

## ORIGINAL ARTICLE


### Investigating the Social Representations of Contagious Diseases in the 19<sup>th</sup> and 20<sup>th</sup> Centuries: A Corpus-based Analysis of Cholera, Measles, and Plague in American Historical Texts

#### Abstract

The current study employed corpus linguistics techniques in order to shed light on the representation of “cholera”, “measles”, and “plague” over 19th and 20th centuries in American society. To this end and also to compare the representation of the mentioned contagious diseases over time, the current study explored how these target words (i.e., cholera, measles and plague) in texts of 19th and 20th centuries collocate with other words. To study the collocation patterns of contagious diseases over time, corpus of historical American English (COHA) was used. The results indicated that language change represented the events taken place in the society. Moreover, as expected, it was revealed that the texts on different diseases (i.e., cholera, measles, and plague) carried over a negative prosody. Regarding the difference between the 19th and 20th centuries, although the frequency of the target words in the 19th and 20th centuries were not equal, the collocational patterns of these contagious diseases over 19th and 20th centuries were almost similar.

**Key words:** Collocation patterns, Representation of contagious diseases, Cholera, Measles, Plague, Corpus of historical American English (COHA)

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Sahar Abbasi Sardari<sup>1</sup>   
Mohammad Saber Khaghaninejad<sup>2</sup>  
Amirsaeid Moloodi<sup>2</sup>

1- Ph.D. Student, Department of foreign languages and linguistics, Faculty of literature and humanities, Shiraz university, Shiraz, Iran

2- Ph.D., Department of foreign languages and linguistics, Faculty of literature and humanities, Shiraz University, Shiraz, Iran

#### Correspondence:

Sahar A Sardari  
Ph.D. Student, Department of foreign languages and linguistics, Faculty of literature and humanities, Shiraz university, Shiraz, Iran

sahar.sardari15@yahoo.com

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## Introduction

In the past century, the development of health programs (i.e., vaccinate programs) has led to a sharp decline of contagious diseases in the United States<sup>1,2</sup>. However, the dramatic decline in the incidence of such diseases has led to the underestimation of the negative consequences of such diseases<sup>3,4</sup>. As stated by the same researchers, this can lead to greater concern for costs and consequences of health programs which in turn will lead to vaccine refusal and greater risk of vaccine-preventable diseases such as cholera and measles. However, according to Van Panhuis *et al.* (2013), the interpretation of long-term disease patterns provided new insight into disease-transmission dynamics. Therefore, in line with the scholars worked on the cases such as measles and pertussis in the United Kingdom<sup>5</sup> and dengue in Thailand<sup>6</sup>, we feel that a detailed analysis of the long-term data can inform people of the value of immunization against diseases.

Besides, as sociolinguistics focuses on the relationship between language and society<sup>7</sup>, investigating the discourse of a society over time can give an insight into the changes that has taken place in the people's points of views regarding the diseases. In recent years, corpus analysis is one of the most prominent data collection methods used to study issues related to linguistics in general and sociolinguistics in particular<sup>8</sup>. Corpus linguistics is defined as "the study of language based on examples of real life language use"<sup>9</sup>. One of the widely used techniques carried out on corpus data is collocation analysis. Collocation as defined by Firth (1961) is a way of demonstrating frequent relationships between words. "If two words collocate, then they have a tendency to occur near or next to each other in naturally occurring language use"<sup>10</sup>. Thus, as stated by Baker (2010), collocations demonstrate relationships, but the researchers need to identify how these relationships are manifested in language and texts.

## Literature Review

### A glance at the history of cholera, measles and plague

In a study conducted by Morris and Black (1985), it was explained that "cholera is not stranger to the united states". Cases were identified with cholera since the first outbreak of the disease in 1817. 150,000 Americans died of cholera during the second worldwide pandemic of cholera in 1832 and 1849. In 1866 also 50,000 died during the fourth worldwide pandemic. Besides, during the sixth pandemic in 1911, cases were reported in two different areas (i.e., New York and Massachusetts). According to Morris and Black (1985), within the last decades of the 20<sup>th</sup> century cholera was endemic

- 1- Hinman et al., 2011: 49-57.
- 2- Roush et al., 2007: 2155-63.
- 3- Larson et al., 2011: 526-35.
- 4- Omer et al, 2009: 1981-8.
- 5- Grenfell et al, 2001: 716.
- 6- Cummings et al., 2004: 344.
- 7- Scovel et al, 1998: 184-6.
- 8- Palacios Martínez, 2020: :101263.
- 9- McEnery et al, 1996: 1.
- 10- Baker, 2010: 24.



again. According to Kaper, Morris, and Levine (1995) also, despite many studies on Cholera, almost until the end of the 20<sup>th</sup> century, cholera was still presenting challenges. However, as stated by the same author two major developments occurred in the history of the disease: 1) A massive outbreak of cholera in South America -the continent that was untouched by the disease in the 20<sup>th</sup> century, in 1991; 2) the pandemic of cholera which began in India and Bangladesh by a previously unknown cause in 1992. In another study, some years later, Bhattacharya (2003) declared that, many anti-secretory drugs were tried and unfortunately, none was useful for treatment of cholera. Moreover, the researcher put emphasize on the role played by feeding during and after cholera.

Moreover, as explained in a more recent research study by Murugaiah (2011), cholera is known as the most feared epidemic disease in developing countries. Despite the effort taken by World Health Organization to reduce the incidence rate of cholera, it still continues to evolve in certain regions<sup>11</sup>. Besides, there is not much information on the factors that contribute to cholera's transmission<sup>12</sup>. However, according to Murugaiah (2011), there is a need for a growing awareness and knowledge of cholera. In the authors' opinion, the residents of developing nations will benefit the most from this developing knowledge and awareness.

In one of the most recent studies, Deen, Mengel, and Clemens (2020) stated that cholera is an ancient disease which is still causing public health problems in many areas of the world. Moreover, as explained by the authors, cholera caused seven pandemics since 1817, and the last of them is ongoing. According to Deen *et al.* (2020), the risk of cholera is increased as the result of factors such as overcrowding, poverty and insufficient water. They also explained that the epidemiology of cholera continues to evolve in many areas of the world (i.e., Asia, Africa and the America). In another study, Lonappan, Golecha, and Nair (2019) have explained that, although Cholera has posed a significant public concern in the last four decades, the researchers are still unable to predict and pre-empt the outbreak of cholera. However, with the current knowledge and advancements to effectively prevent and treat cholera, it is possible to prevent death from the disease<sup>13</sup>.

Measles is a highly contagious disease which has been referred to since the seventeen century<sup>14</sup>. A number of studies so far have studied measles impacts, outbreaks and ways to control it. For example, Assaad (1983) has explained the universality of disease until 1980s, particularly in developing countries which has led to the acceptance of measles as an inevitable risk of early life. Development of measles could

11- Murugaiah, 2011: 337-48.

12- Ibid.

13- Lonappan et al., 2019: Epub ahead of print.

14- Dardis, 2011: 9-12.



be the result of a set factors, such as inappropriate nutrition, common to developing countries. As stated by the same researcher, if given at the critical age, measles vaccine is effective in preventing the disease; as, by increase of age, maternal antibodies diminish and the risk of natural infection increases.

According to Hinman *et al.* (1983), since colonial times, measles has impacted American children. In the initial decades of the 20<sup>th</sup> century, many measles infections were reported each year. As reported by the same researchers, during 1950s, more than 500,000 cases were infected by measles and almost 500 people died of it in in the United States. The results of studies conducted showed that 95% of the infected population was under 15 years old. The introduction of measles vaccine in 1963 impacted the occurrence of measles in the United States. This led to a marked decline in the reported number of infection and death as a result of measles virus<sup>15</sup>. The incidence of measles declined dramatically in 1980s. However, centers for disease control in 1991 reported a 51.1% increase in the cases infected by measles in 1990 in comparison to cases reported in 1989. In 1990, 27672 cases were infected by measles virus.

The introduction of measles vaccine in 1962 led to a dramatic decrease in occurrence of measles in the United States when measles was an almost universal disease<sup>16</sup>. As reported by Wharton (2004), from 1956 to 1960, approximately 542,000 were infected by measles virus annually, which was not comparable to the high number of cases infected by measles virus before the introduction of the first measles vaccine. As demonstrated by the same researcher, in 1950, even before the introduction of measles vaccine, due to the improvements in health care and nutrition, measles-related deaths decreased dramatically. From 1912 to 1916 approximately 5300 measles-related deaths were reported while the measles-related deaths reported during 1956-1960 declined to 450 cases. Therefore, as stated by Griffin and Oldstone (2008), measles virus is one of the most contagious viruses that has been controlled by the introduction of measles vaccine more than 50 years ago. However, as stated by Dardis (2011), although measles is vaccine-preventable, the measles virus can cause serious illness and death. Moreover, according to Emanuele (2020), there has been an increase in the outbreak of measles in the United States in 2019. Therefore, there is need for increasing awareness about measles as a highly contagious disease. Besides, in terms of measles disease, true and accurate information should be disseminated. Furthermore, emphasize should be put on the benefits of im-

15- Hinman et al., 1983: 439-44.

16- Wharton, 2004: S1-S3.



munizing workers.

According to Pollitzer (1954), from the beginning of history, plague has been a threat to mankind. Almost in the beginning of the 20<sup>th</sup> century, Lloyd (1925) said that “plague has a most pernicious past; a present that is bad; and a future that seems to say to civilized man, ‘Your money or your life’<sup>17</sup>. A number of attempts have been made to immunize people against plague. For example in one of the earliest studies, Cavanaugh *et al.* (1974) explained, although exposure to rats and fleas transmitted the plague during 1966-1997 in south Vietnam, the number of Americans that were infected by the plague was really negligible. As stated by the researchers, one plausible explanation for negligible occurrence of plague in Americans was that the killed plague vaccine administered to American personals was effective in the prevention of the disease. However, 296 cases of human plague were reported from 1970 to 1991 in the United States<sup>18</sup>. 295 of these cases were believed to be indigenous cases while one was an imported case. Most of the cases were infected by bubonic or septicemic plague, or both.

In a more recent study, Stenseth *et al.* (2008) explained that although plague is often considered as a problem of past, in many parts of the world, it is still a threat. As explained by the same authors, despite the small number of human cases of plague, the threat of plague for humanity should not be overlooked because of “the disease’s inherent communicability, rapid spread, rapid clinical course, and high mortality if left untreated”<sup>19</sup>. In another study, D’ortenzio *et al.* (2018) explained that an epidemic of plague in 2017 highlighted the gap in knowledge of plague dynamics, factors affecting the disease and the best recommended treatment for this poverty related disease.

This study aims to answer the following research questions by employing the corpus-based analysis of American historical texts:

1. How do the collocates of the words “cholera”, “measles” and “plague” represent these diseases over the 19<sup>th</sup> and 20<sup>th</sup> centuries in the American society?
2. How were the collocates of the words “cholera”, “measles” and “plague” different in the 19<sup>th</sup> and 20<sup>th</sup> centuries in the American society?

### Method

According to Stubbs (2007), Sinclair’s (1998, 2008) model of extended lexical unit has turned to one of the most prominent models of phrasal units of meaning. The extended unit of meaning is composed of the following structure<sup>20</sup>: a) col-

17- Lloyd, 1925: 629.

18- Craven *et al.*, 1993: 758-61.

19- Stenseth *et al.*, 2008: 11.

20- Sinclair, 1998: 1-24.



location, b) colligation, c) semantic preference, d) semantic prosody. For Stubbs, “collocation is the most specific level”<sup>21</sup>. Stubbs (2007) defined collocation as, “the relation between the target word and individual word-forms which co-occur frequently”<sup>22</sup>. As stated by Salama (2011), the target word could be the word which is searched in a concordance and the collocates is the word form which frequently co-occur with the target word. She also stated that semantic preference and semantic prosody are closely related to the concept of collocation. Semantic preference as defined by Stubbs (2007) is “the relation between the node word and the lexical sets of semantically related word-forms or lemmas”<sup>23</sup>. As elaborated by Salama (2011), semantic preference provides a description of a specific lexical item which frequently collocates with a series of items belonging to the same semantic category. Besides, semantic prosody is “the discourse function of the unit, describing the speaker’s evaluative attitude”<sup>24</sup>. Semantic prosody can indicate a hidden meaning. For example, if a word frequently collocates with the words that have a negative meaning, the word is believed to have a negative prosody<sup>25</sup>.

### 1- Material and instrument

The current study has employed the 400 million-word corpus of historical American English (COHA)<sup>26</sup>. COHA released in 2010 contains words of texts from 1810-2000s. As stated by Davies (2012), COHA is larger than other corpora of historical English; it is 100 times larger than other structured corpora. Besides, unlike other historical corpora, COHA is genre-balanced with genre and sub-genre from each decade<sup>27</sup>. As a result, the inclusion of different genres means that the patterns derived from COHA can represent the English speaking societies<sup>28</sup>. The corpus used in the current study (i.e., COHA) is freely available<sup>29</sup>.

### 2- Procedure

As the first step, the frequencies of the target words under investigation (i.e., cholera, measles and plague) over the 19<sup>th</sup> and 20<sup>th</sup> centuries and across different time periods were determined. The frequency analysis was followed by the quantitative analysis which aimed to find an answer to the raised research questions. At this point, the collocates of the target words were studied. However, the number of the observed meaningful collocates for target words under investigation across the 19<sup>th</sup> and 20<sup>th</sup> centuries were not equal. Therefore, considering the fact that high positive mutual information (MI) scores are more likely to constitute collocation charac-

21- Salama, 2011: 320.

22- Stubbs, 2007: 178.

23- Ibid.

24- Ibid.

25- Louw, 1993: 176.

26- Davies, 2012: 121-57.

27- Ibid.

28- Norberg, 2016: 291-317.

29- <https://www.english-corpora.org/coha/>



teristics than those with lower MI scores<sup>30</sup>, and similar to a number of other studies<sup>31</sup>, in order to balance the data for the ease of comparison of each disease over two centuries (19<sup>th</sup> and 20<sup>th</sup>), 10 collocating items with the highest MI values in COHA were studied. Moreover, as the qualitative phase of the research, the actual occurrences of the target words with their collocations have been studied. Then, the semantic relationships between the target words and their collocates have been explored to study the representation of a number of contagious disease (i.e., cholera, measles, plague) over 19<sup>th</sup> and 20<sup>th</sup> centuries. Furthermore, the collocates of the words “cholera”, “measles” and “plague” in the 19<sup>th</sup> and the 20<sup>th</sup> centuries in the American society are compared.

**Results and discussion**

**1- Frequency analysis**

Table 1 summarizes the frequency of the terms “cholera”, “measles” and “plague” from 1810-2000, as represented in COHA. As Table 1 shows, the total frequencies of the words “cholera”, “measles” and “plague” occurring in the COHA corpus are 3560 for “plague”, 1230 and 883 times for cholera and measles, respectively. The frequency of term “plague” is markedly higher than that of the two other diseases. Such results are predictable because from the beginning of history, plague has been a threat to mankind<sup>32</sup>. Besides, even in today’s modernized world, every year, thousands of people are infected by plague disease<sup>33</sup>. Moreover, as presented in this table, “measles” has the lowest frequency. The observed result can be explained by the fact that the introduction of measles vaccine in 1962 led to a remarkable decrease in occurrence of measles in the United States when measles was an almost universal disease<sup>34</sup>.

**Table 1:** The frequencies of “cholera”, “measles”, “plague” in the COHA, 1810-2000

Disease	Frequency
<i>cholera</i>	1230
<i>measles</i>	883
<i>plague</i>	3560

Moreover, Figure 1 shows the terms “cholera”, “measles” and “plague” in different time periods of 19<sup>th</sup> and 20<sup>th</sup> centuries.

In 1810, the words “cholera” and “measles” were not referenced in COHA. The non-occurrence of the term “cholera” can be explained by the fact that the first outbreak of cholera

30- McEnery et al, 1996: n. p.  
 31- e.g., Nelson, 2006: 217-34.  
 32- Pollitzer, 1954: 409-82.  
 33- Stenseth et al., 2008: e3.  
 34- Wharton, 2004: S1-S3.



occurred in 1817<sup>35</sup>. However, according to Dardis (2011), measles were recorded since the 17<sup>th</sup> century. Therefore, the control of the disease by the introduction of measles vaccine in 1963<sup>36</sup> was likely to be the reason for non-occurrence of the term in 1810. Moreover, based on Figure 1, the term “cholera” was used more frequently in 1890s, 1850s, and 1830s, respectively. In 1832 and 1849 the, second worldwide pandemic of cholera resulted in death of 150,000 Americans. Besides, the outbreak of cholera in the last decades of 20<sup>th</sup> century<sup>37</sup> was likely to be the reason for the frequent use of the term cholera in 1890.

- 35- Morris et al, 1985: 343-50.
- 36- Hinman et al., 1983: 439-44.
- 37- Morris et al, 1985: 343-50.
- 38- Wharton, 2004: S1-S3.

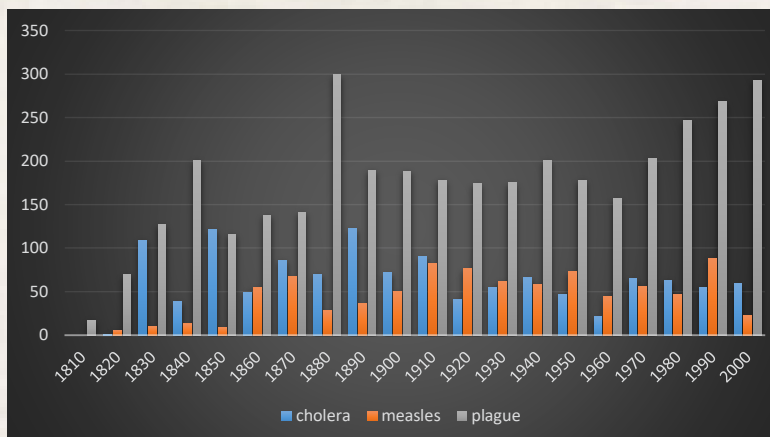


Figure 1. The frequency of the term “cholera”, “measles”, “plague” in the COHA, in different time periods of 1810-2000

Furthermore, the most frequent use of the term “measles” occurred in 1910s, 1950s, 1990s. From 1912 to 1916, approximately 5300 measles-related deaths were reported<sup>38</sup>; therefore, the highly frequent occurrence of the word “measles” in the texts of 1910s is not surprising. In line with the explanations given by Hinman *et al.* (1983), during 1950s, the outbreak of measles led to infection of more than 500,000 cases which resulted in the frequent use of the term measles. Moreover, as reported by the centers for disease control, in 1990 a huge increase in the cases infected by measles virus, compared to that happened in 1980s, was reported. In 1991, 27672 cases were reported to be infected by measles virus. Finally, regarding the term “plague”, as it can be seen in the bar chart, the frequency of plague across all the time periods is greater than that of the two other terms under investigation in the present study.

## 2- Collocation analyses

As shown in the Table 2, most collocates of the word “chol-





era” were carrying negative meanings from 1810s to 1890s. They were influential in creating a potential for focusing on different diseases and damages caused by them.

- 39- Twain, 1962: 46.
- 40- Warner, 1871: 175.
- 41- Butler, 1888: 525-41.

**Table 2:** Collocates of cholera in texts of 1810s-1890s

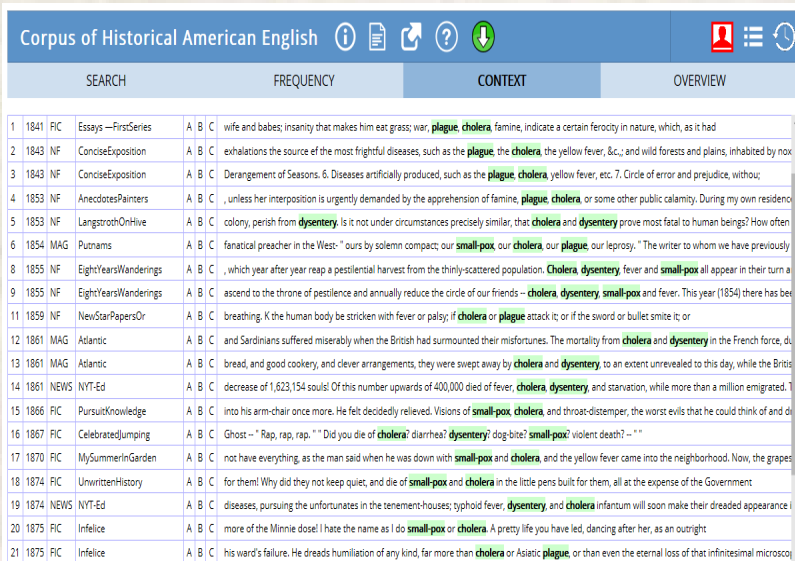
	Collocate	Frequency	MI
<b>Cholera</b>	infantum	9	14.58
	morbus	29	14.47
	dysentery	113	11.25
	epidemic	455	10.09
	Asiatic	550	10.03
	small-pox	455	8.72
	1832	726	8.05
	plague	1298	7.99
	raging	1140	7.59

Besides, the target word “cholera” attracts different health-related terms, such as name of other diseases (e.g., dysentery, small-pox, plague). Below some examples have been presented. Figure 2 also provides the representation of these diseases in the texts of 1810-1890.

Extract 1: *“Did you die of Cholera? diarrhea? dysentery? dog-bite? small-pox? violent death? -- ”*<sup>39</sup>

Extract 2: *But we cannot have everything, as the man said when he was down with small-pox and cholera, and the yellow fever came into the neighborhood*<sup>40</sup>.

Extract 3: *The General had never heard of the yellow fever in the East; had heard of the plague,, of cholera and leprosy as terrible scourges*<sup>41</sup>.



*Figure 2. The collocates of cholera in Texts of 1810s-1890s*



Obviously, in the 19<sup>th</sup> century, cholera was considered as a major threat to mankind. The high frequency of the verb “raging” also provides support for this statement.

Extract 4: *In 1833, while the cholera was raging with extreme violence in Lexington, one of its first victims was a bitter personal enemy; and yet, while fear drove others from his bedside, General Combs nursed him with all the care and tenderness of a devoted friend.*

Moreover, the two other words that meaningfully collocate with cholera were “morbus” and “Asiatic”. As argued by pol-lard (1857), Asiatic cholera was the epidemic form of cholera morbus. The high frequency of the collocate “Asiatic” in the 19<sup>th</sup> century, along with a term such as “epidemic”, indicates that cholera was one of the most epidemic diseases of the 19<sup>th</sup> century<sup>42</sup>.

Furthermore, the term “infantium” indicates the danger posed by the cholera virus to children. Cholera infantum, a disease of infants most prevalent in summers, is “characterized by vomiting, uncontrollable diarrhea and collapse”<sup>43</sup>. As reported by Flippin (1997), cholera infantum is considered as one of the major causes of death in late 19<sup>th</sup> century. An example of the cholera infantum in the context see the following extract.

Extract 5: *With such a crowding of population, can we wonder that “diseases from domiciliary causes, over which we have control, have increased in many instances 100 per cent.; cholera infantum, 250 per cent.; diarrhoea, 1,000 per cent.,”.*

Besides, the high frequency and meaningful relationship between the collocate word “1832” and the word cholera indicates the year 1832 as an important year in the history of cholera disease. During the epidemic of cholera in 1832, thousands of people died in the united states<sup>44</sup>. The extract below is taken from New England magazine.

Extract 6: *In 1832, while the cholera was raging in the city of New York, and the citizens were flying into the country, and many physicians and divines with them; ...*

The other word which meaningfully collocated with the node word cholera was “famine”. As indicated in the example below “war, plague, cholera, famine indicate a certain ferocity in nature, which, as it had its inlet by human crime, must have its outlet by human suffering”<sup>45</sup>, cholera, like famine, was a cause of human misery in the 19<sup>th</sup> century. Besides, meaningful relation between the word famine and cholera can explain the fact that the researchers has emphasized the role played by feeding during and after cholera<sup>46</sup>.

As you can see in table 3, one of the words that meaning-

42- Glass et al., 1992: 1524-6.

43- Flippin, 1997: 4.

44- Morris et al, 1985: 343-50.

45- Emerson et al., 1987: 148.

46- Bhattacharya, 2003: 141-6.



fully collocated with the node word cholera in the texts of 1900s-1990s was “morbus” (see example below).

47- Kaper et al., 1995: 48-86.  
48- Pollard, 1857: 109-15.

**Table 3:** Collocates of cholera in texts of 1900s-1990s

	Collocate	Frequency	MI
<b>Cholera</b>	morbus	10	15.55
	typhus	249	12.44
	typhoid	706	11.04
	dysentery	315	10.72
	epidemic	1337	10.32
	smallpox	573	10.00
	Asiatic	1102	9.84
	diphtheria	405	9.62
	scourge	482	9.11
	malaria	830	9.00

Extract 7: *Taylor’s death was caused by cholera morbus.*

In the 20<sup>th</sup> century, despite many studies conducted on cholera, cholera was still presenting challenges<sup>47</sup>. The term “Asiatic” also collocated meaningfully with the node word under investigation (see example below).

Extract 8: *Simultaneously with the Americans, there appeared amongst the Moros the most fearful of all diseases, the Asiatic cholera, and straightway it was charged upon us.*

As explained before, Asiatic cholera is the epidemic form of the cholera morbus<sup>48</sup>. The word “epidemic” also was another collocate of the word cholera in the texts of the 20<sup>th</sup> century (see example before).

Extract 9: *For example, water and milk are carriers of many forms of disease-producing bacteria, as witness the cholera epidemic in Hamburg nearly twenty years ago.*

According to Morris and Black (1985), during the sixth pandemic of cholera in 1911, cases were reported in two different areas (i.e., New York and Massachusetts). Moreover, in the last decades of the 20<sup>th</sup> century, cholera became endemic again. Furthermore, similar to collocates accompanying the node word cholera in the 19<sup>th</sup> century, collocates of the term cholera in the 20<sup>th</sup> century were mostly negative, creating the possibility for negative co-texts. One of the collocations of cholera with negative semantic prosody was “scourge”.

Extract 10: *The second epidemic came in 1834. but there were only 941 deaths before its advance was checked. In 1848. However, appeared the most disastrous choleras scourge the city has known.*

Furthermore, Cholera in texts of the 20<sup>th</sup> century has been



collocated with words such as “typhus”, “thypoid”, “dynes-try”, “smallpox”, “diphtheria”, and “malaria” (see Figure 3).

SEARCH	FREQUENCY	CONTEXT	OVERVIEW
1 1902 MAG Forum	A B C	and piracy. It has practically put an end to the scourges of <b>smallpox</b> and <b>cholera</b> ; it has established the reign of law and equity throughout the land; it	
2 1902 MAG Forum	A B C	and state-aided schools, with 8,092 scholars. Hospitals were formerly unknown institutions, and <b>cholera</b> and <b>smallpox</b> ran their course unchecked. There e	
3 1902 MAG Forum	A B C	free hospitals throughout the states, exclusive of jail hospitals and lunatic asylums; and <b>cholera</b> and <b>smallpox</b> have been practically extinguished. The pop	
4 1902 MAG Nation	A B C	a pound, is sufficiently realistic As a result of famine conditions, <b>dysentery</b> and <b>cholera</b> broke out and swept away thousands who had escaped the worst r	
5 1904 MAG PopSci	A B C	as the freshest dew-drop may contain in solution tasteless poison that spreads <b>typhoid</b> fever or <b>cholera</b> among the illinformed skeptics who are unwilling	
6 1904 NF HistoryScience --	A B C	we possess, in addition to thediphtheria antoixine, equally specific antoixines of tetanus, <b>cholera</b> , <b>typhus</b> fever, pneumonia, and tuberculosis -- a set of fo	
7 1905 MAG Independent	A B C	.And how shall we answer for the responsibility that will rest upon us if <b>cholera</b> or <b>typhoid</b> makes an accidental entry here? It would decimate the entire pi	
8 1907 MAG Atlantic	A B C	respect it is more dangerous han water, since a <b>plague</b> of <b>typhoid</b> or Asiatic <b>cholera</b> startles the community tram its customary phlegm and causes limed	
9 1909 MAG Harpers	A B C	which has come to us within the last generation, epidemics of <b>typhoid</b> fever, <b>cholera</b> , or <b>dysentery</b> are now generally inexcusable. Such an epidemic is, in f	
10 1909 MAG Harpers	A B C	block the way to the successful serum treatment of such diseases as <b>typhoid</b> fever, <b>cholera</b> , pneumonia, and those of a streptococcal origin. The technical	
11 1909 NF PreventableDiseases	A B C	across the civilized world, beginning, as do nearly all our world-epidemics,? <b>cholera</b> , <b>plague</b> , influenza, etc.,? in China, and spreading, via	
12 1909 NF PreventableDiseases	A B C	Yet the deadliest known hotbed of horrors, the spawning ground of more deaths than <b>cholera</b> , <b>smallpox</b> , yellow fever, and the bubonic <b>plague</b> combined,	
13 1911 MAG Scribners	A B C	more. A wonder, too, that there is not more <b>plague</b> , more <b>cholera</b> , more disease of every kind. Here on the banks of this river are	
14 1912 MAG Harpers	A B C	the yellow-fever blanket and the scarlet-fever ribbon and all their kindred. But <b>typhoid</b> and <b>cholera</b> still came down the river, and ran thence into the milki	
15 1912 MAG Harpers	A B C	the great majority of healthy people. It seems fairly clear that in <b>typhoid</b> , <b>cholera</b> , <b>smallpox</b> , <b>diphtheria</b> , pneumonia, and perhaps a great number of other	
16 1912 MAG Harpers	A B C	volte-face, so have our notions regarding two other of the great human scourges, <b>cholera</b> and <b>typhoid</b> . I have VOL. COVI,? No. 780. - 104spoken a little	
17 1912 MAG Harpers	A B C	the great majority of healthy people. It seems fairly clear that in <b>typhoid</b> , <b>cholera</b> , <b>smallpox</b> , <b>diphtheria</b> , pneumonia, and perhaps a great number of other	
18 1912 NEWS NYT-Reg	A B C	or 200 or 300 years what a horrible sight the world presented: <b>smallpox</b> , <b>cholera</b> , the black death and strange diseases which consumed half the populatio	

- 49- Smith et al., 2012: 38.
- 50- Smith et al., 2012: 35-42.
- 51- Assaad, 1983: 452-9.

Figure 3. Collocates of cholera in texts of 1900s-1990s

“By the turn of the 20<sup>th</sup> century, life expectancy at birth was 45 years in the United States”<sup>49</sup>. Besides cholera, typhoid, dysentery, smallpox, Diphtheria and malaria were the predominant infectious diseases in this time period<sup>50</sup>.

Although collocates of the target word “measles” (i.e., fever, ill, sick) have a negative semantic prosody, they are less negative than collocates of the term cholera (i.e., epidemic, scourge, raging, famine). The use of more neutral collocates can be the result of acceptance of measles as an inevitable risk of early life due to the universality of the disease until 1980s<sup>51</sup>; (see Table 4).

Table 4: Collocates of measles in texts of 1900s-1990s

	Collocate	Frequency	MI
Measles	Whooping-cough	34	14.53
	scarlatina	35	13.61
	mumps	56	13.52
	smallpox	455	10.50
	fever	4669	8.61
	ill	9356	5.55
	sick	10708	5.09
	children	41336	4.28
	like	168196	2.88
	down	123068	2.71

To clarify, a number of examples (extract 11-12) and the concordance of “measles” in texts of the 19<sup>th</sup> century (Figure



4) are provided:

Extract 11: *As they rode on side by side they talked of the youngest two of her children -- Rose and Walter -- both quite ill with measles; ...*

Extract 12: *She usually sends for it, but her son is just now sick with measles.*

CLICK FOR MORE CONTEXT		<input type="checkbox"/>	<input type="checkbox"/>	SAVE LIST	CHOOSE LIST	CREATE NEW LIST	<input type="text"/>	<input type="checkbox"/>	SHOW DUPLICATES
1	1864	FIC	FranksCampaign	A	B	C	She usually sends for it, but her son is just now sick with the measles. " " Yes I think you can not fail to enjoy the pleasant morning		
2	1864	NF	LifeTimesCorrespondence	A	B	C	at home some time, much indisposed. He is now very ill with the measles. He preaches to admiration. Several of the students are also down with the		
3	1867	FIC	WearingGrayBeing	A	B	C	passed his lips until the first battle of Manassas, when, being sick with measles, he fought until almost fainting, and accepted a draught from the canteen of		
4	1869	FIC	MenWomenGhosts	A	B	C	a fellow beyond reason. " Well, then the children had been sick measles, whooping-cough, scarlatina, mumps, he was sure he did not know what		
5	1869	NF	HarrietMosesHer	A	B	C	water. It happened that she was once sent when she was ill with the measles, and, taking cold from wading in the water in this condition, she		
6	1870	FIC	HedgedIn	A	B	C	people in the room besides herself and her child, -- a child sick with measles, a woman drunk, and a woman washing; the room was filled with		
7	1876	MAG	Atlantic	A	B	C	sutor ultra crepidam. " In February, 1828, I fell ill of the measles, of which the followin0 note to Miss S is a record. M* DEAREST		
8	1882	FIC	GrandmotherElsie	A	B	C	side they talked of the youngest two of her children -- Rose and Walter -- both quite ill with measles; of her sister's family, where also there was sickness amon		
9	1882	FIC	GrandmotherElsie	A	B	C	of all keeping together? " Because Rosie and Walter are down with the measles, much too ill to travel. " " And you are going to Europe		
10	1883	MAG	NorthAmRev	A	B	C	and by the same men. Mrs. Wilkinson was at the time sick with the measles. When the men rapped at the door, she begged her husband not to		
11	1887	FIC	QueenPirateIsle	A	B	C	already in the lone churchyard on the hill, and the others lying ill with measles and scarlet fever beside her. She had just walked many weary miles that day		

Figure 4. Sick and ill as collocates of measles in texts of 1810s-1890s

Moreover, different disease names that are meaningfully collocated with the target word “measles” in texts of the 19<sup>th</sup> century show that besides measles, different contagious diseases (i.e., Whooping cough, scarlatina, mumps, smallpox, scarlet fever etc.) are making trouble in the 19<sup>th</sup> century (see extract 10; Figure 5).

Extract 13: *“Well, then the children had been sick; measles, whooping-cough, scarlatina, mumps, he was sure he did not know what not; every one of them from the baby up.”*

Corpus of Historical American English				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
SEARCH	FREQUENCY	CONTEXT	OVERVIEW						
1	1822	FIC	New-EnglandTale	A	B	C	you to take, he has had a dreadful spell with the whooping-cough and the measles, and they have left him kinder sore and rickety; he has not looked		
3	1832	MAG	NewEngMag	A	B	C	to be sustained by the example of many diseases, such as small-pox, measles, scarlet fever, and others. But, it must be allowed, that		
4	1832	MAG	NewEngMag	A	B	C	it is not the law of contagion, as we are acquainted with it in measles and small-pox. In this view the contagious principle of cholera affords a solitary ex		
5	1835	FIC	AnOldSailorsYarns	A	B	C	, unreflecting, ardent, first love, that, like the whooping-cough and the measles, we never have but once; though some patients have it earlier in life		
6	1841	FIC	Essays—FirstSeries	A	B	C	out of his way to seek them. These are the soul's mumps and measles and whooping-coughs, and those who have not caught them can not describe th		
7	1847	FIC	AroundTheTea-Table	A	B	C	she has in navigating a whole nursery of somebody else's children through mumps, measles, whooping-cough and chicken-pox! One of the things that		
9	1847	FIC	AroundTheTea-Table	A	B	C	child's head a disadvantage at the start? Worse than the gauntlets of measles and whooping-cough and mumps which the little ones have to run in this c		
11	1848	MAG	NorthAmRev	A	B	C	fre // quently suffered from a severe cough, and successive attacks of the measles and the small-pox still further injured his constitutiOn. During all his		
12	1855	NF	EightYearsWanderings	A	B	C	descend to second-class diseases: there is no such thing as influenza; whooping-cough, measles, scarlatina, etc., are rarely, if ever, heard of; we		
14	1860	FIC	MissGilbertsCareer	A	B	C	this desire for a career might possibly be a sort of mental small-pox or measles, which must run its course, and would then leave her free from the		
15	1861	FIC	ElsieVenner	A	B	C	said the Doctor, " I should say there was something of that sort: Measles. Mumps. And Sin, -- that's always catching. " The old Doctor		
16	1861	FIC	Trumps	A	B	C	dear; we all have it when we are young, as we have the measles and the whooping-cough. But we get robust constitutions, my dear, " said		
17	1861	NF	BookHouseholdManagement	A	B	C	Denition 2405 General duties of the 2402-4 Habits of cleanliness in children 2400 Hooping-cough 2408 Measles and scarlatina 2410-12 Miss Nightingal		
18	1864	FIC	Macaria	A	B	C	as stupid as can be -- sleeps all the time. My children have had measles and whooping-cough, and chicken-pox and scarlet fever, and I can't imagine wh		
19	1864	FIC	Moods	A	B	C	. I long to be among them, and named an early day, because measles and scarlatina are coming round again, and only Fanny, and the twins,		
20	1866	FIC	DiversViewsOpinions	A	B	C	, and to make ashorenoon doubly shoor, starve em awhile, and run the measles and small-pox thro em. Mix with em a few thousand black wimmen wi		
21	1868	FIC	HyEsPerhaps	A	B	C	" And then did not he have to hear about the mumps, and the measles, and arnica, and belladonna, and chamomile-flower, and dodecateon, till she		

Figure 5. Whooping cough, scarlatina, mumps, smallpox as collocates of measles in texts of 1810s-1890s



The term “children” also collocated meaningfully with measles. As reported by Hinman *et al.* (1983) since colonial times, measles impacted American children.

Extract 14: *Thanks to a kind provision of our natures, no man of sense, has a building mania more than once, any more, to use a borrowed comparison, than our children do their measles, or our collegians and young men of genius, their poetry.*

The word “like” meaningfully collocated with the term measles in texts of the 19<sup>th</sup> century. The frequent occurrence of the word “like” with the target word measles shed light on the worldwide acceptance of measles as an inseparable aspect of people’s lives in that time period.

Extract 15: *School-girl affection is like the measles, -- a disease common to all children, but rarely dangerous.*

The meaningful relation between the word “down” and measles also can be due to the misery caused by this infectious disease and the feeling of people as being defeated by this contagious disease.

Extract 16: *Because Roise and Walter are down with the measles; much too ill to travel.*

The 20<sup>th</sup> century witnessed damages due to different types of diseases such as measles, rubella, Chicken-pox, mumps, Whooping-cough, etc. Moreover, during the 20<sup>th</sup> century, the United States witnessed a huge decline in the deaths due to infectious diseases<sup>52</sup>.

Extract 17: *Although smallpox vaccination was developed in 1798, routine vaccination for diphtheria, tetanus, pertussis (whooping cough), smallpox, measles, rubella (German measles), and poliomyelitis has largely eliminated these diseases as causes of human suffering and death in this century.*

The other word that collocated with the word measles in texts of 1900s-1990s is “vaccine” (see Table 5). The word “vaccine” carries a positive semantic prosody (see example below).

Extract 18: *Infant deaths went down 20 percent in that period and we are just now beginning to realize the benefits of the measles vaccine*

As the above examples (Extract 15, 16) reveal, the introduction of measles vaccine in 1963 impacted the occurrence of measles in the United States<sup>53</sup>. It led to a marked decline in the reported number of infection and death as a result of measles virus<sup>54</sup>.

The collocate “epidemic”, in the collocation pattern “measles epidemic”, can refer to widespread infection with measles virus in the 20<sup>th</sup> century. As reported by Hinman *et al.* (1983), in the initial decades of the 20<sup>th</sup> century, many

52- Anonymous, 1999: 621.

53- Hinman et al., 1983: 439-44.

54- Ibid.



measles infections were reported each year. Moreover, during 1950s, more than 500,000 cases were infected by measles and almost 500 people died of it in the United States<sup>55</sup>. Furthermore, as reported by centers for disease control in 1990, 27672 cases were infected by measles virus. For an example of collocation pattern measles epidemic read the example below.

Extract 19: *Canadian health officials were concerned that the remaining five percent of non - immune children would fuel a measles epidemic across the country.*

As it is obvious in the above extract from the text titled “needle points: Prickly questions about vaccination” which was written in 1997, from which the concern for vaccination against measles can be inferred. The introduction of measles vaccine in 1963 impacted the occurrence of measles in the United States<sup>56</sup>. It led to a marked decline in the reported number of infection and death as a result of measles virus<sup>57</sup>. As reported by Hinman *et al.* (1983) the incidence of measles declined dramatically in 1980s.

- 55- Ibid.
- 56- Ibid.
- 57- Ibid.
- 58- Pollitzer, 1954: 409-82.
- 59- D’ortenzio et al., 2018: 307-17.

**Table 5:** Collocates of measles in texts of 1900s-1990s

	Collocate	Frequency	MI
<b>Measles</b>	rubella	49	14.11
	chicken-pox	15	13.97
	mumps	138	13.30
	whooping-cough	24	13.29
	small-pox	84	11.48
	diphtheria	405	10.89
	meningitis	161	10.54
	measles	637	10.41
	vaccines	335	9.75
	epidemic	1337	8.98

From the beginning of history, plague has been a threat to mankind<sup>58</sup>. As it can be predicted, the target word “plague” attracts collocates with different negative semantic preferences (see Figure 2). Collocates with negatively embedded semantic meanings (i.e., famine, infected, raged, etc.) provide evidence for the damage and misery caused by plague. Besides, even in today’s developed world, despite many developments that have taken place, there is not much known about the plague dynamics or even factors affecting the disease; there is also no highly accepted treatment for this poverty related disease<sup>59</sup>.

To have a picture of the collocation pattern of the target word “plague” over 19<sup>th</sup> and 20<sup>th</sup> centuries, the concordance



of “plague” in words of texts of 1810s-1890s and the concordance of “plague” in texts of 1900s-1990s will be explored. Table 6 shows the collocations of the word “plague” over 19<sup>th</sup> century (see Figure 6).

60- Yan-ping, 2013: 3.  
61- Shoucheng, 2003: 2.

Corpus of Historical American English			
SEARCH	FREQUENCY	CONTEXT	OVERVIEW
1	1821 MAG NorthAmRev	A B C would catch the small pox, and another with a fracture be <b>infected</b> with the <b>plague</b> ; and the most virulent and contagious disorders would soon obtain	
2	1825 FIC RebelsBostonBefore	A B C , and to speak Of freedom, the forbidden fruit, Manfred. When the <b>plague raged</b> in London, one of the most remarkable features of the time was the	
3	1827 FIC BuccaneersARomance	A B C grain, which hath been manured by the gore of armies. Excirpation, from <b>plague, famine, murder, leprosy, and a thousand torments and diseases, are</b>	
4	1827 FIC HopeLeslieVolume1	A B C or guinea of mine shall ever go to one who is <b>infected</b> with this spreading <b>plague</b> . " This letter was too explicit to be misunderstood; but so far from	
5	1827 FIC Tancred	A B C .Scene I The Council Tent as before. Ray, Raymond <b>famine</b> and the <b>plague</b> have so distressed our Camp, The soldiers rise in open mutiny -- Despondin	
6	1830 MAG NorthAmRev	A B C and parcel of manufactures from every part of the world had been <b>infected</b> with the <b>plague</b> , the exclusion could not have been enforced with a more s	
7	1833 NF ByOrderKing	A B C the people, war on kings, the plague on war, <b>famine</b> on the <b>plague</b> , folly on everything, having proved a certain measure of chastisement in the mere	
8	1835 FIC NormanLeslieA Tale	A B C produced in double abundance, and the huts of the poor had been sheltered from <b>plague</b> and <b>famine</b> . He entered. His step was soft and noiseless. He	
9	1836 FIC Philothea	A B C health. Some attributed it to the atmosphere of Athens, still <b>infected</b> with the <b>plague</b> ; others supposed it had its origin in the death of Paralus. The wild	
10	1836 FIC Philothea	A B C of the visible. Tithonus formerly told me of similar cases that occurred when the <b>plague raged</b> in Ethiopia and Egypt; and Artaphernes says he has seen	
11	1836 FIC Philothea	A B C courtiers, he added: " A proud nation are these Greeks! When the <b>plague ravaged</b> all Persia and Media, Hippocrates of Cos, refused our entreaties, and	
12	1836 MAG NorthAmRev	A B C of summer?" In 1665, the city of London was <b>ravaged</b> by the <b>plague</b> . If, with Mr. Forster, we attribute this to the remarkable comet which	
13	1837 MAG NorthAmRev	A B C , because we now know every particular of his melody. Is his melody a <b>plague</b> that has <b>infected</b> his whole mind, so that we must take it with us	
14	1840 NF YoungMaiden	A B C absolutely indefensible. History tells us, that in the thirteenth century, when the <b>plague raged</b> in Florence, it spread through the suburbs of that city, fr	
15	1843 FIC LettersFromNew	A B C phenomena governed by laws which regulate the universe. It is recorded that when the <b>plague raged</b> in Athens, in the days of Plato, many recovered fr	
16	1844 MAG NewEnglaleRev	A B C every reflecting man in Christendom -- the voice of war, or <b>famine, or plague</b> , could scarcely sound more terrific. He knows what is to come: he	

Figure 6. Concordance of plague in Texts of 1810-2000

Table 6: Collocates of plague in texts of 1810s-1890s

	Collocate	Frequency	MI
Plague	bubonic	14	13.63
	locusts	204	8.76
	famine	1416	8.29
	cholera	596	7.99
	infected	696	7.36
	pestilence	867	7.56
	raged	735	7.28
	smallpox	455	7.38
	ravages	629	7.14
	spots	1788	6.52

A very strong collocate of plague is “locusts”. As indicted by the text extracted from New York Times in 1987, in the late 19<sup>th</sup> century, the United States experienced locust plague<sup>60</sup>.

Extract 20: ..., and the plague of locusts settles on the land.

Destroying agriculture, plague of locusts can negatively impact every aspects of human’s life (i.e., social life, politics, etc.)<sup>61</sup>. Extract 19 refers to the destructive nature of plague in general, and plague of locusts in particular.

Extract 21: ...; for his army, destructive as a plague of locusts when plunder urged them on, ...

Another strong collocate of plague that can be perceived negatively is “famine”. As it is clear in the below example “plague” such as “famine” was inflicting suffering on vast number of people in 19<sup>th</sup> century.



Extract 22: *the voice of war, or famine, or plague, could scarcely sound more terrific.*

The other world collocated with plague is “bubonic”, as reported by New York Times in 1899:

Extract 23: *“Two cases of what is believed to be bubonic plague reached this port yesterday”.*

Bubonic plague is believed to be transmitted by fleas and responsible for the catastrophic epidemic through the history<sup>62</sup>.

Moreover, plague was meaningfully collocated with names of other contagious diseases, such as cholera, pestilence and small pox. As indicated by the given examples, plague, along with other infectious diseases (i.e., cholera, pestilence, small pox), was a source of discomfort for people in the 19<sup>th</sup> century.

Extract 24: *...; war, plague, cholera, famine, indicate a certain ferocity in nature,...*

Extract 25: *They are indeed, the peculiar victims of plague, pestilence, and famine.*

Extract 26: *Whether an epidemic like the plague or small pox has seized them, or whether the flies and wasps and bees upon which they feed had grown poisonous, we never shall know.*

Moreover, the significant co-occurrence of the world “spot” with the target word plague can refer to the endemic nature of plague. Plague is a contagious disease that spreads rapidly over the land<sup>63, 64</sup>.

Extract 27: *Panama is one of the earth's plague spots.*

The other terms with negative semantic prosody (i.e., infected, raged and ravages) that collocate with the target word “plague” can reveal the threatening situation caused by plague (see Figure 7).

The significant collocates co-occurring with the target word plague in the texts of 1900s-1990s constitute a number of words with mostly negative semantic prosody. Table 7 provides the collocates of “plague” in texts of the 20<sup>th</sup> century.

As it can be seen in Figure 8, Among the collocates of plague, the highest MI value belongs to the term “bubonic”. The strong association between the target word plague and the collocate “bubonic” is justified as bubonic plague has been considered as the most common disease occurred in endemic countries<sup>65</sup>. In 1900, several cases were reported to be infected by bubonic plague in San Francisco<sup>66</sup>.

Extract 28: *..., outbreak of bubonic plague continued steadily and devastatingly for centuries,...*

“Pneumonic” was another term that meaningfully collocated with the target word plague. The United States witnessed

62- Hinnebusch, 1997: 645-52.

63- Brinkerhoff et al., 2009: 491-7.

64- Davis et al, 2008: 634-7.

65- Organization, 1999: 340-4.

66- McClain, 1988: 447-513.



the outbreak of pneumonic plague in the 19<sup>th</sup> century<sup>67</sup>. In 1919, an outbreak of pneumonic plague occurred in Oakland. In 1924 also, another outbreak of the disease was reported in Los Angeles. The extract below is taken from the Time magazine in 1956.

67- Meyer, 1961: 249.

1	1821	MAG	NorthAmRev	A	B	C	would catch the small pox, and another with a fracture be <b>infected</b> with the <b>plague</b> and the most virulent and contagious disorders would soon obtain a mast
2	1825	FIC	RebelsBostonBefore	A	B	C	, and to speak Of freedom, the forbidden fruit. Manfred. When the <b>plague raged</b> in London, one of the most remarkable features of the time was the
3	1827	FIC	HopeLeslieVolume1	A	B	C	or guinea of mine shall ever go to one who is <b>infected</b> with this spreading <b>plague</b> . This letter was too explicit to be misunderstood; but so far from
4	1830	MAG	NorthAmRev	A	B	C	and parcel of manufactures from every part of the world had been <b>infected</b> with the <b>plague</b> ; the exclusion could not have been enforced with a more strict an
5	1836	FIC	Philothea	A	B	C	health. Some attributed it to the atmosphere of Athens, still <b>infected</b> with the <b>plague</b> ; others supposed it had its origin in the death of Paralus. The widowed
6	1836	FIC	Philothea	A	B	C	of the visible. Tithonus formerly told me of similar cases that occurred when the <b>plague raged</b> in Ethiopia and Egypt; and Artaphernes says he has seen a lea
7	1837	MAG	NorthAmRev	A	B	C	, because we now know every particular of his malady. Is his malady a <b>plague</b> that has <b>infected</b> his whole mind, so that we must take it with us
8	1838	NF	IncidentsTravel	A	B	C	little cabin. /a/ /a/ The Rock of the Chain. -- <b>Ravages of the Plague</b> . -- Deserted Quarries -- A youthful Navigator:-- A recollection of Sam Patch
9	1840	NF	YoungMaiden	A	B	C	absolutely indefensible. History tells us, that in the thirteenth century, when the <b>plague raged</b> in Florence, it spread through the suburbs of that city, from the
10	1843	FIC	LettersFromNew	A	B	C	phenomena governed by laws which regulate the universe. It is recorded that when the <b>plague raged</b> in Athens, in the days of Plato, many recovered from it v
11	1844	MAG	NewEngtaleRev	A	B	C	American parry avoid a district inhabited by Irishmen as if it was <b>infected</b> with the <b>plague</b> ? Do Irishmen confine their repeal meetings, which are suspected by
12	1844	NF	KnickerbockerNew	A	B	C	of Constantinople, sufficiently near the scenes of death caused by the <b>ravages of the plague</b> to be thoroughly acquainted with them, and yet to be separated f
13	1849	NF	EssayOnUnionChurch	A	B	C	king's match with this lady was a greater judgment to the nation than the <b>plague</b> , which then <b>raged</b> in the land; for, considering the malignity of the
14	1855	FIC	WorksEdgarAllan	A	B	C	!" It was in the spirit of this wisdom that, when a great <b>plague raged</b> at Athens, and every means had been in vain attempted for its removal
15	1866	FIC	WinningHisWay	A	B	C	turned away without answering, -- avoiding her as if she was <b>infected</b> with the <b>plague</b> . When the cold northeast storms came, when the clouds hung low upon
16	1871	NF	FragmentScience	A	B	C	kind, thoroughly investigated and successfully combated by M. Pasteur. For fifteen years a <b>plague</b> had <b>raged</b> among the silkworms of France. They had sickne
17	1875	NF	AdviceMotherOn	A	B	C	neither young nor old, rich nor poor, and commits greater <b>ravages</b> than the <b>plague</b> ever did. Small-pox is a disgrace: it is a disgrace to any civilised
18	1879	NEWS	NYT-Reg	A	B	C	efforts in behalf of the people who suffered so terribly by the <b>ravages of the plague</b> . Independent of its value as a means of preventing the introduction of cor
19	1887	NEWS	NYT-Ed	A	B	C	of them, and the coast is now said to be permanently <b>infected</b> with that <b>plague</b> . The California Board of Health has observed with much anxiety the developm

Figure 7. *Infected, raged and ravages as collocates of plague in Texts of 1810s-1890s*

Table 7: Collocates of plague in texts of 1900s-1990s

	Collocate	Frequency	MI
Plague	bubonic	112	13.80
	pneumonic	18	12.76
	typhus	249	9.87
	cholera	575	9.66
	locusts	409	9.42
	smallpox	573	8.22
	epidemics	328	8.15
	famine	1655	7.93
	outbreaks	428	7.77
	ravage	470	7.37

Extract 29: *But there was a danger that the disease might spread to his lungs- where it would become the dangerously infectious form known as pneumonic plague, or “Black Death”.*

The words “ravage” and “epidemic” and “outbreak” in the texts of the 20<sup>th</sup> century represent the threat of plague to vast number of people over time. As stated by Stenseth *et al.* (2008), even in today’s developed world, plague is causing damages. Therefore, actions should be taken to understand how human are affected by plague dynamic.

Extract 30: *With no weapon but cleanliness, governments*



*in Europe made of plague epidemics an inert entry in the dusty annals of medicine.*

Extract 31: *In former times National Geographic, October 1980|p525 the rat explosion triggered outbreak of plague or devastated wheat and rice crops.*

Extract 32: *... partly, at any rate, to repair the ravages the plague had made among the clergy.*

CLICK FOR MORE CONTEXT		<input type="checkbox"/> [F]	SAVE LIST	CHOOSE LIST	CREATE NEW LIST	[F]	SHOW DUPLICATES
1	1906	MAG	Cosmopolitan	A	B	C	name is forgotten. With no weapon but cleanliness, governments in Europe made of <b>plague epidemics</b> an inert entry in the dusty annals of medicine. In India the
2	1911	NF	OldEnglishLibraries	A	B	C	was enlarged, partly, at any rate, to repair the <b>ravages the plague</b> had made among the clergy. -- Camb. Lit., II, 354;
3	1923	NF	GossipSeventeenth	A	B	C	in-127 Gossip of the Seventeenth and Eighteenth Centuries sanitary conditions and recurrent <b>outbreaks of the plague</b> . In this case, however, Bishop Burnet sug ges
4	1925	MAG	Atlantic	A	B	C	by prayer and almsgiving, Christians gave up washing; Hindus liberated rats captured during <b>plague epidemics</b> . Religious orders and priests of the church gave the
5	1930	MAG	Harpers	A	B	C	has succumbed to the disease of size, that malady which <b>ravages</b> like a very <b>plague</b> . Thus football, which used to be a game, has of late become
6	1936	NF	ScientificProgress	A	B	C	was due largely to the barbarian invasion, but partly to a series of devastating <b>plague epidemics</b> . Since all knowledge and culture throughout the Middle Ages rema
7	1941	MAG	Time	A	B	C	rats to city rats, there would be danger of great <b>epidemics</b> . # The <b>plague</b> is spread in two ways: 1) by fleas; 2) by the
8	1942	MAG	ReadersDigest	A	B	C	other illness. Authorities are doing their best to check these <b>ravages</b> , but the <b>plague</b> spots around military camps multi-   ply faster than they can be wiped out.
9	1953	NF	EnglishHousewife	A	B	C	you an unclean small lock of the same." 4 During <b>outbreaks of the plague</b> the London theatres were closed; assemblies were prohibited, and the sale of possibly
10	1957	MAG	Time	A	B	C	with a profit. Because of slow transportation, storms, piracy and <b>outbreaks of plague</b> , trade and profit margins were so precarious as to give ulcers to the steellest
11	1958	NEWS	NYT-Ed	A	B	C	be eradicated by the middle of the next decade. Meanwhile, <b>epidemics</b> of cholera, <b>plague</b> and typhus have been checked. Effective treatment has been, provided f
12	1975	MAG	Time	A	B	C	285560 By comparison with the great influenza <b>epidemics</b> , the <b>plague</b> that hit Minnesota recently was a trivial affair. One hundred and twenty-five people were
13	1977	RIC	MovGauntletThe	A	B	C	a while, then moves to his side. Sensing the <b>ravages</b> of betrayal that <b>plague</b> him, an innate compassion surfaces. She reaches out, gently touches his shoulder
14	1980	MAG	NatGeog	A	B	C	In former times National Geographic, October 1980   p525 the rat explosion triggered <b>outbreaks of plague</b> or devastated wheat and rice crops. Thus the flowering c
15	1983	RIC	Phantoms	A	B	C	a fine job when it comes to tracking down and controlling vectors for <b>outbreaks of plague</b> or mass food poisoning or water contamination. But essentially, they're b
16	1993	RIC	UglyWays	A	B	C	the Ark to Ekron, and that city also suffered the <b>ravages</b> of the terrible <b>plague</b> . Finally they realized what the nature of the problem was. So they returned
17	1999	MAG	America	A	B	C	1). Though leprosy gradually died out in Europe, <b>outbreaks</b> of the bubonic <b>plague</b> continued steadily and devastatingly for centuries, well beyond Timoretto's lifeti

Figure 8. *Epidemics, ravage and outbreak as collocates of plague in Texts of 1910s-1990s*

As it is obvious in the above examples, plague is not a disease limited to human but also a disease widespread in wildlife. The spread of the disease in wildlife can also be supported by the fact that the term “locusts” collocates significantly with the target word “plague”, in texts of the 20<sup>th</sup> century. The extract below is taken from Time magazine, 1988:

Extract 33: *As if all those woes were not enough, a plague of locusts is threatening to wipe out the country's meager crops of millet and sorghum.*

As explained by Stenseth *et al.* (2008), since plague is widespread in wildlife reservoir, it is not possible to eradicate it. Therefore, serious actions are needed to control the devastating impact of plague on human life.

The target word plague is also accompanied by the word “famine” with a negative semantic meaning (see Figure 9). Again, the co-occurrence of these two words can refer to the devastating situations caused by Plague.

Extract 34: *...no appointment to office small or great, no handling of any community in time of plague or famine, ...*

Similar to the case of other diseases, collocates of other disease names (i.e., cholera, small-pox and typhus) with the term “plague” can refer to the misery that was caused by these diseases over time and specifically in the 20<sup>th</sup> century



(see examples below).

Extract 35: *And the plague, smallpox or whatever it was, finished him first.*

Extract 36: *It is indisputable that such diseases as cholera, malaria, plague, typhus, and typhoid fevers have practically disappeared as the result of improved sanitation and cleanliness.*

Extract 37: *Of less immediate interest to us in the western hemisphere are the specific vaccines for the prevention of cholera and bubonic plague, but their decided worth necessitates their mention.*

SEARCH	FREQUENCY	CONTEXT	CONTEXT +
1 1900 NF StoryNineteenth	A B C	of the following summer. The drought of 1896, with the consequent <b>famine</b> and <b>plague</b> that devastated India last winter, was thus predicted some months in a	
2 1907 MAG Nation	A B C	of a total population of nearly 150,000,000. Hence, increasing poverty, <b>famine</b> , <b>plague</b> , and discontent. The argument of increasing population is recognized as	
3 1908 PIC PlayPiper	A B C	creatures of the Ark. For a similitude, -- our <b>famine</b> gone, Our <b>plague</b> of rats and mice, -- CROWD Hurrah -- hurrah! JACOBUS' T is	
4 1909 PIC HappyHawkins	A B C	bit of a fuss over us,' cause the gang had been worse'n a <b>plague</b> an' a <b>famine</b> . You can judge o' their nerve when they made	
5 1911 MAG Scribes	A B C	in life but to die; who look upon disease and disaster, <b>famine</b> and <b>plague</b> , as visitations of God; who? some of them? have held it	
6 1911 MAG Scribes	A B C	appointment to office small or great, no handling of any community in time of <b>plague</b> or <b>famine</b> , no hygienic precautions or sanitary arrangements, into which	
7 1920 PIC BackGodsCountry	A B C	, and there was no food; why it matters that there were <b>famine</b> and <b>plague</b> in the great unknown land, and that people were dying and our world going	
8 1922 MAG Atlantic	A B C	as Gandhi IVOLdd have it, all logic suggests chaos, invasion, <b>famine</b> , <b>plague</b> , internecine war; and yet it can be argued that the very habits of	
9 1923 MAG Harpers	A B C	or no schools, colleges or universities; no police system; and <b>famine</b> and <b>plague</b> were uncombated. The country was like a vast domain in dilapidation with few	
10 1932 NF GrowthDevelopment	A B C	dreadful deed, for not only was there plague upon the land, but the <b>plague</b> had brought <b>famine</b> in its train. One can imagine the crowds of trembling men	
11 1946 PIC LastCircle	A B C	would brace his heart and put himself in Death's way -- but, in <b>plague</b> and <b>famine</b> and conflict, Death passed him by. So he went on.	
12 1953 PIC ReturnLannyBudd	A B C	{p212}Where they smile in secret, looking over wasted lands, Blight and <b>famine</b> , <b>plague</b> and earthquake, roaring deeps and fiery sands, Clanging fights, and flar	
13 1962 PIC Reivers	A B C	who after ages of trying to cope with the anguishes of mortality -- <b>famine</b> , <b>plague</b> , war, injustice, folly, greed -- in a word, civilized government	
14 1965 PIC Thomas	A B C	still unsatisfied. After his plundering of the countryside came <b>famine</b> , and after <b>famine</b> <b>plague</b> . And it was said there fell a rain of blood three days and a	
15 1971 PIC DeathFox	A B C	." Our King calls it "a foul town." Though <b>famine</b> and <b>plague</b> may scatter the crowds -- not silencethem, mind you, for they are as	
16 1971 PIC DeathFox	A B C	, who could kill more men by ignorance, folly, and rash stupidity than <b>plague</b> and <b>famine</b> together, and scratch your head to recollect a victory by any of	
17 1972 MAG SatEvePost	A B C	rate. Population growth could be stopped in its tracks by worldwide <b>famine</b> , or <b>plague</b> , or thermonuclear war. Worldwide today there are, annually, about thirt	
18 1977 MAG Time	A B C	probably was only part of the ransom paid. In a time of <b>famine</b> , <b>plague</b> , constant war, baronial feuding and serious peasant uprisings, the poet lived to	
19 1977 MAG NatGeog	A B C	matter that burnt offerings on such a scale were only in times of crisis? <b>plague</b> , <b>famine</b> , or invasion? and the victims often criminals or prisoners of war	
20 1981 PIC FollowRiver	A B C	temples to make sacrifice, all the gods appear. They threaten the people with <b>plague</b> and <b>famine</b> . So to avoid disaster, the temple priests beg the people to	

Figure 9. *Famine as a collocate of plague in Texts of 1910s-1990s*

As it can be inferred from Extract 37, there have been a number of attempts to immunize people against plague. In a study conducted by Cavanaugh *et al.* (1974), it was explained that, although there was the plague, transmitted by rats and fleas during 1966-1997 in south Vietnam, the number of Americans that were infected by plague virus was negligible. According to Cavanaugh *et al.* (1974), one plausible explanation for negligible occurrence of plague in Americans was that the killed plague vaccine administered to American personals was effective in the prevention of the disease. However, despite the attempts made so far, plague is still considered as a threat in many parts of the world<sup>68</sup>.

### 2-1. Comparing the centuries

To find an answer to the second research question, the frequency of the terms “cholera”, “measles”, and “plague” in the texts of 19<sup>th</sup> and 20<sup>th</sup> centuries were compared (Table 8).



As it is shown in the Table 8 and Figure 10, there is not a huge difference between the frequency of the target word “cholera” in the 19<sup>th</sup> and 20<sup>th</sup> centuries. Cholera is not stranger to United States<sup>69</sup>. The outbreak of cholera occurred in both 19<sup>th</sup> and 20<sup>th</sup> centuries. Since the first outbreak of cholera in 1817, cases infected with cholera were identified. In 1832 and 1849, during the second worldwide pandemic of cholera, 150,000 Americans died of cholera. In the 20<sup>th</sup> century also cholera presented challenges to Americans. For example, during the sixth pandemic in 1911, cases were reported in New York and Massachusetts. Within the last decades of the 20<sup>th</sup> century also cholera was endemic again<sup>70</sup>. Therefore, despite many studies on Cholera, almost until the end of 20<sup>th</sup> century, cholera was still presenting challenges<sup>71</sup>.

- 69- Morris et al, 1985: 343-50.
- 70- Ibid.
- 71- Kaper et al., 1995: 48-86.
- 72- Hinman et al., 1983: 439-44.
- 73- Ibid.
- 74- Gregg, 1941: 170-180.

**Table 8:** The frequencies of “cholera”, “measles”, “plague” in the COHA over 19th and 20th centuries

	1810-1890	1900-1990
Cholera	596	575
Measles	224	637
Plague	1298	1969

Moreover, the frequency of the word “measles” in the 19<sup>th</sup> and 20<sup>th</sup> centuries was not comparable. Much to researchers’ surprise, the frequency of the term measles in texts of the 20<sup>th</sup> century was more than two times higher than the frequency of the same word in texts of the 19<sup>th</sup> century. Initial decades of the 20<sup>th</sup> century witnessed several measles infections. Moreover, during 1950s, more than 500,000 cases were infected by measles and almost 500 people died of it in the United States<sup>72</sup>. Furthermore, as reported by centers for disease control in 1990, 27672 cases were infected by measles virus. The introduction of measles vaccine in 1963<sup>73</sup> could be another reason for more frequent use of the word “measles” in the 20<sup>th</sup> century. Moreover, a closer inspection of the concordance of “measles” in texts of 1900s-1990s revealed that the outbreak of German measles (rubella) in 1941<sup>74</sup> was another reason for the remarkable increase in the frequency of term “measles” in texts of 1910s-1990s. Although the word “German” collocates meaningfully (MI= 5.99) with the target word “measles” in words of texts of the 20<sup>th</sup> century, no significant relationship can be found between the word “German” and “measles” in texts of 1810s-1890s.

Although higher than the frequency of measles and cholera in both 19<sup>th</sup> and 20<sup>th</sup> centuries, the frequency of the term “plague” in the 19<sup>th</sup> century was lower than the frequency of the target word in the 20<sup>th</sup> century. From the beginning of his-



tory, plague has been a threat to mankind<sup>75</sup>. Although plague is often considered as a problem of past, in many parts of the world, it is still a threat<sup>76</sup>. However, according to Reed, Palmer, Williams, and Kisch (1970), “little plague was recorded through mid-nineteenth century”<sup>77</sup>. This could be the reasons for the lower frequency of the target word “plague” in texts of the 19<sup>th</sup> century in comparison to texts of the 20<sup>th</sup> century.

Figure 10 presents the same information in a histogram format. The x axis shows the contagious diseases under investigation in the present study (i.e., cholera, measles, and plague) over 19<sup>th</sup> and 20<sup>th</sup> centuries. The y axis presents the frequency of the words.

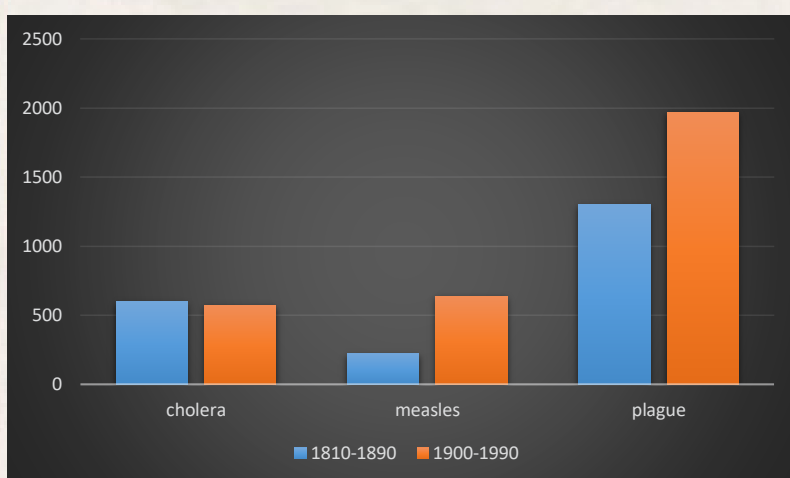


Figure 10. The frequency of the term “cholera”, “measles”, “plague” in the COHA, over 19<sup>th</sup> and 20<sup>th</sup> centuries

As the next step, after comparing the frequency of “cholera”, “measles” and “plague” over 19<sup>th</sup> and 20<sup>th</sup> centuries, their collocation patterns over 19<sup>th</sup> and 20<sup>th</sup> centuries were investigated. A closer analysis of the selected collocates of the target words under investigation revealed that several words had similar prosodies. Not surprisingly, a negative prosody was displayed in collocational patterns of the target word “cholera” in texts of the 19<sup>th</sup> century. The significant association of the words “epidemic” and “raging” referred to the trouble making nature of “cholera” as a contagious disease. Additionally, two other semantic groups were identified. One of which was health-related nouns such as the name of diseases (i.e., morbus, dysentery, Small-pox, plague) as well as a word such as infantum which referred to a viral disease of infants. The third group, which was covering a small proportion of the meaningful collocates of the term “cholera” (less than 5%), was referring to the time and origin of the disease outbreak. Besides, a large proportion of the meaningful col-

75- Pollitzer, 1954: 409-82.

76- Stenseth et al., 2008: e3.

77- Reed et al., 1970: 466.



locates of the word “cholera” in texts of the 20<sup>th</sup> century was concerned with health-related terms. Others were classified under the category disaster, giving reference to the trouble and misery caused by this infectious disease in the 20<sup>th</sup> century.

Semantic category of the meaningful collocates of the target word “measles” in texts of the 19<sup>th</sup> century was also explored. No semantic prosody with time and origin of the disease was made; but two other semantic categories were presented. In addition to the health-related terms and the words categorized under the heading disaster, the term “children” was categorized under stage of life, referring to the acceptance of the disease as an inescapable part of children’s life. The other semantic category exhibited to the power of the measles disease over the mankind. Moreover, a closer inspection of collocations of measles in texts of the 20<sup>th</sup> century showed that in addition to health-related terms and the terms categorized under the heading disaster, a number of other collocations referred to the introduction of vaccine in this time period. Next, semantic associations of the target word “plague” in texts of the 19<sup>th</sup> century were investigated. Results showed that in addition to the two semantic groups of health and disaster, there was another semantic group linked to the nature of the disease. Moreover, almost the same semantic classification was displayed for “plague” in texts of the 20<sup>th</sup> century. This shows that plague has been always a danger to mankind and no marked fluctuations is observed in the pattern of infection by plague over 19<sup>th</sup> and 20<sup>th</sup> centuries.

As the next step, collocational patterns of the disease under investigation over 19<sup>th</sup> and 20<sup>th</sup> centuries were compared. As it can be seen in Table 9, collocates of the word “cholera” in both 19<sup>th</sup> and 20<sup>th</sup> centuries were carrying negative meanings and they were creating the potential for a negative context. Besides, the target word “Cholera” in both 19<sup>th</sup> and 20<sup>th</sup> centuries attracted different health-related terms such as the name of other diseases (e.g., dysentery, small-pox, plague). Moreover, the use of terms such as “raging” and “scourge” as collocates of cholera in texts of 1810-1890 and 1900-1990, respectively, revealed that cholera in both 19<sup>th</sup> and 20<sup>th</sup> centuries was considered as a threat to mankind. Moreover, Collocational patterns such as “Asiatic cholera” and “cholera epidemic” referred to the pandemic of cholera in both 19<sup>th</sup> and 20<sup>th</sup> centuries. Cholera was one of the most feared diseases of the 19<sup>th</sup> century<sup>78</sup>. The 20<sup>th</sup> century also witnessed epidemic of cholera in the United States. During the sixth pandemic of cholera in 1911, cases were reported to be infected by measles virus<sup>79</sup>. In the last decades of the 20<sup>th</sup> century also cholera

78- Seas et al., 1996: 37-46.

79- Morris et al, 1985: 343-50.



was endemic again. The meaningful relationship between the world “infantum” and “cholera” indicated that children were also threatened by the cholera virus in 19<sup>th</sup> and 20<sup>th</sup> centuries. Negative words such as famine also indicated that cholera was a cause of human trouble and misery. In the 20<sup>th</sup> century, despite many studies on “cholera”, cholera was still presenting challenges<sup>80</sup>.

- 80- Kaper et al., 1995: 48-86.  
81- Assaad, 1983: 452-9.  
82- Hinman et al., 1983: 439-44.

**Table 9:** Collocates of cholera in texts of 1810-1890 and 1900-1990

1810-1890	1910-1990
infantum	morbus
morbus	Typhus
dysentery	typhoid
epidemic	dysentery
Asiatic	epidemic
smallpox	smallpox
1832	Asiatic
plague	diphtheria
raging	scourge
famine	malaria

As it can be seen in Table 10, collocates of the target word “measles” in 19<sup>th</sup> and 20<sup>th</sup> centuries, despite carrying negative prosody, are more neutral than collocates of the two other diseases under investigation. This could be due to the fact that until 1980s, because of the universality of the disease, the measles has been accepted as an inevitable risk of early life<sup>81</sup>. Furthermore, in texts of the 20<sup>th</sup> century, “vaccine” is meaningfully collocated with the target word “measles”. The significant co-occurrence of the term “measles” could be the result of the introduction of measles vaccine in 1963<sup>82</sup>.

**Table 10:** Collocates of measles in texts of 1810-1890 and 1900-1990

1810-1890	1910-1990
whooping cough	rubella
scarlatina	chicken-pox
mumps	mumps
smallpox	whooping-cough
fever	smallpox
ill	diphtheria
sick	meningitis
children	measles
like	vaccines
down	epidemic

Moreover, as it can be seen in table 11, irrespective of the





time the text is extracted from, collocates of the target word “plague” carry a negative semantic meaning. This findings can be justified since from the beginning of history, plague has been considered as a threat to mankind<sup>83</sup>. Collocates with negative semantic preferences (i.e., famine, ravage, etc.) can provide evidence for the misery and damages caused by plague through history. Moreover, the word “bubonic”, which is the most frequent collocate of the target word “plague” in texts of the 20<sup>th</sup> century, does not appear in the concordance of “plague” in texts of the 19<sup>th</sup> century except in 7 texts of magazine and news in the last decades of 1890s. As reported by New York Times in 1899:

Extract 27: ... he said: “The appearance of the bubonic plague in the East during the past two years finds the world for the first time prepared to investigate scientifically the cause of its development and indicate the means of relief.”

As reported by Craven *et al.* (1993), 296 cases of human plague were reported from 1970 to 1991 in the United States. Most of the cases were infected by bubonic or septicemic plague, or both<sup>84</sup>.

- 83- Pollitzer, 1954: 409-82.
- 84- Craven et al., 1993: 758-61.
- 85- Pollitzer, 1954: 409-82.
- 86- Stenseth et al., 2008: e3.
- 87- Wharton, 2004: S1-S3.

**Table 11:** Collocates of plague in texts of 1810-1890 and 1900-1990

1810-1890	1910-1990
bubonic	bubonic
locusts	pneumonic
famine	typhus
cholera	cholera
infected	locusts
pestilence	smallpox
raged	epidemics
smallpox	famine
ravages	outbreaks
spots	ravage

**Discussion**

Higher frequency of the target word “plague” in comparison to “measles” and “cholera” can be justified as plague is still considered a menace to mankind<sup>85</sup>. Despite so many developments in health-care issues over the years, thousands of people are reported to be infected with plague annually<sup>86</sup>. The lower frequency of the term “measles” in comparison to the two other diseases under investigation in the present study is also justified. The introduction of measles vaccine in 1962 led to a steep decline in the number of measles-infected patients in United States<sup>87</sup>. Therefore, as described by Griffin and Oldstone (2008), measles virus - one of the most



contagious viruses- has been controlled by the introduction of measles vaccine. Moreover, as demonstrated by Wharton (2004), outbreak of measles was controlled by improvements in health care and nutrition and thereby led to a remarkable decline in measles related deaths.

Moreover, exploring the collocational patterns of “cholera”, “measles”, and “plague” showed that most of the collocates of the word “cholera” and “plague” (i.e., raging, scourge, etc.) carried negative meanings and they mostly created a potential for co-texts that focused on different diseases and damages caused by them. Such negative collocates revealed the misery, trouble and the threatening atmosphere caused by such diseases. Although attempts were made to control cholera, the disease was eradicated even up to the end of 20<sup>th</sup> century<sup>88</sup>. According to Morris and Black (1985), numerous cases were identified with cholera since the first outbreak of the disease in 1817. In 1832 and 1842, 150,000 Americans died of cholera. In 1866, also 50,000 died during the fourth worldwide pandemic. Besides, during the sixth pandemic of cholera in 1911, a number of people were reported to be infected by cholera in New York and Massachusetts. Last decades of the 20<sup>th</sup> century also witnessed another pandemic of cholera<sup>89</sup>. Plague also has been a never-ending threat for public health<sup>90</sup>. “Plague has a most pernicious past; a present that is bad; and a future that seems to say to civilized man, ‘Your money or your life’”<sup>91</sup>. As explained by Stenseth *et al.* (2008) plague should not be considered as a problem of past as it is still a threat in many parts of the world. Despite the small number of human cases of plague, the threat of plague for humanity should not be ignored because of “the disease’s inherent communicability, rapid spread, rapid clinical course, and high mortality if left untreated”<sup>92</sup>.

However, the collocates of the term “measles”, although negative, carried less negative semantic meanings in comparison to collocates of the target words “cholera” and “plague”. The history of measles, a tremendously contagious disease, dated back to the seventeenth century<sup>93</sup>. However, the universality of disease until 1980s, especially in developing countries has led to the worldwide acceptance of measles as an unavoidable risk of early life<sup>94</sup>. Another reason for the use of collocates with less negative semantic meanings with the term “measles” in comparison to the terms “cholera” and “plague” could be the introduction of vaccine in 1963. Introduction of the measles vaccine resulted in a remarkable decrease in infection and death due to measles virus<sup>95,96</sup>. As explained by Assaad (1983), if given at the critical age, measles vaccine prevents the disease effectively.

- 88- Kaper *et al.*, 1995: 48-86.
- 89- Morris *et al.*, 1985: 343-50.
- 90- Pollitzer, 1954: 409-82.
- 91- Lloyd, 1925: 629.
- 92- Stenseth *et al.*, 2008: 11.
- 93- Dardis, 2011: 9-12.
- 94- Assaad, 1983: 452-9.
- 95- Hinman *et al.*, 1983: 439-44.
- 96- Wharton, 2004: S1-S3.



Furthermore, the larger number of instances of “measles” and “plague” in texts of 1900s-1990s, in comparison to frequency of the same words in texts of 1810s-1890s, does not necessarily imply that these contagious diseases have been more prevalent in the 20<sup>th</sup> century. Closer investigation of the concordance of the target word “measles” revealed that the first attempt to use vaccine to immunize against measles in 1963<sup>97</sup> as well as the outbreak of German measles (rubella) in 1941<sup>98</sup> were among the main reasons for higher frequency of the term measles in texts of the 20<sup>th</sup> century. The higher frequency of the target word “plague” in texts of the 20<sup>th</sup> century was likely to be due to the fact that “little plague was recorded through mid-nineteenth century”<sup>99</sup>.

Furthermore, comparing the collocational patterns of the target words “cholera”, “measles”, and “plague”, the researchers found that collocates of the word “cholera” in both 19<sup>th</sup> and 20<sup>th</sup> centuries carried negative meanings. This finding revealed that cholera in both 19<sup>th</sup> and 20<sup>th</sup> centuries was challenging. According to Glass *et al.* (1992), cholera was one of the most widespread diseases of the 19<sup>th</sup> century. The 20<sup>th</sup> century also witnessed epidemic of cholera in the United States. During the epidemiology of cholera in 1911, cases were reported in New York and Massachusetts<sup>100</sup>. Last decades of the 20<sup>th</sup> century also witnessed another pandemic of cholera. In 20<sup>th</sup> century, despite many studies on “cholera”, cholera was still causing trouble<sup>101</sup>. Moreover, it was observed that the collocates of the target word “plague” also in texts of both 19<sup>th</sup> and 20<sup>th</sup> centuries carried a negative semantic meaning. Moreover, collocates with negative semantic preferences (i.e., famine, ravage, etc.) provided evidence for the challenges caused by plague through history. These findings can be justified in the light of the fact that plague has been always a common cause of death<sup>102</sup>. However, findings of the current study revealed that collocates of the target word “measles” in both 19<sup>th</sup> and 20<sup>th</sup> centuries carried a less negative meaning. Besides, the word “vaccine” which was a significant collocate of the term “measles” in texts of 1900s-1990s but not the texts of 1810s-1890s can be justified in the light of the fact that measles vaccine was first introduced in 1963<sup>103</sup>. Introduction of the measles vaccine led to a remarkable decrease in the disease burden<sup>104</sup>.

### Conclusion

Results of the present study, in line with the findings reported by Balteiro (2015), shows that language is the linguistic mirror of society. In the present study, collocations of the target words “cholera”, “measles” and “plague” provided in-

97- Hinman et al., 1983: 439-44.

98- Gregg, 1941: 170-180.

99- Reed et al., 1970: 466.

100- Morris et al., 1985: 343-50.

101- Kaper et al., 1995: 48-86.

102- Pollitzer, 1954: 409-82.

103- Hinman et al., 1983: 439-44.

104- Ibid.



sight into the social events that took place during 19<sup>th</sup> and 20<sup>th</sup> centuries. As an example, collocates, such as “raging” and “scourge”, mirror the threatening atmosphere of society caused by contagious diseases, such as “cholera”, and “plague”. Moreover, the use of more neutral collocates with the target word “measles”, in comparison to the collocates used with the two other diseases, reflects the acceptance of the measles as an unavoidable risk of early life in the past centuries. Furthermore, the appearance of the word “vaccine” as a significant collocate of the target word “measles” in texts of the 20<sup>th</sup> century also reflects the introduction of measles vaccine in the 20<sup>th</sup> century.

Therefore, findings of the current study have showed that language can represent the events taken place in the society. Overall, as expected, the texts on different diseases (i.e., cholera, measles, and plague) have carried over a negative prosody. Over years, different contagious diseases have caused so much pain and damage to people. All three diseases explored in the current study (i.e., cholera, measles and plague) have been the causes of huge misery and death to people. However, there have been ongoing attempts to decrease the destructive effect of such diseases. Despite this ongoing attempt to control diseases, the negative consequences of such diseases should not be underestimated. Considering the devastating effect of contagious diseases, people should be aware that they have to take part in health programs. Therefore, the descriptions provided in the current study have tended to offer strong evidence of the value of participation in health programs such as vaccination programs.

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