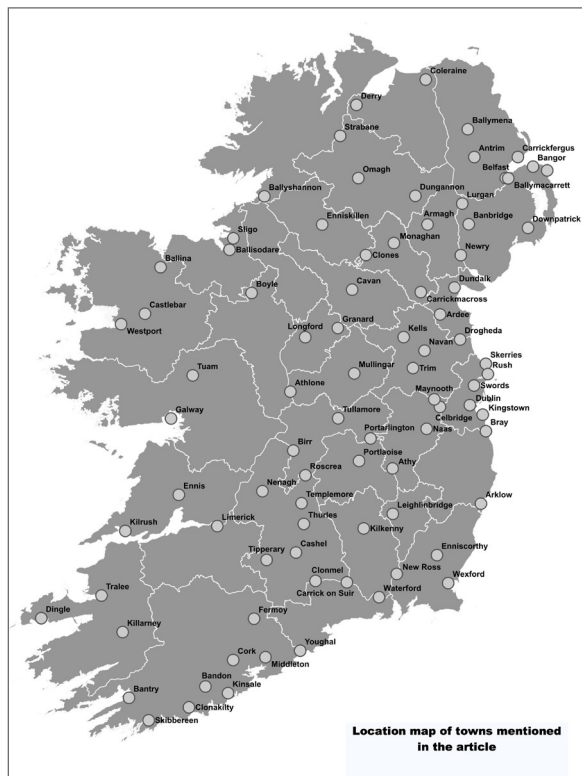


Figure 1. Location of towns mentioned in this article. Source: Census of Ireland, 1831.

That study is ongoing, and preliminary figures and evaluations for selected towns are addressed here. Three different epidemiological statistical terms are used in this study. Morbidity, the cases of disease per thousand of the population; mortality, the number of deaths per thousand of the population; and case fatality rate which is the ratio of deaths to cases expressed as a percentage.

In early 1832, the Central Board of Health instructed the local boards of health to return the numbers of new cases, deaths, and recoveries, daily or twice weekly to Dublin by mail coach. These numbers were recorded on over 120 manuscript sheets, providing daily or weekly returns of cases and deaths from a large number of towns across Ireland. This data is sorted roughly by month, and spans April to October 1832. The sheets are in varying states of disrepair, some having been spliced at some stage in the past, but they give us a comprehensive data set from dozens of towns across the country. This is a rich source of quantitative data, more comprehensive and complete than similar data for England and Wales (Davenport *et al.*, 2019, p. 415).

In the same archive series is a further set of manuscript sheets, entitled, '*Cholera; Returns of Cases and Deaths up to 24th December 1832*', tabulating county totals. O'Neill (1973) provides a table extracted from these original returns, which showed totals for all 36 counties. However, on inspection of these returns at the National Archives in 2022, several sheets (1 – 6) are now missing, including those for all the counties of Connacht, as well as most of Munster. This forces us to rely in part on O'Neill's transcript, which, when checked against the surviving originals, proves accurate. The returns list numerous towns, registered by county, along with their total cases and deaths. It is not clear from the originals if this data includes cases and deaths from the respective county at large, or just from each reported town or village. It would appear that they are the totals of the individual returns from each Local Board Health – generally a town or parish – as given over the period from March 1832 to December of that year.

Using the county case and death totals as given in the original returns, and O'Neill's extract, we arrive at a recorded national total of 51,192 cases and 19,394 deaths for 1832. Combining this with the 1831 census return of populations for each county, (Census, 1831), we can deduct a crude case and mortality rate for each of the counties (see Table 1). It is important to note that these are county totals, only in so far as they enumerate the cumulative returned cases and deaths from each town or parish board. Many rural areas had no boards of health, and therefore made no return. Difficulties arise in getting an overall picture because of the significant omissions from the record. Most authors agree that the total of just under 20,000 dead for 1832 is a conservative estimate. Newspapers of the period consistently report that the 'published returns are very defective; many perished without obtaining notice or aid' (*Belfast Commercial Chronicle*, 2 June 1831). Such was the uncertain nature of the statistics as returned, that in 1841 the Census Commissioners re-assessed the number of cases and deaths, and also included numbers from 1833, which were returned to the Cholera Board before its dissolution in May 1833. This later report officially returned 20,070 deaths for 1832, and 5,308 for 1833 a total of 25,378 (Census, 1841). Original returns for 1833 are no longer extant, so the total figures in this article relate only to 1832.

The spread of cholera in Ireland

Asiatic cholera was unlike any previous enteritic disease. Irish and English urban areas were familiar with the milder, endemic form of cholera, often referred to as 'English' or summer cholera. This illness was known by many names, but the term 'fever' was most commonly used in reports. Older Irish manuscripts often referred to such outbreaks under the name of '*Tonn-Taosgach agus crampaidhe*': 'the purging and vomiting with cramps' (Census 1841, Census 1851). The new Asiatic form was to be much deadlier.

From its arrival in Belfast in late February or early March 1832, (*Dublin Express Packet*, 20 March 1831), the epidemic swept steadily across the island, mostly along the main roads and coaching routes, but probably arising independently at several of the port towns as well. Military movements may have played a hitherto unacknowledged part in the spread of cholera to provincial Ireland. At the start of 1832 a decision was made by Sir Hussey Vivian, commander of the forces in Ireland, to bring extra troops from England, to help quell the agrarian outrages taking place all over the country. Troops were moved south from Ulster, where there were less disturbances, to towns in the fertile vales of Munster and south Leinster, where opposition and resistance against the Tithe was most focused (O'Donoghue, 1972, p. 78). Several of these troop movements can be traced in the columns of local newspapers, chronicled alongside reports of cholera outbreaks in the same towns. We must assume some correlation between these events. Provincial towns with army barracks often record outbreaks that coincided with the movement of regiments, such as at Templemore, the largest military barracks in Tipperary (Grace, 2011, p.55).

Belfast was probably the most prepared of Irish towns, despite the 'accumulations of filth' that were collected behind the homes of its poorest inhabitants (Farrell, 2014, p 58). Cleansing of streets and lanes was conducted, and houses fumigated and whitewashed. Reports of the disease are first noted amongst paupers landing at Donaghadee on coal boats from Scotland, despite attempts at quarantine. Several further cases were noted, but not publicised over the next fortnight, until the first official death was reported on 18 March 1832 (Farrell, 2014, p.72). Less than a week later, on 25 March, Dublin reported its first cholera cases, and newspapers started to publish reports of its spread. The lack of cases in other towns in the interval would suggest an independent arrival of cholera through Dublin port. Belfast had no further cases until 15 April, by which time deaths were mounting in Dublin. Over 430 people had died in the capital by early May, rising to 1,524 by 5 July. By Christmas 1832 it was estimated that the number of deaths in Dublin was around 4,478. (CSO/OP/1832/523). In Belfast the epidemic erupted fully from the end of June, and by the start of July there were 281 cases and 51 deaths. (*Belfast Newsletter*, 7 July 1832).

It took some time for the cholera to spread across the entire country. Many rural areas escaped totally, with rural and remote county Leitrim not reporting its first case until January 1833 (Census, 1841). Cork city had its first outbreak on 12 April 1832, some two weeks after Dublin. Two weeks later cholera had reached Tralee in Kerry, which was several days by coach from Dublin. In the northern part of Ireland, the spread

seems to have occurred radially from Belfast, with cases reported in Banbridge (9 April) and in Warrenpoint (17 April) in County Down. Further south, Ardee and Carlingford in County Louth recorded cases in the last week of April 1832 (Duffy, 1982). Stranorlar and Ramelton in County Donegal reported their first cases on the 12 and 22 of April respectively, and Dunfanaghy in remote west Donegal around the 12 April. Interestingly, although it might be expected that cholera came to the Donegal towns via the port of Derry which had a significant hinterland, that city did not experience its first case until the 21 August (*Londonderry Sentinel*, 25 August 1832).

By mid-June 1832, there were still several Ulster counties reporting no cases, or at least no returns, including Tyrone, Fermanagh, Monaghan, Cavan, and Derry. Bundoran and Ballyshannon (treated as a single Board of Health), in the far south of Donegal evaded the pestilence until the first week of August, mostly by throwing up a cordon sanitaire (*Ballyshannon Herald*, August 1832). Ballyshannon was struck again in the first week of November when cholera was said to have been 'making sad havoc' in the town (*Sligo Journal*, 9 November 1832). Derry seemed to escape the first wave of cholera, but by 5 October, there had been 416 cases and 89 deaths (*Londonderry Sentential*, 6 October 1832). Nearby Coleraine was hit by 25 August, eventually recording 286 cases and 105 deaths. There appears to be a pattern of some Ulster towns escaping earlier waves, but then suffering throughout the autumn and winter months of 1832, frequently being visited twice. Strabane was attacked on the 13 August and had 91 cases and 23 deaths by the 29 September; there was another outbreak in October, when a further 19 people died (*Londonderry Sentinel*, 6 October 1832). Dungannon reported cases again on 15 November. Enniskillen appears to report its first case at the end of September; it would eventually have 49 deaths by the end of 1832 (*Enniskillen Chronicle*, 29 November 1832.) Similarly, Newry, which was on the coach route to Dublin had 129 recorded deaths by the start of July, even though its first reported case occurred at the end of May. (*Belfast Telegraph*, July 1832). Monaghan seems to have escaped lightly, with only 22 deaths, and Carrickmacross reported 61 deaths, all taking place in the Autumn of 1832 (CSO/OP/1832/568).

There was also a distinct spread outwards from Dublin; Naas reported cases on 13 April, Arklow was struck on 8 April, with the rural towns of north county Dublin returning cases in early April. Nevertheless, on May 1, newspapers were reporting that the disease had become almost confined to Dublin and Cork, suggesting a lull in the spread of the cholera (*Dublin Evening Packet*, 1 May 1832).

Drogheda and Dundalk reported their first cases on 5 May, and county Louth was to record the second highest morbidity rate after Dublin. Navan reported its first case on the 12 May, but had only reported 7 deaths by the 23 June, possibly due to its fresh water supply; it was to eventually suffer 54 deaths. Nearby Kells, with a similar population had a significantly higher case fatality rate, of over 47 percent, due possibly in part to its large concentration of poor-quality housing and contaminated wells (Simms, 1990). County Meath in general escaped the worst of the epidemic (O'Neill, 2020, p.99).

Connacht appeared to escape the ravages of the disease until May, when Galway, despite taking precautions against the pestilence, notified its first case on 12 May. By the start of June, the city was experiencing 'unmitigated violence'. The *Dublin Evening Post* had reported on 26 June that only a small number of cases had occurred in Connacht, and that three counties, Leitrim, Sligo and Roscommon remained cholera free at that date (*Kilkenny Moderator*, 2 June 1832). However, by the end of July, Castlebar and Westport were in a 'frightful state', with 76 cases in Westport alone, and 46 deaths in Castlebar (Ainsworth, 1842, p.438). Ennis had a considerable number of deaths, but was eclipsed by nearby Limerick city, on the River Shannon, which was struck on the 14 May, again perhaps via its port. With its notorious lanes and tenement houses, Limerick was to record 1,043 deaths in just four months. Inland, Kilkenny was attacked in the middle of August, but by mid-November 1832, the incidence of the disease had declined greatly. A brief outbreak in the last week of May 1833 came as a shock, but quickly abated. (Law, 1996).

The disease appeared to be slower to reach some towns, despite the prevalence of infection in nearby larger urban areas. Waterford reported its first case on the 1 June, Carrick-on-Suir in Tipperary just two days later. However, the spread of cholera through Tipperary's numerous small towns was erratic; Tipperary Town followed on the 15 June, as did Clonmel on the 20 June. The wave then moved northwards to Roscrea on the 7 July, Nenagh on 12, then breaking out in Cashel, some 30 miles distant, on the 20 of July. Cholera did not appear in Thurles until 5 September, where it lingered until early November. Wexford town escaped until 21 August (Creighton, 1894, pp 816-821). Various towns seem to have had short, sharp bouts of cholera, with no re-occurrence, but others seem to have had two visitations, or an epidemic pattern that was drawn out over many weeks. This pattern of recurrence is seen in many northern towns, like Strabane and Coleraine. Grace's study on county Tipperary towns has pointed out that several places had significant second outbreaks, with the subsequent waves being worse than the original (Grace, 2011). As noted above, Tipperary Town recorded its initial outbreak on 15 June which subsided in early August, but it then re-appeared on 9 December 1832. By January *The Waterford Mail*, reported that the town had had 60 deaths in the previous 10 days. Another re-eruption occurred in Carrick-on-Suir in early October, lasting sporadically until the spring of 1833, when there were 137 cases and 112 deaths in total (CSO, 2/440/1-10). A second outbreak occurred in Clonmel in late December 1832, and there were 52 deaths reported from them until May 1833. Cashel had its first case of cholera on 20 July, but contagion then stopped, returning to erupt in mid-August when there were 103 deaths. Cashel endured a third bout of the pestilence in late November 1832, when cholera was reported to be raging again. Roscrea suffered a second wave of infections in December 1832, leaving 35 dead in one week. Nenagh experienced a short outbreak in early July which subsided quickly, but the contagion returned with vengeance in mid-August, leaving 148 dead by the end of September (Grace, 2011, p. 55).

The average duration of the epidemic in each town appears to have been anywhere from 4 weeks to 6 weeks. Duration seems to have depended on a number of factors, principally the water supply, but also the level of poverty, poor housing, and the geographic location of a particular town. The pattern of disease in Sligo is clearly related to the water supply, as there is a very rapid rise in cases and deaths over a period of about 14 days, followed by a sudden collapse in cases, a short lag in the collapse of deaths, and then a petering out of the morbidity and deaths over a further four weeks or so (Irwin, 1832). This epidemic curve is a clear indication of a point source outbreak, with a shared water source being the likely culprit. Panic and flight were commonplace in many stricken towns; most of the population of Sligo and Tullamore moved wholesale to encampments in the surrounding countryside, often leaving the very poor and sick behind (Irwin, 1832). Residents of Galway fled to Oughterard, 14 miles away from the city, in an effort to escape the epidemic (*Dublin Evening Post*, 2 June 1832).

Some counties and towns were however, attacked unexpectedly in the spring of 1833 and sporadically into 1834. March 1833 seemed to bring things to a head, when six hundred cases and three hundred deaths were reported from across the country. (Robins, 1994, p. 107). Towns in Ulster which had previously escaped the epidemic, were unexpectedly attacked in late 1833, with Armagh having a particularly bad outbreak in September 1834.

Rural areas were not exempt from the scourge of cholera, despite having more diverse clean water sources, and being far from urban settlements. One such example is the coastal fringes of rural county Cork, one of the most densely inhabited parts of the country, with a rural population of 622,500 in 1831. This area was characterised by a unique settlement-type, the clachans. These were a nucleated vernacular settlement, typically grouped without a formal plan and usually located on marginal land, where land-holding was organised communally, and often with considerable ties of kinship between the families involved. The west Cork baronies of West and East Carbery were already in a wretched way before 1832, due to the famine of 1822 and subsequent outbreaks of fever (Report, 1822). Population density on the three rocky peninsulas of the south-west, and along the coast from Skibbereen to Kinsale, was in excess on 164 persons per kilometre, and many of the settlements, though not classified as villages, exhibited many of the characteristics of such groupings (Whelan, 2012, p.7). Almost 800 deaths were to be recorded in the rural west Cork baronies in 1832-33, an average mortality rate of 42.3, following the pattern of cholera arriving late in 1832, and more deaths taking place in the Spring of 1833, than in 1832 (Census, 1841). Deaths in rural Cork and other rural areas of the west, northwest and southwest are widely considered to be underestimates. Few rural areas had a parish Board of Health, those that did were often ineffective.

County Totals for cases and deaths, 1832

Three key measures are explored below. The morbidity or case rate, (cases per thousand of population per year), is the standard for measuring the incidence of disease in any given population. The mortality rate, or death rate, is expressed as a rate of deaths per thousand of the population. Case fatality rates are usually expressed as a percentage, and refer to the proportion of cases which resulted in death. The case fatality rate is a measure of the severity of a disease, but can be skewed by the under or over reporting of case numbers. During the 1832-33 cholera epidemic, the average Irish morbidity rate was 8.5 per thousand. The average mortality rate was lower, at 3.3. Nevertheless, the average case fatality rate – the percentage of cases resulting in death – was very high, at 38.4 percent. This is a clear indication of the severity of the disease, and a prognosis of poor outcomes for victims.

Cholera was primarily an urban disease, but as statistics were aggregated primarily at county level, it is possible to use the returns from the Cholera Board to look at which counties and regions were most affected in 1832 (See Table 1). It is important to note that this analysis focuses on the 1832 figures only; further research will deal with the contrast between rural and urban areas as outlined in the 1841 Census Commissioners report.

Some counties had several mid-size towns, as was the case with Tipperary and Cork; others had only one prime urban centre, such as counties Sligo and Limerick. The morbidity and mortality rates in several counties were determined by the impact of the disease in that county's urban areas. Counties with very high populations often had a low incidence of disease, like county Donegal, with almost 300,000 inhabitants, but where less than 6,000 people lived in towns; it had a mortality rate of just 0.57. County Galway, with a rural population of about 395,000, had a morbidity rate of 6.6, and a mortality rate of 2.87. Much of this was accounted for by the high incidence of disease in Galway city with a morbidity rate of over 80; remote Connemara and rural parts of east Galway appear to have escaped lightly.

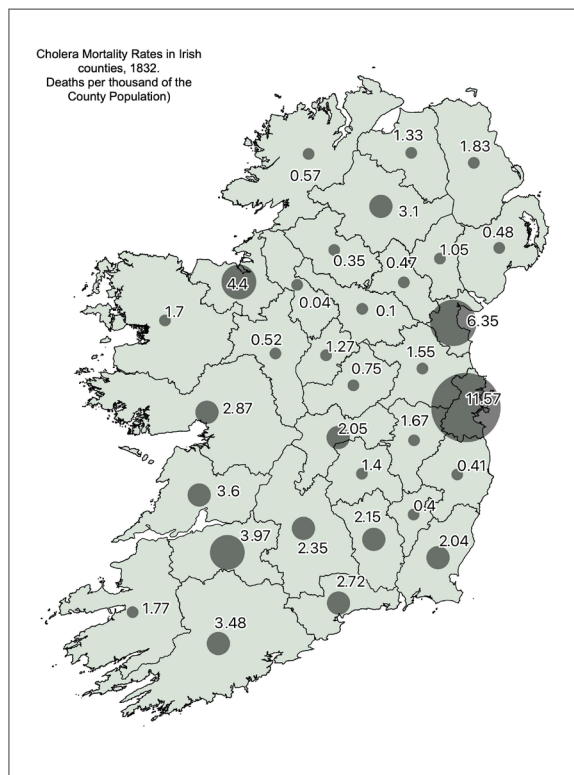


Figure 2. Cholera Mortality Rates in Irish counties, 1832. Source: Data from NAI, CSO/OP/1832/523; CSO/OP/26.

The counties with the highest **morbidity**, tended to have dense urban settlements; Dublin, with an outsized city; county Louth, (Drogheda and Dundalk suffered heavily), county Limerick, (Limerick City suffered 1,400 deaths), and Antrim with its large urban area of Belfast City. County Cork, home to Ireland's third largest city and with seventeen substantial provincial towns, was to have a case fatality rate of 37 percent and morbidity rate of 9.5 per thousand. Cork city accounted for many of the recorded cases in the county, over 50 percent, and several towns in the county recorded over a 40 percent case-fatality rate. Conversely, the severity of the disease in densely populated rural Cork is difficult to ascertain from contemporary sources. County Sligo, with one urban centre, Sligo town, had the third highest county rate of cases per thousand, and a case fatality rate of 47 percent, making it one of the riskiest counties in which to catch cholera. County Tipperary had nine towns with a population of over 2,000, and the county as a whole had a mortality rate of 3.9 (over 900 deaths), and a high case fatality rate of almost 60 percent. The counties with the highest mortality rate (apart from Dublin), were Louth, Sligo, Limerick, and Clare, all counties dominated by one or two large towns (See Figure 2). County Clare had one of the highest rural death tolls in the country, a fact that is attested to by other sources. (Census, 1841). Further investigation of contemporary sources may better reveal the impact of cholera on more rural areas, in so far as they can be generalised on a county basis.

Table 1: Case and Mortality Rates by County, 1832. Source: Calculated from the original returns, NAI, CSO/OP/1832/568, with missing data from originals supplemented by O'Neill's 1973 transcript.

County	County Population 1831	Total Cases	Total Deaths	Morbidity Rate (i.e. Cases per 1,000 pop.)	Mortality Rate (i.e. Deaths per 1,000 pop.)	Case Fatality Rate (i.e. % Deaths relative to number of Cases)
Antrim	316,909	3,249	579	10.3	1.83	17.82%
Armagh	220,124	599	231	2.7	1.05	38.56%
Carlow	81,988	43	33	0.5	0.40	76.74%
Cavan	227,933	30	23	0.1	0.10	76.67%
Clare	258,322	2,155	929	8.3	3.60	43.11%
Cork	801,732	7,560	2,791	9.4	3.48	36.92%
Derry	222,012	1,195	296	5.4	1.33	24.77%
Donegal	289,149	451	164	1.6	0.57	36.36%
Down	342,012	1,535	164	4.5	0.48	10.68%
Dublin	387,197	14,701	4,478	38.0	11.57	30.46%
Fermanagh	149,763	106	53	0.7	0.35	50.00%

Galway	414,784	2,728	1,189	6.6	2.87	43.59%
Kerry	263,126	958	466	3.6	1.77	48.64%
Kildare	108,410	483	181	4.5	1.67	37.47%
Kilkenny	168,951	550	363	3.3	2.15	66.00%
Kings Co.	144,225	433	295	3.0	2.05	68.13%
Leitrim	141,524	11	5	0.1	0.04	45.45%
Limerick	315,435	3,383	1,252	10.7	3.97	37.01%
Longford	112,558	265	143	2.4	1.27	53.96%
Louth	124,846	1,876	793	15.0	6.35	42.27%
Mayo	366,328	1,391	624	3.8	1.70	44.86%
Meath	171,826	515	266	3.0	1.55	51.65%
Monaghan	195,536	171	91	0.9	0.47	53.22%
Queens Co.	145,851	373	204	2.6	1.40	54.69%
Roscommon	249,613	217	129	0.9	0.52	59.45%
Stigo	171,765	1,577	756	9.2	4.40	47.94%
Tipperary	402,363	1,582	944	3.9	2.35	59.67%
Tyrone	304,468	1,068	944	3.5	3.10	88.39%
Waterford	177,054	879	482	5.0	2.72	54.84%
Westmeath	136,872	161	103	1.2	0.75	63.98%
Wexford	182,713	862	373	4.7	2.04	43.27%
Wicklow	121,558	86	50	0.7	0.41	58.14%

Statistics can sometime be misleading; County Carlow had a case fatality rate of 76 percent, but only had 43 cases in 1832. Cavan, with a much denser population had very few reported deaths and low morbidity, but a high case fatality rate. Tyrone has a similar distortion, as can be seen from Table 2. These are outliers, and Waterford is more typical of the counties in this range; Waterford had a high number of cases (879), a morbidity rate of 5 and high case fatality rate of almost 55 percent.

Table 2: All counties with over 50 percent Case Fatality rate. Note that the rate is often based on a low number of cases, thus artificially inflating the rate. Source: Calculated from the original returns, NAI, CSO/OP/1832/568, with missing data from originals supplemented by O'Neill's 1973 transcript.

County	County Population 1831	Total Cases	Total Deaths	Morbidity Rate (i.e. Cases per 1,000 pop.)	Mortality Rate (i.e. Deaths per 1,000 pop.)	Case Fatality Rate (i.e. % Deaths relative to number of Cases)
Tyrone	304,468	1,068	944	3.5	3.10	88.39%
Carlow	81,988	43	33	0.5	0.40	76.74%
Cavan	227,933	30	23	0.1	0.10	76.67%
Kings Co.	144,225	433	295	3.0	2.05	68.13%
Kilkenny	168,951	550	363	3.3	2.15	66.00%
Westmeath	136,872	161	103	1.2	0.75	63.98%
Tipperary	402,363	1,582	944	3.9	2.35	59.67%
Roscommon	249,613	217	129	0.9	0.52	59.45%
Wicklow	121,558	86	50	0.7	0.41	58.14%
Waterford	177,054	879	482	5.0	2.72	54.84%
Queens Co.	145,851	373	204	2.6	1.40	54.69%
Longford	112,558	265	143	2.4	1.27	53.96%
Monaghan	195,536	171	91	0.9	0.47	53.22%
Meath	171,826	515	266	3.0	1.55	51.65%
Fermanagh	149,763	106	53	0.7	0.35	50.00%

The low number of cases and deaths in certain counties (see Table 3) gives rise to a number of questions. Were cases genuinely low, and if so, why? Were the low rates a result of under-reporting or were there variables at play that lessened the impact of the disease in counties such as Cavan, Leitrim, and Fermanagh, all with dense populations. Cavan in particular was one of the most densely populated parts of Ireland, but was also mostly rural, containing just three towns with populations of between 2,000 and 3,000. On further investigation, an examination of the tabulated cholera returns from the 1841 report reveals that Cavan experienced the 'late wave' that affected many Ulster towns in early 1833. The county was to have 322 cases and 121 deaths in 1833, with a 24.4 percent mortality rate. (Census, 1841). Leitrim was subjected to the same pattern, with 247 cases and 101 deaths in 1833, as was Carlow, with 263 cases and 174 deaths (Census, 1841). Using data solely from 1832 misses later outbreaks, but as no

original data survives for 1833, we are forced to interpolate this wave using the Census Commissioners report of 1841, and the various contemporary newspaper reports.

Table 3: The six counties with the lowest return of cases per thousand of the population, 1832. Source: Calculated from the original returns, NAI, CSO/OP/1832/568, with missing data from originals supplemented by O'Neill's 1973 transcript.

County	County Population 1831	Total Cases	Total Deaths	Morbidity Rate (i.e. Cases per 1,000 pop.)	Mortality Rate (i.e. Deaths per 1,000 pop.)	Case Fatality Rate (i.e. % Deaths relative to number of Cases)
Leitrim	141,524	11	5	0.1	0.04	45.45%
Cavan	227,933	30	23	0.1	0.10	76.67%
Fermanagh	149,763	106	53	0.7	0.35	50.00%
Carlow	81,988	43	33	0.5	0.40	76.74%
Wicklow	121,558	86	50	0.7	0.41	58.14%
Monaghan	195,536	171	91	0.9	0.47	53.22%

Cholera in urban areas

While county level data is revealing, it masks much of the lived experience of the epidemic. The pre-famine urban structure in Ireland consisted of four distinct tiers of towns (Aalen, 1978, p. 269) The first tier were the larger cities of Dublin, Cork, Belfast, Limerick and Waterford, all ports with varying populations of between 26,000 and 230,000, illustrating the unequal nature of the tier. Only Belfast had a significant industrial base. The second tier, often referred to as 'regional capitals' consisted of about 15 provincial towns, with populations varying from 10,000 to 25,000. Typically these towns were sixty miles apart, and offered a 'complex array of commercial, cultural, and administrative facilities' for very large surrounding areas. Below this tier were the large market towns, with populations between 3,000 and 10,000, and usually more than thirty miles apart. These towns frequently had a church, schools, specialised shops, and administrative buildings. In the bottom tier were the large villages, with a population of under 3,000, which served the surrounding agricultural hinterland with basic services. Mapping the case (morbidity) and death (mortality) rates for towns or urban areas, as returned in the Board of Health observations is challenging. Deciding which 'towns' or 'villages' to use as part of the data set gives rise to the issue of definition. As cholera is a crowd disease, the areas studied would have to be clearly urban in function and form. The nearest census to the cholera epidemic was taken just the year before its arrival, in 1831. It was the third decennial census, and subject to many criticisms, with the national

total population estimated to have been under-enumerated by about 132,000 people (Lee, 1981, pp 46-43). Nevertheless, the 1831 census provides us with the most accurate framework we have of urban-rural demographics at that time (Census, 1831).

In the later 1841 census report, the Commissioners divided each county into 'Civic' and 'Rural' districts, where 'civic' meant a town or village where the population was more than 2,000 inhabitants (Census, 1841). Using that definition and applying it retrospectively to the denominations given in the 1831 abstract, such-defined towns and their populations were extracted from the general returns of each county. Towns which straddle county boundaries are returned as one unit, in one county, e.g., Athlone, as being in Westmeath, and Clonmel as in Tipperary (See note 2). Extracting those 'civic' areas from the 1831 census statistical returns, gave a total of 127 'civic' areas, varying from the smallest, Rathfriland in county Down, (pop. 2,001), to Dublin City (pop. 232,362).

The expansive 'Counties of Cities', 'Counties of Towns', and 'Corporation Boroughs' – administrative peculiarities of the pre-famine urban structure – presented distinct problems in terms of the extent of their often-enormous corporation boundaries, frequently home to a disproportionate, dispersed, rural population, who were enumerated along with that of the built-up areas. To correct this, the study applies the population figures given in the *Municipal Corporations Report, 1837*, (Mun. Corp. 1837), or approximates the urban population from the returns of the 1841 census, which defined urban areas more clearly. To use the given 1831 population without amendment would have caused the statistics for cases and deaths to be skewed by the non-urban population. This method was applied to a number of other city boroughs and towns, all of which had a population in excess of 8,000 (See note 3)

In the following, the focus is on a subset of the data from the Cholera Returns, relating to 90 towns across the island for which data is most readily available, representing the various tiers of the urban hierarchy, and which provide scope for some generalisations (see Table 4, Figures 1, 3, 4 and 5).

Of course, national figures and county-level data disguise the rates in individual towns; those with smaller populations often have disproportionately higher mortality and case fatality rates. The small village of Ballisodare, just south of Sligo with a population of 550, had a case fatality rate of over 55 percent, and mortality rate of over 90; many other small villages exhibited the same patterns. Larger towns with the highest case-fatality rates (excluding towns with too-few cases or deaths to be statistically significant), were Tullamore, (77%), Cashel, (71 %), Thurles (70%), Kilkenny (68.7%), Templemore, (63.3%), Roscrea (61%), Dundalk, (59.2%), Clonmel, (57.2%), Nenagh (59.2%), and Longford (55%) (See Table 4 and Figure 5). The number of county Tipperary towns in this category is striking. What made Tipperary's urban centres so susceptible to cholera? (See Table 5)

The town with the highest morbidity rate (121.4) was Sligo, a fact that is attested to by other independent contemporary reports (Irwin, 1832). It had the fifth highest number of cases in Ireland (1,469), and the sixth highest number of deaths (698). Sligo also

had a mortality rate of 57.6 and a case fatality rate of 47.2 percent, making it one of the deadliest places to get the disease, a situation that is again supported by contemporary descriptions (Irwin, 1832). Galway city, within its smaller urban limits, had almost 600 deaths, significantly less than Sligo, with a case fatality rate of 46 percent. Ballyshannon and Bundoran had a significantly lower population than either Sligo or Galway but had a high morbidity (101), and a case-fatality rate of 35.3 percent.

Dublin city (inside the canals) had the largest number of cases and deaths nationally, as expected, and a morbidity rate of 80.4, but its mortality rate of 25 was less than half that of Sligo. It is uncertain why case and death rates in Dublin city are as low as they were. The presence of a 'dense, pauper population' in many areas of the city (Prunty 1998, p. 38), with numerous slums, insanitary privies and overcrowded lanes and back alleys, would suggest that higher death rates could be expected. Prunty argues that the practical efforts made by the city's parochial health boards after their establishment in 1818, went some way towards mitigating the immediate effect of the 1832 epidemic (Prunty, 1998, pp 62-65). The greatest amount of grant monies from the Central Board of Health was assigned to the Dublin City Board; over £33,000 in 1832 alone, an indication of the level of distress in the city (CSO, 2/2440/ 1-10). As letters from that board show, the situation in most of Dublin was dire; burials overwhelmed the city, and graveyards were closed (CSO/RP/1832/1655). It is likely that cases and deaths were underreported in the poorer areas of Dublin city; an in-depth examination of the progress of the epidemic in Dublin City may reveal more.

Cork city was the second largest urban area in Ireland, with a population of over 84,000. It was also a poor city, with large slum areas, and high levels of poverty, and a busy port. Unsurprisingly it was to bear the brunt of the epidemic in Munster with over 4,000 cases and 1,220 deaths. However its morbidity was 48.5 (less than Limerick), and with a 30 percent case fatality rate, it was less risker overall than Limerick city. The large market towns of county Cork had significant morbidity and mortality rates. Kinsale had a morbidity rate of 73.6, and case fatality of 34 percent. Clonakilty, west of Cork city, reckoned with a low case load, but a morbidity rate in excess of 60. Bantry, at the heart of west Cork, experienced a high morbidity rate of 35, and a case fatality of 48 percent. Figures for this town may be a good barometer for the incidence of disease in west Cork in general. Middleton in east Cork had very low case numbers and appears to have escaped the worst of the 1832 wave, as did the north Cork market town of Fermoy, which had low morbidity at 17, and consequently low overall deaths. But Youghal, a historic walled seaport, had over 200 cases, and with a case fatality rate of almost 55 percent was a much risker place in which to catch the disease.

Limerick, a city in industrial decline, with a significant slum problem, had about half the population of Cork, but almost the same number of deaths (See Table 4), and higher case and death rates. Statistically, this supports the narrative of the progress of the cholera in Limerick city (Mangan, 2008). Belfast, similar in size to Limerick, had an equal number of cases but far fewer deaths. Its mortality rate of 14.8 was the lowest of the four big cities, in part due to its effective Board of Health and its status as a newer

city with better employment prospects. Kilkenny, despite a lower number of cases had a very high case fatality rate, almost 69 percent, as did Tullamore, Dundalk and Kilrush (See Table 5). Paradoxically, Dublin, Cork, and Belfast recorded the lowest case fatality rates, due in part to the excessive size of their populations compared to the next tier of Irish towns.

Towns like Athlone, on the banks of the wide and relatively fast-flowing Shannon appear to have had fewer cases than towns like Drogheda or Limerick, where drinking water came from often shallow and polluted wells. The larger cities and towns tended to have outbreaks which were more localised, as the greater number of water sources was a limiting factor. Diversity of water sources generally increased with the size of population, but many Irish provincial towns were heavily dependent on a single river, or small number of wells for their drinking water (IHTA). Towns with the highest number of cases didn't always have the highest morbidity rate or case fatality rates as is borne out by Table 6. It is worth examining the very high case numbers in quite small towns like Ballyshannon/ Bundoran, Maynooth, Rush, and Celbridge, where high case numbers may be indicative of a shared water source.

Drogheda and Sligo were noted at the time as 'the worst affected provincial towns' in Ireland with a mortality rate equal to the worst urban areas in Britain (See note 4). In these sizable country towns, cholera cases were so numerous, progress so rapid, and so singularly fatal at the first outbreak, that these places attracted much contemporary attention (Census, 1841, p xxi). The data shows that Sligo was in fact the worse of the two in all the statistical categories. Sligo, with the smaller urban population had a mortality rate of 57.6, almost twice that of Drogheda. In Drogheda the cholera 'raged for a period of more than four months', and out of population of over 17,400, it was 'supposed that nearly 1,500 fell victim to its fury' (Wilson, 1986, p. 30). By the end of June, 835 cases had been reported of which 372 were fatal. On the 11 August the *Drogheda Journal* reported that the epidemic was 'nearly at an end', and the inhabitants who had fled the town were coming back. The figures issued for the end of August were the last issued officially, 1,213 cases and 419 deaths (CSO/OP/1832/568).

In Sligo the epidemic hit during the height of the sultry summer of 1832. Over a six-week period the official death toll in this small provincial town was almost 700 lives. People died within hours of contracting the disease, and when the traditional burial ground at Sligo Abbey overflowed with bodies, a mass grave was opened to cope with the large number of infectious corpses (Gallagher & Hensey, 2021). Doctors battled in vain to contain the cholera, and townspeople fled to the countryside until the disease abated. Seven medical men were to die before the contagion waned. All regular business was suspended in Sligo during the epidemic for a total of 24 days (Gallagher, 2020). Sligo, like Drogheda and Galway, had experienced an increased level of poverty from 1815 onwards, and a significant in-migration of landless labourers to the 'cabin-built' suburbs of Irish provincial towns. In Sligo the water supply, which comprised the river and a few shared wells, was quickly suspected of carrying the disease. In Drogheda, the Board of Health sent Dr Richard Stephens to investigate the water supply, which was found to be contaminated by sewage seepage.

Table 4: Selection of 90 towns, all with populations over 2,000 inhabitants. sorted by deaths per thousand, taken from the calculated returns of the Cholera Board, 1831. Source: NAI, CSO/OP/1832/568. Note: the disease figures for Athlone only applies to the Westmeath side of the town, but the population is for both sides.

Town	Urban Population in 1831	Total Cases	Total Deaths	Morbidity Rate (i.e. Cases per 1,000 pop.)	Mortality Rate (i.e. Deaths per 1,000 pop.)	Case Fatality Rate (i.e. % Deaths relative to number of Cases)
Stigo	12,100	1469	698	121.4	57.69	47.52%
Ballyshannon & Bundoran	3,775	385	136	101.99	36.03	35.32%
Ennis	7,711	746	271	96.74	35.14	36.33%
Galway	16,392	1,313	565	80.1	34.47	43.03%
Rush	2,144	237	72	110.54	33.58	30.38%
New Ross	5,011	393	160	78.43	31.93	40.71%
Celbridge	1,647	117	52	71.04	31.57	44.44%
Tullamore	6,324	247	190	39.06	30.04	76.92%
Drogheda	17,365	1,215	491	69.97	28.28	40.41%
Ballymacarett (Belfast suburb)	5,168	357	140	69.08	27.09	39.22%
Kinsale	7,823	576	198	73.63	25.31	34.38%
Dublin	232,361	18,689	5,798	80.43	24.95	31.02%
Westport	4,448	254	109	57.1	24.51	42.91%
Maryborough (Portlaoise)	3,223	141	75	43.75	23.27	53.19%
Limerick	45,000	2,949	1,045	65.53	23.22	35.44%
Clonakilty	3,807	233	86	61.2	22.59	36.91%
Templemore	2,936	101	64	34.4	21.8	63.37%
Kells	4,326	193	92	44.61	21.27	47.67%
Tralee	9,569	472	201	49.33	21.01	42.58%
Carrickmacross	2,979	113	61	37.93	20.48	53.98%
Longford	4,516	167	92	36.98	20.37	55.09%
Kilrush	3,996	155	79	38.79	19.77	50.97%
Swords	2,537	168	49	66.22	19.31	29.17%
Castlebar	6,373	261	119	40.95	18.67	45.59%

Ardee	3,975	162	74	40.75	18.62	45.68%
Roscrea	5,512	167	102	30.3	18.51	61.08%
Donaghadee	2,986	160	54	53.58	18.08	33.75%
Coleraine	5,752	286	104	49.72	18.08	36.36%
Nenagh	8,466	250	148	29.53	17.48	59.20%
Blackrock	2,020	84	35	41.58	17.33	41.67%
Bantry	4,275	150	72	35.09	16.84	48.00%
Cashel	6,971	163	117	23.38	16.78	71.78%
Antrim	2,655	91	44	34.27	16.57	48.35%
Downpatrick	4,784	218	79	45.57	16.51	36.24%
Kingstown	5,756	234	93	40.65	16.16	39.74%
Maynooth	2,053	207	33	100.83	16.07	15.94%
Dungannon	3,515	294	56	83.64	15.93	19.05%
Kilkenny	19,000	431	296	22.68	15.58	68.68%
Naas	3,808	103	59	27.05	15.49	57.28%
Cork City	84,000	4,078	1,219	48.55	14.51	29.89%
Thurles	7,084	144	102	20.33	14.4	70.83%
Granard	2,069	53	29	25.62	14.02	54.72%
Derry	14,120	884	188	62.61	13.31	21.27%
Middleton	2,034	71	27	34.91	13.27	38.03%
Omagh	2,221	68	29	30.62	13.06	42.65%
Wexford	10,673	284	138	26.61	12.93	48.59%
Tuam	6,663	212	86	31.82	12.91	40.57%
Bangor	2,741	190	35	69.32	12.77	18.42%
Navan	4,416	154	54	34.87	12.23	35.06%
Newry	13,065	340	159	26.02	12.17	46.76%
Gort	3,627	70	42	19.3	11.58	60.00%
Youghal	9,606	201	110	20.92	11.45	54.73%
Dundalk	10,078	194	115	19.25	11.41	59.28%
Clonmel	12,500	240	137	19.2	10.96	57.08%
Enniscorthy	5,955	158	63	26.53	10.58	39.87%
Birr	6,484	124	68	19.12	10.49	54.84%
Trim	3,282	71	34	21.63	10.36	47.89%

Lurgan	2,842	109	29	38.35	10.2	26.61%
Belfast	48,224	2,833	418	58.75	8.67	14.75%
Skibbereen	4,429	61	38	13.77	8.58	62.30%
Skerries	2,556	64	21	25.04	8.22	32.81%
Fermoy	6,976	118	53	16.92	7.6	44.92%
Tipperary Town	6,972	85	52	12.19	7.46	61.18%
Athlone	5,705	74	41	12.97	7.19	55.41%
Waterford	26,377	397	188	15.05	7.13	47.36%
Banbridge	2,469	30	17	12.15	6.89	56.67%
Dingle	4,327	41	29	9.48	6.7	70.73%
Arklow	4,383	38	27	8.67	6.16	71.05%
Mullingar	4,395	36	26	8.19	5.92	72.22%
Monaghan	3,848	40	22	10.4	5.72	55.00%
Ballymena	4,067	59	21	14.51	5.16	35.59%
Killarney	7,910	71	40	8.98	5.06	56.34%
Carrick on Suir	9,220	98	43	10.63	4.66	43.88%
Bray	2,590	13	11	5.02	4.25	84.62%
Leighlinbridge	2,035	20	8	9.83	3.93	40.00%
Ballina	7,992	63	30	7.88	3.75	47.62%
Enniskillen	13,775	100	49	7.26	3.56	49.00%
Carrickfergus	3,800	37	12	9.74	3.16	32.43%
Armagh	9,470	82	28	8.66	2.96	34.15%
Athy	4,494	22	13	4.9	2.89	59.09%
Clones	2,381	14	6	5.88	2.52	42.86%
Caher	3,408	18	8	5.28	2.35	44.44%
Bandon	9,917	43	23	4.34	2.32	53.49%
Portarlington	3,091	7	6	2.26	1.94	85.71%
Boyle	3,433	10	5	2.91	1.46	50.00%
Cavan	2,931	4	4	1.36	1.36	100.00%
Wicklow	2,472	3	2	1.21	0.81	66.67%
Callan	6,111	8	3	1.31	0.49	37.50%
Newtownards	4,442	3	1	0.68	0.23	33.33%
Lisburn	5,745	4	1	0.7	0.17	25.00%

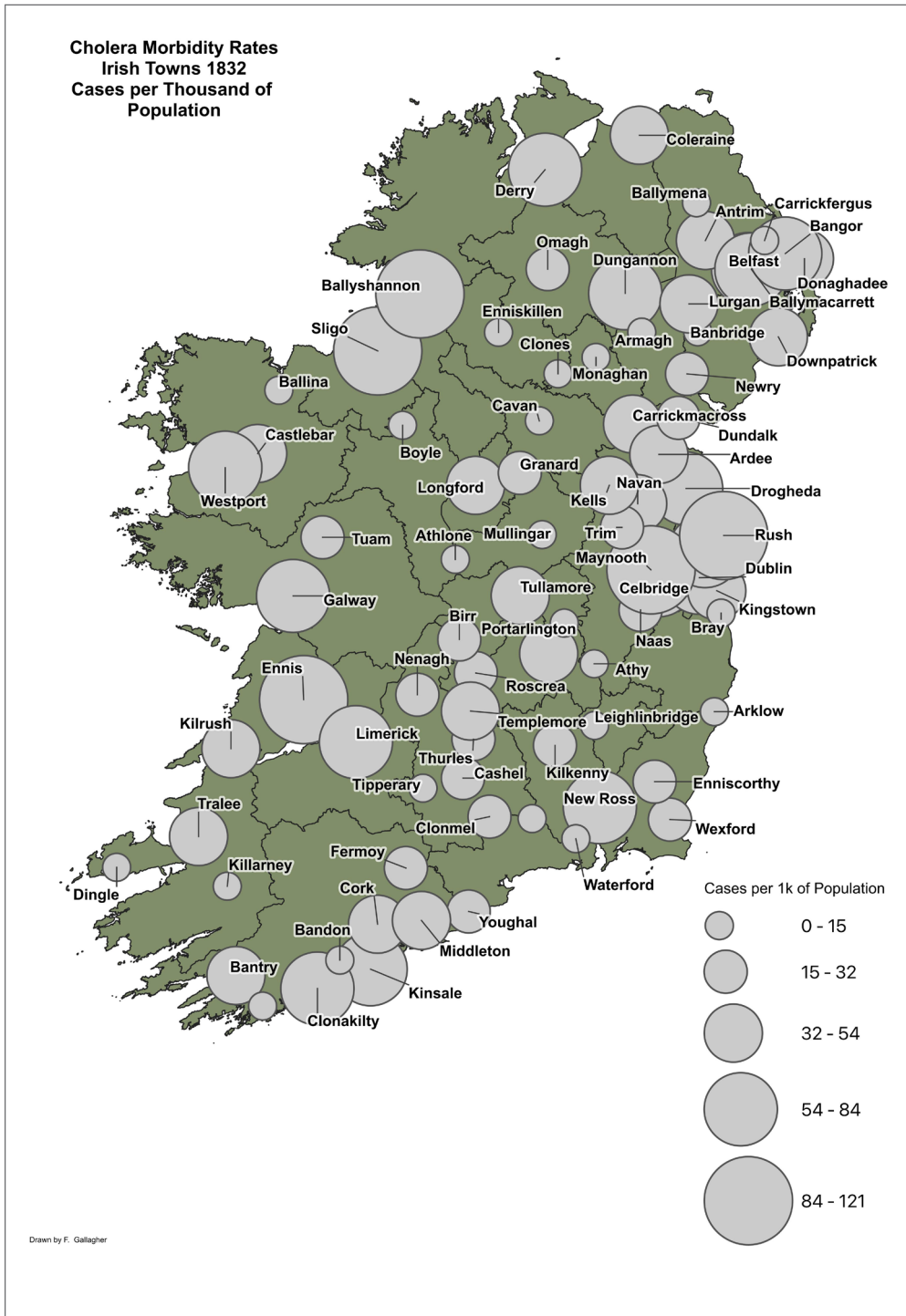


Figure 3. Cholera Morbidity Rates in Irish Towns 1832.

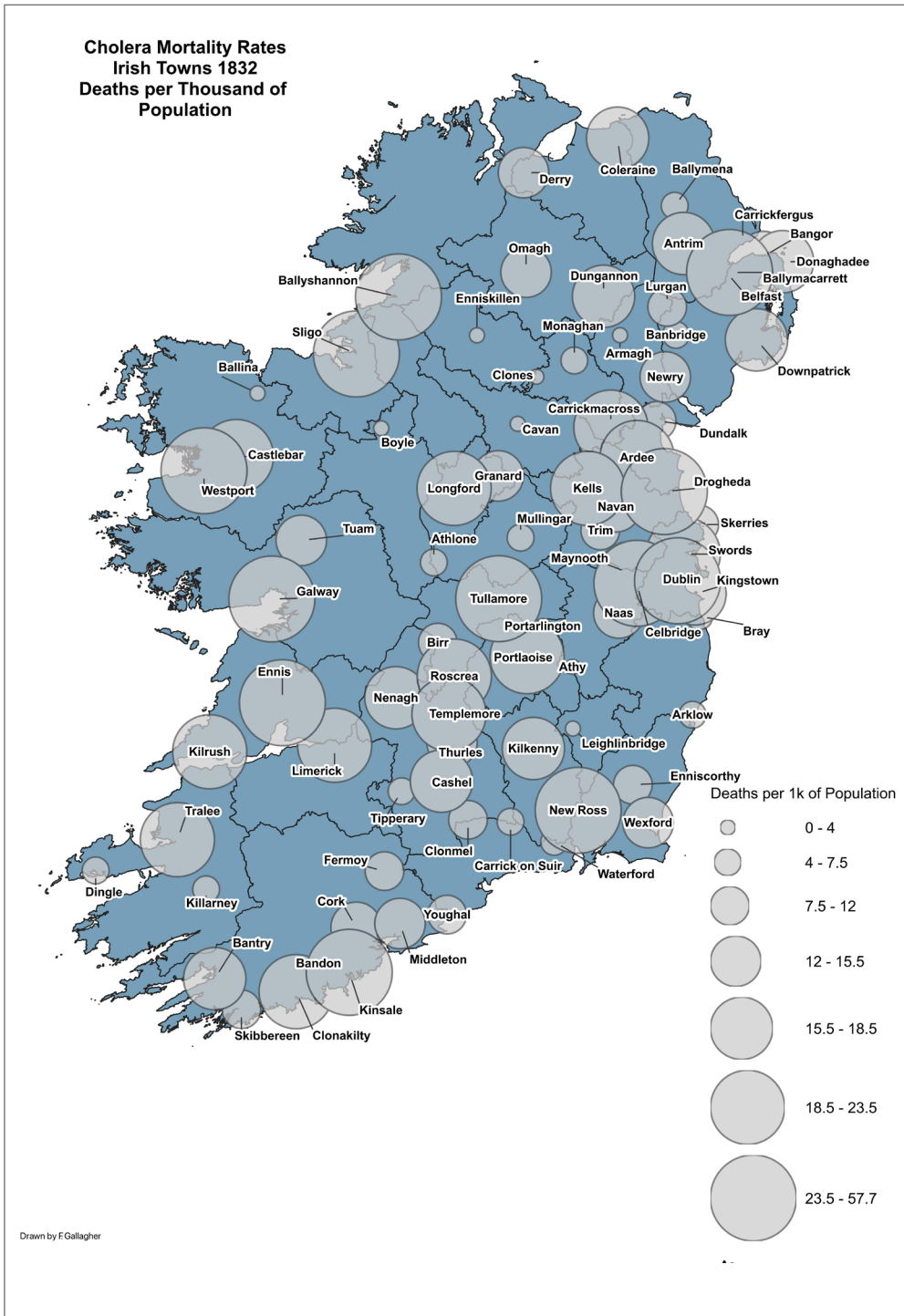


Figure 4. Cholera Mortality Rates in Irish Towns 1832.

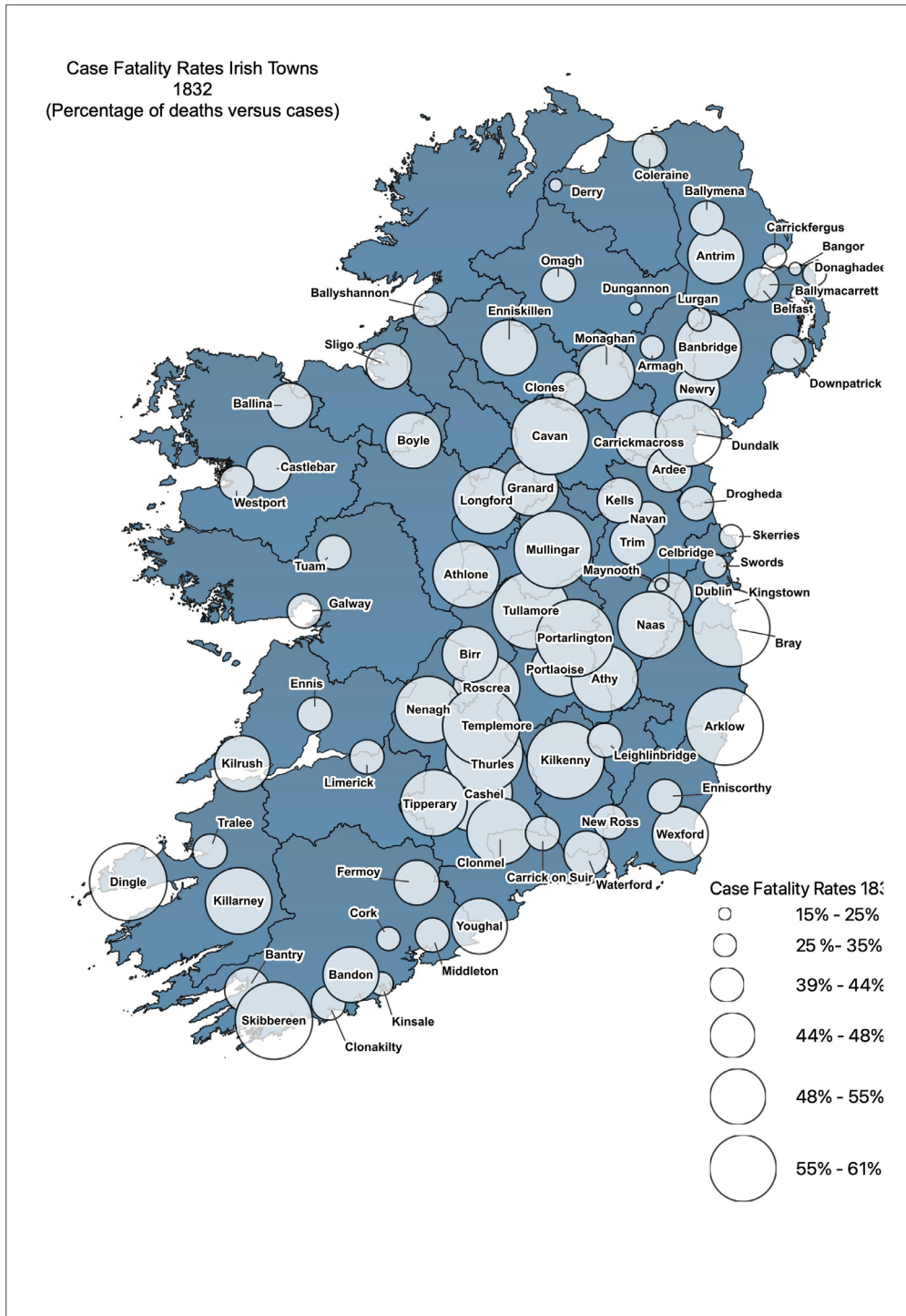


Figure 5. Case Fatality Rates in Irish towns, 1832.

Table 5. Towns with a case-fatality rates above 50 percent.

Town	Population in 1831	Total Cases	Total Deaths	Morbidity Rate (i.e. Cases per 1,000 pop.)	Mortality Rate (i.e. Deaths per 1,000 pop.)	Case Fatality Rate (i.e. % Deaths relative to number of Cases)
Tullamore	6,324	247	190	39.06	30.04	76.92%
Cashel	6,971	163	117	23.38	16.78	71.78%
Thurles	7,084	144	102	20.33	14.40	70.83%
Kilkenny	19,000	431	296	22.68	15.58	68.68%
Templemore	2,936	101	64	34.40	21.80	63.37%
Tipperary	6,972	85	52	12.19	7.46	61.18%
Roscrea	5,512	167	102	30.30	18.51	61.08%
Dundalk	10,078	194	115	19.25	11.41	59.28%
Nenagh	8,466	250	148	29.53	17.48	59.20%
Clonmel	12,500	240	137	19.20	10.96	57.08%
Ballisodare	546	90	50	164.84	91.58	55.56%
Longford	4,516	167	92	36.98	20.37	55.09%
Birr	6,484	124	68	19.12	10.49	54.84%
Youghal	9,606	201	110	20.92	11.45	54.73%
Carrickmacross	2,979	113	61	37.93	20.48	53.98%
Portlaoise	3,223	141	75	43.75	23.27	53.19%
Kilrush	3,996	155	79	38.79	19.77	50.97%

Table 6: The 15 towns with the highest number of cases, 1832. Source: Calculated from the original returns, NAI, CSO/OP/1832/568.

Town	Urban Population 1831	Total Cases	Total Deaths	Morbidity Rate (i.e. Cases per 1,000 pop.)	Mortality Rate (i.e. Deaths per 1,000 pop.)	Case Fatality Rate (i.e. % Deaths relative to number of Cases)
Dublin	232,361	18,689	5,798	80.43	24.95	31.0%
Cork	84,000	4,078	1,219	48.55	14.51	29.9%
Limerick	45,000	2,949	1,045	65.53	23.22	35.4%
Belfast	48,224	2,833	418	58.75	8.67	14.8%
Sligo	12,100	1,469	698	121.4	57.69	47.5%
Galway	16,392	1,313	565	80.1	34.47	43.0%
Drogheda	17,365	1,215	491	69.97	28.28	40.4%
Derry	14,120	884	188	62.61	13.31	21.3%
Ennis	7,711	746	271	96.74	35.14	36.3%
Kinsale	7,823	576	198	73.63	25.31	34.4%
Tralee	9,569	472	201	49.33	21.01	42.6%
Kilkenny	19,000	431	296	22.68	15.58	68.7%
Waterford	26,377	397	188	15.05	7.13	47.4%
New Ross	5,011	393	160	78.43	31.93	40.7%
Ballyshannon & Bundoran	3,775	385	136	101.99	36.03	35.3%

Conclusions

The use of nineteenth century epidemic statistics within a GIS environment has revealed several new patterns in the geographic distribution and spread of Asiatic cholera throughout Ireland in 1832. Previously, cholera was believed to have spread from town to town along the main road network. The data presented here suggests a more nuanced picture; it is likely that, given the extensive cross channel trade, cholera was introduced through multiple ports at different locations in Ireland at the same time. Looking at the dates on which first cases were reported, it is clear that the disease often made unexpected leaps, skipping one town on a communications route, to infect another further away, but often returning to infect or re-infect a town several months later. Troop and militia movements probably played a more significant role than has been previously recognised.

This study enables us, for the first time, to measure the morbidity and mortality rates in a number of Irish towns. The results have confirmed that those places which attracted the most attention at the time, such as Sligo and Drogheda, did indeed have high mortality rates, but other towns which do not figure as prominently in the newspaper reports also had very high case fatality rates. County Tipperary towns seem to have had some of the highest case fatality rates in Ireland. Geographical location and features had an obvious influence on some towns. Distance from ports with cross-channel trade, may have delayed the arrival of cholera in a particular area.

High levels of destitution, poverty and poor housing played a significant role. Several of the towns with significant mortality risks as defined in this study, such as Drogheda and Sligo, were towns where up to a half or three-quarters of the housing stock was of abject quality. (Gallagher, 2016, p.120). The high occurrence of abysmal housing meant that numerous cesspools and open drains discharged into rivers and wells, hastening contamination and transmission. Initial evidence points towards towns with multiple water sources having a lower morbidity and mortality rate, than those depending on a single source.

The high mortality rate of those who contracted the disease is a notable characteristic of the disease in Ireland and that is borne out by this detailed investigation of the statistics for Irish towns. The incidence of the disease was very high in Ireland, a point which was argued over at the time, but is borne out by this study. As demonstrated, the average Irish morbidity rate over the period of the epidemic was 8.5; the average mortality rate was 3.3 per thousand, in comparison to 1.9 in Britain. The Irish average case-fatality rate was very high, at 38.4 percent, and was significantly higher in some provincial towns.

Some patterns emerge from the mapping of the data, but clearly there are many other issues which have been revealed by the mapped data, requiring further examination on a smaller scale. Was there a higher incidence of morbidity and mortality in the lower social classes? Was it riskier to live in an urban area than a rural one? Was the incidence of disease disproportionate in the larger towns of the Irish urban hierarchy? Was there a relationship between town size and case fatality rates? Why some towns like Carlow entirely escaped the epidemic in 1832 remains unclear.

Future examination and analyses of the invaluable sources in the National Archives will undoubtedly reveal more about the effect of this forgotten epidemic on the Irish urban landscape.

Notes

Note 1: There are two major sources for the data, both in the National Archives of Ireland: the Cholera Board Observations, Chief Secretary's Office, Official Papers, CSO/OP/1832/no. 568, (formerly referenced as PROI Transferred Papers, 1A/46/13); and the separate, *Report on the Table of Death*, Census of Ireland, 1841, Section I, pp xx-xxi, [p 619-625 in total report], which was part of a report on deaths in Ireland by Sir William Wilde, who reviewed the general pattern of mortality for the Census Commissions. Also used are the copious documentation from the various county and parish Boards of Health, Cholera Papers, 1832-34, Applications for Loans, (10 Boxes, 2/440/1-10),

Note 2: Civic districts in the 1841 Census were defined as towns of over 2,000 inhabitants. This criteria was applied to the results of the 1831 census for the purpose of this study. There may be several such urban districts in any given county. The 'civic' figure for each county, is a cumulative total of all these districts.

Note 3: There were 23 of these towns. They included the 'big-four' cities of Dublin, Cork, Belfast and Limerick, all with populations in excess of 50,000, forming a distinct tier in the urban hierarchy. Limerick City's boundary for example included almost 20,000 people who were living in a vast rural area, which was not urban in form or function.

Note 4: The English industrial cities of Manchester and Leeds had total deaths of 674 and 702 respectively. Both cities had a population in excess of 100,000. From tables in E. Ashworth Underwood. MD, in *Proc. of Royal Soc. of Med.*, Vol XLI, (1947), pp 165-173.. Also calculated from the various Irish returns as compared with official returns from Britain.

Primary Sources

2nd Report – *Second report on the prevention and treatment of spasmodic cholera most respectfully submitted to His Excellency the Lord Lieutenant, by the General Board of Health in Dublin.* (Dublin, 1831), National Library of Ireland, pamphlet series, P414, P766, P1757(3).

Contagious Diseases (Ireland) Act, (1819), (59 Geo. III, c.41).

CSO: Chief Secretary's Office, Official Papers, held by the National Archives of Ireland. Formerly referenced as PROI Transferred Papers, 1A/46/13);

CSO/OP/1832/523

COS/OP/26 (1833)

CSO/OP/1832/568

CSO/OP/1833/51

CSO/OP/ Cholera papers: Applications for Loans, (10 Boxes, 2/440/1-10),

CSO/RP/1832/1655, Letter from Sir Hussey Vivian, to Sir William Gosset, [Under Secretary], reporting that 57 bodies have been buried in Bully's Acre and warning that if measures are not taken Dublin will be one great Charnel House

Census 1831. (1833) Census of Ireland, 1831, *Abstract of answers and returns under the population acts.* Enumeration 1831, BPP 1833, XXXIX (634), 341.

Census 1841. (1843). 'Table showing the numbers and cases of deaths of cholera, with their relative proportions in the rural and civic districts of the counties of Ireland' in *Census of Ireland, 1841, Report of the commissioners appointed to take the census of Ireland for the year 1841*, Section I, [BPP 1843 XXIV] (504) vol. i., pp xx-, Section I, pp xx-xxi, [p 619-625 in total report]

Census 1851. (1856). *Census of Ireland, 1851 Part V, Tables of Deaths*, vol. i., containing the report, tables of pestilences, and analysis of the tables of deaths. BPP, 1856, XXIX, [2087-1] 1. , pp 209-213.

DMJ – *The Dublin Journal of Medical Science*, vols. 1, 2 & 3 (1831-1833).

Fever Hospitals Act: 2 Will. 4 c. 9, Fever Hospitals (Ireland) Act, *An Act to amend Two Acts passed in the Fifty-eighth and Fifty-ninth Years of the Reign of His Majesty King George the Third, for establishing Fever Hospitals and for preventing contagious Diseases in Ireland.* (58 Geo. 3 c. 47 and 58 Geo. 3 c. 41)

IHTA- Royal Irish Academy, Irish Historic Town Atlas, various town indices and descriptive texts..

Mun. Corp. (1837). *Municipal Corporations boundaries (Ireland) reports and plans*. HC 1837 (301) xxix. *Municipal corporations (Ireland) appendices to the first report to the commissioners*. HC 1835, xxxvii, xxviii; 1836, xxiv.

Report, 1822. – *Report of the Committee for the Relief of the Distressed Districts in Ireland 1822*, with appendix

Newspapers

Belfast Commercial Chronicle

Dublin Express Packet and Correspondence

Londonderry Sentinel

Ballyshannon Herald

Sligo Journal,

Londonderry Sentential,

Enniskillen Chronicle and Erne Packet

Belfast Telegraph

Kilkenny Moderator,

Dublin Evening Post

References

- Aalen, F. H. A., 1978.** *Man and landscape in Ireland*, (London, 1978), p. 269.
- Ainsworth, W. F., 1842.** ‘The Cholera in Ireland, at Westport’, in *W. Francis Ainsworth’s Magazine*, July 1842, vol. 2, British Periodicals, p. 438.
- Baker, F., & Cheyne, J., 1821.** *An account of the rise, progress and decline of fever lately epidemical in Ireland* (Dublin, 1821).
- Bonsall, J., 2021.** *A confined anomaly in the ‘Cholera Field’: characterising urban mass Graves of 19th century cholera epidemic victims; An archaeo-forensic geophysical investigation at the Sligo cholera field, Rathquarter, Sligo*. One of two unpublished reports for the Heritage Council (2021) relating to Sligo’s Cholera Field.
- Cranfield, R., 1834.** *Cholera; particularly in reference to the treatment of the disease, as it has appeared in Ireland since the beginning of the year 1832* (Dublin, 1834).
- Crawford E. M., 1999.** ‘Typhus in nineteenth century Ireland’, in E. Malcom and G. Jones, (eds), *Medicine, disease and the state in Ireland, 1650-1940* (Cork, 1999), pp 121-137.
- Creighton, C., 1894.** Charles Creighton, *A history of epidemics in Britain; volume 2: from the extinction of Plague to the present time* (London, 1894), pp 816-821.
- Davenport, R. J., 2019.** Satchell, & Shaw-Taylor, L. ‘Cholera as a ‘sanitary test’ of British cities, 1831–1866’, in *The History of the Family*, 24:2, 404-438. DOI: 10.1080/1081602X.2018.1525755
- Duffy, P., 1982).** Cholera in county Louth, 1832-39, in *Journal of the County Louth Archaeological and Historical Society*, (1982) vol. 20, no. 2, pp 117-126.
- Farrell, N., 2014).** ‘Asiatic cholera and the development of public health in Belfast, 1832-1878’, (unpublished PhD Thesis, University of Ulster, 2014).
- Fenning, H., 2003.** The cholera epidemic in Ireland, 1832-33; priests, ministers, doctors, in *Archivium Hibernicum*, vol. 57, pp 77-125.
- Geary, L. M., 2004.** *Medicine and Charity in Ireland, 1718-1851* (Dublin, 2004), p. 70
- Grace, D., 2011.** ‘The cholera outbreak of 1832-33 in county Tipperary’, in *Tipperary Historical Journal*, (2011), pp 39-67.
- Fíona Gallagher., 2021.** *Defining Sligo’s ‘Cholera Field’; an historical analysis of epidemic mass-burials in a provincial town, subsequent to a scientific geophysical survey’*. One of two unpublished reports for the Heritage Council (2021) relating to Sligo’s Cholera Field.
- Gallagher, F. & Hesney, R., 2021.** A scoping survey of Sligo abbey to investigate the extent and nature of cholera burials during the 1832 epidemic; unpublished report for Sligo Stoker Society, funded by the Heritage Council, 2021.
- Gallagher, F., 2020.** Cholera; Fever, Fear and Facts- a pandemic in Irish urban history. Occasional blog at, <https://www.drfinagallagher.com>

- Gallagher, F., 2016.** 'Rehousing the urban poor in Irish country towns, 1880-1947: a case study of Sligo', (Unpublished PhD thesis, Maynooth University, 2016) pp 120-121.
- Hannan, K., 1988.** 'The 1832 cholera epidemic in Limerick', in *The Old Limerick Journal*, vol. 24, (1988), pp 48-50.
- Howison, W., 1832.** 'Remarks on the malignant cholera in Ireland and Scotland', in *The Lancet*, vol. 19, Is. 480, (November 1832), pp 203-207.
- Irwin, H., 1832.** *A Record of Cholera Asiatica as it occurred in Sligo in the months of August & September 1832*, in PRONI, (MIC/666/D/14/1).
- Kotar S. L. & Gessler, J. E., 2014.** *Cholera : a worldwide history* (Jefferson, 2014).
- Lee, J. J., 1981.** 'On the accuracy of the pre-Famine Irish censuses', in J.M. Goldstron & L.A. Clarkson (eds.), *Irish population, economy and society; essays in honour of the late K.H. Connell* (Oxford, 1981), pp 46-53.
- Law, E. J., 1996.** 'Cholera in Kilkenny, 1832-33 in *Old Kilkenny Review: Journal of the Kilkenny Archaeological Society*, vol. 48, (1996), pp 117-122.
- Mangan, M., 2008.** A comparison of the experiences of Dublin city and Limerick City during the cholera epidemic of 1832, in, O'Brien, G. & O'Kane, F, (eds), *Georgian Dublin*, (Dublin, 2008), pp 188-96;
- Morris, R. J., 1976.** *Cholera: the social response to an epidemic*, (London, 1976), p. 17.
- McCabe, C., 2018.** *Begging, charity and religion in pre-famine Ireland*, (Liverpool, 2018),
- O'Donoghue, P., 1972.** 'Opposition to Tithe payments in 1832-3' in *Studia Hibernica*, vol. 12 (1972), pp 77-108.
- O'Neill, T. P., 1973.** 'Fever and public health in pre-famine Ireland' in *Journal of the Royal Society of Antiquities of Ireland*, vol. 103 (1973) 1-34.
- O'Neill, T. P., 1974.** 'Clare and Irish poverty, 1815-1851.', in *Studia Hibernica*, no. 14, (1974), pp 7-27.
- O'Neill, T. P., 2003.** Cholera in Offaly in the 1830s, in *Offaly Heritage*, (2003), pp 96-107.
- O'Neill, T. P., 2020.** 'Navan and the cholera epidemic of 1832', in *Ríocht na Midhe*, (2020) p.86-100.
- Prunty, J., 1998.** *Dublin slums 1800-1925: a study in urban geography* (Dublin, 1998) p.62
- Pullen, D. B., 1832.** *Practical observations on the epidemic cholera at Cork*, (May 1832).
- Robins, J., 1994.** *The Miasma: epidemic and panic in nineteenth century Ireland* (Dublin, 1995).
- Stoker, C. T., 1873.** *Account of cholera outbreak in Ireland in 1832*, Trinity College Dublin, MS 11076/2/3. Typescript transcription of an account originally written in Caen, May 1873.
- Stoker, W., 1832.** *Sketch of the medical and statistical history of epidemic fevers in Ireland, from 1798, and of pestilential diseases, since 1823* (Dublin, 1832).
- Simms, A., 1990.** *Kells, Irish Historic Town Atlas*, No.4, (Dublin, 1990)
- Thomas, A. J., 2015.** *Cholera; The Victorian plague*, (London, 2015), p. 29
- Underwood, E., 1947.** Ashworth, MD, in Proc. of Royal Soc. of Med., Vol XLI, pp 165-173.
- Van der Kuyl, A., 2021.** *The Dutch Cholera epidemic of 1832, as seen through 19th century medical publications* (Utrecht, 2021), p.98.
- Whelan, K., 2012.** Whelan's re-drawing of 'T. Freeman's map of the distribution of population in Ireland in 1841' in Crowley, Smyth and Murphy, (eds), *Atlas of the Great Irish Famine*, (Dublin, 2012), p. 7.
- Wilson, M., 1986.** 'One of the most fatal and calamitous visitations of spasmodic cholera known in the UK' in *The Journal of the Old Drogheda Society*, v.5, (1986), pp 27-31.