Regular Expressions: Great results with simple methods

Save some texts from Wikipedia

No text mining without texts. We just use some texts from Wikipedia to practice. Python makes it easy to download Wikipedia articles. To do this, we import the SaveWiki script (available on LearnWeb, just a few handy functions) and save all Wikipedia pages in the category *Infectious disease* in the folder *infect* .

In [3]:
```python
import SaveWiki
SaveWiki.downloadWikiCat('Infectious diseases','infect')
```

Simple string search

In Python we can easily search in a line of text/string. We simply run through all the lines of a file and see whether a certain word occurs in it.

In [4]:
```python
import codecs

file = codecs.open('infect/Quarantine.txt','r','utf8')

for line in file:
    line = line.strip()
    if 'community' in line:
        print(line)
        print('-----')

file.close()
```

```
The word quarantine comes from quarantena or quarantaine, meaning "forty days", used
in the Venetian language in the 14th and 15th centuries and also in France. The word
is designated in the period during which all ships were required to be isolated befo
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followed the trentino, or "thirty-day isolation" period, first imposed in 1347 in th
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to ships, "a state of enforced isolation", and as "a restriction on the movement of
people and goods which is intended to prevent the spread of disease or pests". The w
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of people into or out of a defined geographic area, such as a community, in order to
prevent an infection from spreading.
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The Islamic prophet Muhammad advised quarantine: "Those with contagious diseases sho
uld be kept away from those who are healthy." The Persian polymath Avicenna also rec
ommended quarantine for patients with infectious diseases, especially tuberculosis.T
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leprosy, started early in Islamic history. Between 706 and 707 the sixth Umayyad cal
iph Al-Walid I built the first hospital in Damascus and issued an order to isolate t
hose infected with leprosy from other patients in the hospital. The practice of mand
atory quarantine of leprosy in general hospitals continued until the year 1431, when
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the Ottomans built a leprosy hospital in Edirne. Incidents of quarantine occurred th
roughout the Muslim world, with evidence of voluntary community quarantine in some o
f these reported incidents.
-----
```

We can now find all lines that contain the word *community*, but not those that contain *communities*. We could solve that in Python, but eg capitalization would be the next problem. Here we can often more efficiently use regular expressions.

PERL Syntax

There have been a number of UNIX programs, such as vi, sed, and grep, that use regular expressions since the 1970s. Many of these functions have been grouped together in the PERL scripting language. The notation used in all of these programs is therefore often called PERL notation. This notation is also supported by Python. An Overview of this notation is available on LearnWeb or can be foud at many internet sites.

We now use the *re.search()* function for searching. The first argument is a regular expression, the second is the string in which to search.

In [5]:

```python
import re

file = codecs.open('infect\Quarantine.txt','r','utf8')

for line in file:
    line = line.strip()
    if re.search('(C|c)ommunit(y|ies)',line):
        print(line)
        print('-----')

file.close()
```

```
The word quarantine comes from quarantena or quarantaine, meaning "forty days", used
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Epidemics of yellow fever ravaged urban communities in North America throughout the late-eighteenth and early-nineteenth centuries, the best-known examples being the 1793 Philadelphia yellow fever epidemic and outbreaks in Georgia (1856) and Florida (1888). Cholera and smallpox epidemics continued throughout the nineteenth century, and plague epidemics affected Honolulu and San Francisco from 1899 until 1901. State governments generally relied on the cordon sanitaire as a geographic quarantine measure to control the movement of people into and out of affected communities. During the 1918 influenza pandemic, some communities instituted protective sequestration (sometimes referred to as "reverse quarantine") to keep the infected from introducing influenza into healthy populations. Most Western countries implemented a range of containment strategies, including isolation, surveillance, and the closure of schools, churches, theatres, and public events.

Sanitary conventions were also concluded between European states. A Soviet-Latvian sanitary convention was signed on 24 June 1922, for which ratifications were exchanged on 18 October 1923. A bilateral sanitary convention was concluded between the governments of Latvia and Poland on 7 July 1922, for which ratifications were exchanged on 7 April 1925. Another was concluded between the governments of Germany and Poland in Dresden on 18 December 1922, and entered into effect on 15 February 1923. Another one was signed between the governments of Poland and Romania on 20 December 1922. Ratifications were exchanged on 11 July 1923. The Polish government also concluded such a convention with the Soviet government on 7 February 1923, for which ratifications were exchanged on 8 January 1924. A sanitary convention was also concluded between the governments of Poland and Czechoslovakia on 5 September 1925, for which ratifications were exchanged on 22 October 1926. A convention was signed between the governments of Germany and Latvia on 9 July 1926, for which ratifications were exchanged on 6 July 1927.In 1897, the incubation period for this disease was determined and this was to be adopted for administrative purposes. The incubation period was comparatively short, some three or four days. After much discussion ten days was accepted by a majority. The principle of disease notification was unanimously adopted. Each government had to notify other governments of the existence of plague within their jurisdictions and state the measures of prevention being carried out to prevent its spread. The area declared infected was limited to the district or village where the disease prevailed, and no locality was deemed to be infected because of the importation into it of a few cases of plague while there has been no spread. It was decided during the prevalence of plague, every country had the right to close its land borders to traffic. At the Red Sea, it was decided after discussion a healthy vessel could pass through the Suez Canal and continue its voyage in the Mediterranean during the incubation period of the disease and that vessels passing through the Canal in quarantine might, subject to the use of the electric light, coal up in quarantine at Port Said by night or by day, and that passengers might embark in quarantine at that port. Infected vessels, if these carry a doctor and a disinfecting stove, have a right to navigate the Canal in quarantine and subject only to the landing of those who are suffering from plague.In the 20th and 21st centuries, people suspected of carrying infectious diseases have been quarantined, as in the cases of Andrew Speaker (multi-drug-resistant tuberculosis, 2007) and Kaci Hickox (Ebola, 2014). During the 1957–58 influenza pandemic and the 1968 flu pandemic, several countries implemented measures to control spread of the disease. In addition, the World Health Organization applied a global influenza surveillance network.During the 1994 plague in India, many people were quarantined. Vessels and aircraft carrying passengers were fumigated.In the SARS epidemic, thousands of Chinese people were quarantined and checkpoints to take temperatures were set up.Moving infected patients to isolation wards and home-based self-quarantine of people potentially exposed was the main way the Western African Ebola virus epidemic was ended in 2016; members of the 8th WHO Emergency Committee criticised international travel restrictions imposed during the epidemic as ineffective due to difficulty of enforcement, and counterproductive as they slowed down aid efforts. The People's Republic of China has employed mass quarantines – firstly of the city of Wuhan and subsequently of all of the Hubei province (population 55.5 million) – in the coronavirus disease 2019 pandemic. After a few weeks, the Italian government imposed lockdowns for the entire country (more than 60 million people) in an attempt to stop the spread of the disease there. India quarantined itself from the world for a period of one month. Most governments around the world restricted or advised against all non-essential travel to and from countries and areas affected by the outbreak. By late 2020, the virus had already spread within communities in large parts of the w

orld, with many not knowing where or how they were infected.

Eyam was a village in Britain that imposed a cordon sanitaire on itself to stop the
spread of the bubonic plague to other communities in 1665. The plague ran its course
over 14 months and one account states that it killed at least 260 villagers. The chu
rch in Eyam has a record of 273 individuals who were victims of the plague.

We don't know now what we found, *community* or *communities*. We find out like this:

In [6]:
```python
file = codecs.open('infect\Quarantine.txt','r','utf8')

for line in file:
    line = line.strip()
    result = re.search('(C|c)ommunit(y|ies)',line)
    if result:
        print(result.group(0))

file.close()
```

```
community
community
communities
communities
communities
```

We can also output the position in the string:

In [7]:
```python
file = codecs.open('infect\Quarantine.txt','r','utf8')

nr = 0
for line in file:
    nr+=1
    line = line.strip()
    result = re.search('(C|c)ommunit(y|ies)',line)
    if result:
        print(nr,result.group(0),result.start(),'-',result.end())


file.close()
```

```
7 community 1157 - 1166
20 community 812 - 821
30 communities 40 - 51
38 communities 4258 - 4269
159 communities 122 - 133
```

We now only find the first occurrence of the search pattern. We use the *findall()* function to find
all found locations. We'll look at that later. Now let's focus on the regular expressions.

Note that a * is not a wildcard, but means repeating the preceding one as often as you like. You
can use a dot (.) to match any character. If you have want to search a '.', you must use '\.' use.
Likewise, if you are looking for a parenthesis, you must precede it with the *backslash*.

Finally, another example in which we use repetition with a given lower and upper bound

In [8]:
```python
file = codecs.open('infect\Quarantine.txt','r','utf8')

nr = 0
for line in file:
    nr = nr+1
```

```
    result = re.search('[A-Z]{3,5}',line)
    if result:
        print(nr,result.group(0),result.start(),'-',result.end())

file.close()
```

```
2 SARS 396 - 400
38 SARS 3108 - 3112
73 COVID 198 - 203
89 AQIS 116 - 120
119 SARS 535 - 539
120 CDC 72 - 75
122 CDC 164 - 167
123 CDC 54 - 57
126 CDC 8 - 11
132 DGMQ 49 - 53
133 ACRP 534 - 538
143 COVID 2432 - 2437
148 MAF 0 - 3
191 COVID 4 - 9
193 COVID 11 - 16
199 COVID 550 - 555
220 COVID 78 - 83
230 NASA 56 - 60
252 ISBN 140 - 144
253 SARS 33 - 37
254 PMID 158 - 162
258 MRSA 83 - 87
260 SARS 15 - 19
261 PBS 28 - 31
262 PDF 89 - 92
```

Exercise

Try the following regular expressions and try to understand the expressions using the two tables in the slides.

1. '[A-Z]{3}'
2. '[A-Z]{3,}'
3. '(.*)'
4. '([^]*)'
5. '([^()]*)'
6. '(\w*)'
7. \d+. [A-Z][a-zä]+ [12][09][0-9][0-9]'
8. '\w+virus'

In [9]:
```
file = codecs.open('infect\Quarantine.txt','r','utf8')

nr = 0
for line in file:
    nr = nr+1
    result = re.search('[A-Z]{3}',line)
    if result:
        print(nr,result.group(0),result.start(),'-',result.end())

file.close()
```

```
2 SAR 396 - 399
38 SAR 3108 - 3111
```

```
73 COV 198 - 201
89 AQI 116 - 119
119 SAR 535 - 538
120 CDC 72 - 75
122 CDC 164 - 167
123 CDC 54 - 57
126 CDC 8 - 11
132 DGM 49 - 52
133 ACR 534 - 537
143 COV 2432 - 2435
148 MAF 0 - 3
191 COV 4 - 7
193 COV 11 - 14
199 COV 550 - 553
220 COV 78 - 81
230 NAS 56 - 59
252 ISB 140 - 143
253 SAR 33 - 36
254 PMI 158 - 161
258 MRS 83 - 86
260 SAR 15 - 18
261 PBS 28 - 31
262 PDF 89 - 92
```

In [10]:
```python
file = codecs.open('infect\Quarantine.txt','r','utf8')

nr = 0
for line in file:
    nr = nr+1
    result = re.search('[A-Z]{3,}',line)
    if result:
        print(nr,result.group(0),result.start(),'-',result.end())

file.close()
```

```
2 SARS 396 - 400
38 SARS 3108 - 3112
73 COVID 198 - 203
89 AQIS 116 - 120
119 SARS 535 - 539
120 CDC 72 - 75
122 CDC 164 - 167
123 CDC 54 - 57
126 CDC 8 - 11
132 DGMQ 49 - 53
133 ACRP 534 - 538
143 COVID 2432 - 2437
148 MAF 0 - 3
191 COVID 4 - 9
193 COVID 11 - 16
199 COVID 550 - 555
220 COVID 78 - 83
230 NASA 56 - 60
252 ISBN 140 - 144
253 SARS 33 - 37
254 PMID 158 - 162
258 MRSA 83 - 87
260 SARS 15 - 19
261 PBS 28 - 31
262 PDF 89 - 92
```

In [11]:
```python
file = codecs.open('infect\Quarantine.txt','r','utf8')
```

```python
nr = 0
for line in file:
    nr = nr+1
    result = re.search('(.*)',line)
    if result:
        print(nr,result.group(0),result.start(),'-',result.end())

file.close()
```

1 A quarantine is a restriction on the movement of people, animals and goods which i
s intended to prevent the spread of disease or pests. It is often used in connection
to disease and illness, preventing the movement of those who may have been exposed t
o a communicable disease, yet do not have a confirmed medical diagnosis. It is disti
nct from medical isolation, in which those confirmed to be infected with a communica
ble disease are isolated from the healthy population. Quarantine considerations are
often one aspect of border control. 0 - 538
2 The concept of quarantine has been known since biblical times, and is known to hav
e been practised through history in various places. Notable quarantines in modern hi
story include the village of Eyam in 1665 during the bubonic plague outbreak in Engl
and; East Samoa during the 1918 flu pandemic; the Diphtheria outbreak during the 192
5 serum run to Nome, the 1972 Yugoslav smallpox outbreak, the SARS pandemic, the Ebo
la pandemic and extensive quarantines applied throughout the world during the COVID-
19 pandemic since 2020. 0 - 525
3 Ethical and practical considerations need to be considered when applying quarantin
e to people. Practice differs from country to country; in some countries, quarantine
is just one of many measures governed by legislation relating to the broader concept
of biosecurity; for example, Australian biosecurity is governed by the single overar
ching Biosecurity Act 2015. 0 - 363
4 0 - 0
5 0 - 0
6 == Etymology and terminology == 0 - 31
7 The word quarantine comes from quarantena or quarantaine, meaning "forty days", us
ed in the Venetian language in the 14th and 15th centuries and also in France. The w
ord is designated in the period during which all ships were required to be isolated
before passengers and crew could go ashore during the Black Death plague. The quaran
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in the Republic of Ragusa, Dalmatia (modern Dubrovnik in Croatia).Merriam-Webster gi
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The word is also used as a verb.Quarantine is distinct from medical isolation, in wh
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healthy population.Quarantine may be used interchangeably with cordon sanitaire, and
although the terms are related, cordon sanitaire refers to the restriction of moveme
nt of people into or out of a defined geographic area, such as a community, in order
to prevent an infection from spreading. 0 - 1216
8 0 - 0
9 0 - 0
10 == History == 0 - 13
11 0 - 0
12 0 - 0
13 === Ancient === 0 - 15
14 An early mention of isolation occurs in the Biblical book of Leviticus, written i
n the 7th century BC or perhaps earlier, which describes the procedure for separatin
g out people infected with the skin disease Tzaraath. The medical nature of this iso
lation is, however, disputed. As traditional exegesis (dated 700 CE) sees it as a pu
nishment for trespassing one of several negative commandment, most notably Evil Spee
ch. A more recent hypothesis postulates that the infected are required to isolate th
emselves in order to prevent spread of disease (although the Bible does not imply co
ntagiousness of Tzaraath): 0 - 611
15 0 - 0
16 Anyone with such a defiling disease must wear torn clothes, let their hair be unk
empt, cover the lower part of their face and cry out, "Unclean! Unclean!" As long as
they have the disease they remain unclean. They must live alone; they must live outs

ide the camp. 0 - 263

17 0 - 0

18 0 - 0

19 === Medieval Islamic world === 0 - 30

20 The Islamic prophet Muhammad advised quarantine: "Those with contagious diseases should be kept away from those who are healthy." The Persian polymath Avicenna also recommended quarantine for patients with infectious diseases, especially tuberculosis.The mandatory hospital quarantine of special groups of patients, including those with leprosy, started early in Islamic history. Between 706 and 707 the sixth Umayyad caliph Al-Walid I built the first hospital in Damascus and issued an order to isolate those infected with leprosy from other patients in the hospital. The practice of mandatory quarantine of leprosy in general hospitals continued until the year 1431, when the Ottomans built a leprosy hospital in Edirne. Incidents of quarantine occurred throughout the Muslim world, with evidence of voluntary community quarantine in some of these reported incidents. 0 - 869

21 0 - 0

22 0 - 0

23 === Medieval Europe === 0 - 23

24 The word "quarantine" originates from quarantena, the Venetian language form, meaning "forty days". This is due to the 40-day isolation of ships and people practised as a measure of disease prevention related to the plague. Between 1348 and 1359, the Black Death wiped out an estimated 30% of Europe's population, and a significant percentage of Asia's population. Such a disaster led governments to establish measures of containment to handle recurrent epidemics. A document from 1377 states that before entering the city-state of Ragusa in Dalmatia (modern Dubrovnik in Croatia), newcomers had to spend 30 days (a trentine) in a restricted place (originally nearby islands) waiting to see whether the symptoms of Black Death would develop. In 1448 the Venetian Senate prolonged the waiting period to 40 days, thus giving birth to the term "quarantine". The forty-day quarantine proved to be an effective formula for handling outbreaks of the plague. Dubrovnik was the first city in Europe to set up quarantine sites such as the Lazzarettos of Dubrovnik where arriving ship personnel were held for up to 40 days. According to current estimates, the bubonic plague had a 37-day period from infection to death; therefore, the European quarantines would have been highly successful in determining the health of crews from potential trading and supply ships.Other diseases lent themselves to the practice of quarantine before and after the devastation of the plague. Those afflicted with leprosy were historically isolated long-term from society, and attempts were made to check the spread of syphilis in northern Europe after 1492, the advent of yellow fever in Spain at the beginning of the 19th century, and the arrival of Asiatic cholera in 1831. 0 - 1747

25 Venice took the lead in measures to check the spread of plague, having appointed three guardians of public health in the first years of the Black Death (1348). The next record of preventive measures comes from Reggio/Modena in 1374. Venice founded the first lazaret (on a small island adjoining the city) in 1403. In 1467 Genoa followed the example of Venice, and in 1476 the old leper hospital of Marseille was converted into a plague hospital. The great lazaret of Marseille, perhaps the most complete of its kind, was founded in 1526 on the island of Pomègues. The practise at all the Mediterranean lazarets did not differ from the English procedure in the Levantine and North African trade. On the arrival of cholera in 1831 some new lazarets were set up at western ports; notably, a very extensive establishment near Bordeaux. Afterwards, they were used for other purposes. 0 - 878

26 0 - 0

27 0 - 0

28 === Modern history === 0 - 22

29 0 - 0

30 Epidemics of yellow fever ravaged urban communities in North America throughout the late-eighteenth and early-nineteenth centuries, the best-known examples being the 1793 Philadelphia yellow fever epidemic and outbreaks in Georgia (1856) and Florida (1888). Cholera and smallpox epidemics continued throughout the nineteenth century, and plague epidemics affected Honolulu and San Francisco from 1899 until 1901. State governments generally relied on the cordon sanitaire as a geographic quarantine measure to control the movement of people into and out of affected communities. During the 1918 influenza pandemic, some communities instituted protective sequestration (sometimes referred to as "reverse quarantine") to keep the infected from introducing influenza into healthy populations. Most Western countries implemented a range of con

tainment strategies, including isolation, surveillance, and the closure of schools, churches, theatres, and public events. 0 - 961

31 0 - 0

32 In the 1830s, both the Ottoman Empire and Egypt established new quarantine systems. In 1831, Mehmet Ali of Egypt founded the Quarantine Board in Alexandria. In 1838, the Ottoman government installed the Supreme Council of Health, including the Quarantine Administration, in Istanbul. These two institutions set up permanent quarantines throughout the eastern Mediterranean, based on the western Mediterranean quarantine model. For example, at the port of Izmir, all ships and their cargo would be inspected and those suspected of carrying the plague would be towed to separate docks and their personnel housed in separate buildings for a determined period of time. In Thessaly, along the Greek-Turkish border, all travellers entering and exiting the Ottoman Empire would be quarantined for 9–15 days. Upon appearance of the plague, the quarantine stations would be militarised and the Ottoman army would be involved in border control and disease monitoring. 0 - 957

33 0 - 0

34 0 - 0

35 ==== International conventions 1852–1927 ==== 0 - 45

36 Since 1852, several conferences were held involving European powers, with a view to uniform action in keeping out infection from the East and preventing its spread within Europe. All but that of 1897 were concerned with cholera. No result came of those at Paris (1852), Constantinople (1866), Vienna (1874), and Rome (1885), but each of the subsequent ones doctrine of constructive infection of a ship as coming from a scheduled port, and an approximation to the principles advocated by Great Britain for many years. The principal countries which retained the old system at the time were Spain, Portugal, Turkey, Greece, and Russia (the British possessions at the time, Gibraltar, Malta, and Cyprus, being under the same influence). The aim of each international sanitary convention had been to bind the governments to a uniform minimum of preventive action, with further restrictions permissible to individual countries. The minimum specified by international conventions was very nearly the same as the British practice, which had been in turn adapted to continental opinion in the matter of the importation of rags. 0 - 1118

37 The Venice convention of 30 January 1892 dealt with cholera by the Suez Canal route; that of Dresden of 15 April 1893, with cholera within European countries; that of Paris of 3 April 1894, with cholera by the pilgrim traffic; and that of Venice, on 19 March 1897, was in connection with the outbreak of plague in the East, and the conference met to settle on an international basis the steps to be taken to prevent, if possible, its spread into Europe. An additional convention was signed in Paris on 3 December 1903.A multilateral international sanitary convention was concluded at Paris on 17 January 1912. This convention was most comprehensive and was designated to replace all previous conventions on that matter. It was signed by 40 countries, and consisted of 160 articles. Ratifications by 16 of the signatories were exchanged in Paris on 7 October 1920. Another multilateral convention was signed in Paris on 21 June 1926, to replace that of 1912. It was signed by 58 countries worldwide, and consisted of 172 articles.In Latin America, a series of regional sanitary conventions were concluded. Such a convention was concluded in Rio de Janeiro on 12 June 1904. A sanitary convention between the governments of Argentina, Brazil, Paraguay, and Uruguay was concluded in Montevideo on 21 April 1914. The convention covers cases of Asiatic cholera, oriental plague and yellow fever. It was ratified by the Uruguayan government on 13 October 1914, by the Paraguayan government on 27 September 1917 and by the Brazilian government on 18 January 1921. 0 - 1555

38 Sanitary conventions were also concluded between European states. A Soviet-Latvian sanitary convention was signed on 24 June 1922, for which ratifications were exchanged on 18 October 1923. A bilateral sanitary convention was concluded between the governments of Latvia and Poland on 7 July 1922, for which ratifications were exchanged on 7 April 1925. Another was concluded between the governments of Germany and Poland in Dresden on 18 December 1922, and entered into effect on 15 February 1923. Another one was signed between the governments of Poland and Romania on 20 December 1922. Ratifications were exchanged on 11 July 1923. The Polish government also concluded such a convention with the Soviet government on 7 February 1923, for which ratifications were exchanged on 8 January 1924. A sanitary convention was also concluded between the governments of Poland and Czechoslovakia on 5 September 1925, for which ratifications were exchanged on 22 October 1926. A convention was signed between the governments of Germany and Latvia on 9 July 1926, for which ratifications were exchan

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39 0 - 0
40 0 - 0
41 == Signals and flags == 0 - 23
42 0 - 0
43 Plain yellow, green, and even black flags have been used to symbolise disease in both ships and ports, with the colour yellow having a longer historical precedent, as a colour of marking for houses of infection, previous to its use as a maritime marking colour for disease. The former flag used for the purpose was the "Lima" (L) flag, which is a mixture of yellow and black flags previously used. It is sometimes called the "yellow jack" but this was also a name for yellow fever, which probably derives its common name from the flag, not the colour of the victims (cholera ships also used a yellow flag). The plain yellow flag ("Quebec" or Q in international maritime signal flags) probably derives its letter symbol for its initial use in quarantine, but this flag in modern times indicates the opposite—a ship that 'requests free pratique', i.e. that declares itself free of quarantinable disease, and requests boarding and routine port inspection.Ships in quarantine today would fly either the Q flag alone, meaning "My vessel is 'healthy' and I request free pratique", or the double Q flag (QQ), meaning "I require health clearance". 0 - 1139
44 0 - 0
45 0 - 0
46 == Ethical and practical considerations == 0 - 42
47 The quarantining of people often raises questions of civil rights, especially in cases of long confinement or segregation from society, such as that of Mary Mallon (also known as Typhoid Mary), a typhoid fever carrier who was arrested and quarantined in 1907 and later spent the last 23 years and 7 months of her life in medical iso

lation at Riverside Hospital on North Brother Island. 0 - 385

48 0 - 0

49 0 - 0

50 === The United Nations and the Siracusa Principles === 0 - 54

51 Guidance on when and how human rights can be restricted to prevent the spread of infectious disease is found in the Siracusa Principles, a non-binding document devel oped by the Siracusa International Institute for Criminal Justice and Human Rights a nd adopted by the United Nations Economic and Social Council in 1984. The Siracusa P rinciples state that restrictions on human rights under the International Covenant o n Civil and Political Rights must meet standards of legality, evidence-based necessi ty, proportionality, and gradualism, noting that public health can be used as ground s for limiting certain rights if the state needs to take measures 'aimed at preventi ng disease or injury or providing care for the sick and injured.' Limitations on rig hts (such as quarantine) must be 'strictly necessary,' meaning that they must: 0 - 8 31

52 0 - 0

53 respond to a pressing public or social need (health) 0 - 52

54 proportionately pursue a legitimate aim (prevent the spread of infectious diseas e) 0 - 82

55 be the least restrictive means required for achieving the purpose of the limitati on 0 - 83

56 be provided for and carried out in accordance with the law 0 - 58

57 be neither arbitrary nor discriminatory 0 - 39

58 only limit rights that are within the jurisdiction of the state seeking to impose the limitation.In addition, when quarantine is imposed, public health ethics specify that: 0 - 172

59 0 - 0

60 all restrictive actions must be well-supported by data and scientific evidence 0 - 78

61 all information must be made available to the public 0 - 52

62 all actions must be explained clearly to those whose rights are restricted and to the public 0 - 92

63 all actions must be subject to regular review and reconsideration.Finally, the st ate is ethically obligated to guarantee that: 0 - 126

64 0 - 0

65 infected people will not be threatened or abused 0 - 48

66 basic needs such as food, water, medical care, and preventive care will be provid ed 0 - 83

67 communication with loved ones and with caretakers will be permitted 0 - 67

68 constraints on freedom will be applied equally, regardless of social consideratio ns 0 - 83

69 patients will be compensated fairly for economic and material losses, including s alary. 0 - 87

70 0 - 0

71 0 - 0

72 === Psychological impact === 0 - 28

73 Quarantine can have adverse psychological effects on the quarantined, including p ost-traumatic stress, confusion, and anger. According to a "Rapid Review" published in The Lancet in response to the COVID-19 pandemic, "Stressors included longer quara ntine duration, infection fears, frustration, boredom, inadequate supplies, inadequa te information, financial loss, and stigma. Some researchers have suggested long-las ting effects. In situations where quarantine is deemed necessary, officials should q uarantine individuals for no longer than required, provide clear rationale for quara ntine and information about protocols, and ensure sufficient supplies are provided. Appeals to altruism by reminding the public about the benefits of quarantine to wide r society can be favourable." 0 - 782

74 0 - 0

75 0 - 0

76 === Short-term quarantines, e.g. for decontamination === 0 - 56

77 Quarantine periods can be very short, such as in the case of a suspected anthrax attack, in which people are allowed to leave as soon as they shed their potentially contaminated garments and undergo a decontamination shower. For example, an article entitled "Daily News workers quarantined" describes a brief quarantine that lasted u ntil people could be showered in a decontamination tent.The February–March 2003 issu

e of HazMat Magazine suggests that people be "locked in a room until proper decon co uld be performed", in the event of "suspect anthrax".Standard-Times senior correspon dent Steve Urbon (14 February 2003) describes such temporary quarantine powers: 0 - 664

78 0 - 0

79 Civil rights activists in some cases have objected to people being rounded up, st ripped and showered against their will. But Capt. Chmiel said local health authoriti es have "certain powers to quarantine people". 0 - 211

80 The purpose of such quarantine-for-decontamination is to prevent the spread of co ntamination and to contain the contamination such that others are not put at risk fr om a person fleeing a scene where contamination is suspect. It can also be used to l imit exposure, as well as eliminate a vector. 0 - 294

81 New developments for quarantine include new concepts in quarantine vehicles such as the ambulance bus, mobile hospitals, and lockdown/invacuation (inverse evacuatio n) procedures, as well as docking stations for an ambulance bus to dock to a facilit y under lockdown. 0 - 265

82 0 - 0

83 0 - 0

84 == Standard quarantine practices in different countries == 0 - 58

85 0 - 0

86 0 - 0

87 === Australia === 0 - 17

88 0 - 0

89 Biosecurity in Australia is governed by the Biosecurity Act 2015. The Australian Quarantine and Inspection Service (AQIS) is responsible for border inspection of pro ducts brought into Australia, and assesses the risks the products might harm Austral ian environment. No person, goods, and vessels are permitted into Australia without clearance from AQIS. Visitors are required to fill in the information card on arrivi ng in Australia. Besides other risk factors, visitors are required to declare what f ood and products made of wood and other natural materials they have. Visitors who fa il to do so may be subject to a fine of A\$444, or may face criminal prosecution and be fined up to A\$444,000 or imprisonment of up to 10 years.Australia has very strict quarantine standards. Quarantine in northern Australia is especially important becau se of its proximity to South-East Asia and the Pacific, which have many pests and di seases not present in Australia. For this reason, the region from Cairns to Broome—i ncluding the Torres Strait—is the focus for quarantine activities that protect all A ustralians. As Australia has been geographically isolated from other major continent s for millions of years, there is an endemically unique ecosystem free of several se vere pests and diseases that are present in many parts of the world. If other produc ts are brought inside along with pests and diseases, it would damage the ecosystem s eriously and add millions of costs in the local agricultural businesses. 0 - 1498

90 0 - 0

91 0 - 0

92 === Canada === 0 - 14

93 There are three quarantine Acts of Parliament in Canada: Quarantine Act (humans) and Health of Animals Act (animals) and Plant Protection Act (vegetations). The firs t legislation is enforced by the Canada Border Services Agency after a complete rewr ite in 2005. The second and third legislations are enforced by the Canadian Food Ins pection Agency. If a health emergency exists, the Governor in Council can prohibit i mportation of anything that it deems necessary under the Quarantine Act. 0 - 489

94 Under the Quarantine Act, all travellers must submit to screening and if they bel ieve they might have come into contact with communicable diseases or vectors, they m ust disclose their whereabouts to a Border Services Officer. If the officer has reas onable grounds to believe that the traveller is or might have been infected with a c ommunicable disease or refused to provide answers, a quarantine officer (QO) must be called and the person is to be isolated. If a person refuses to be isolated, any pea ce officer may arrest without warrant. 0 - 540

95 A QO who has reasonable grounds to believe that the traveller has or might have a communicable disease or is infested with vectors, after the medical examination of a traveller, can order him/her into treatment or measures to prevent the person from s preading the disease. QO can detain any traveller who refuses to comply with his/her orders or undergo health assessments as required by law. 0 - 392

96 Under the Health of Animals Act and Plant Protection Act, inspectors can prohibit access to an infected area, dispose or treat any infected or suspected to be infecte

d animals or plants. The Minister can order for compensation to be given if animals/ plants were destroyed pursuant to these acts. 0 - 295

97 Each province also enacts its own quarantine/environmental health legislation. 0 - 78

98 0 - 0

99 0 - 0

100 === Hong Kong === 0 - 17

101 Under the Prevention and Control of Disease Ordinance (HK Laws. Chap 599), a health officer may seize articles they believe to be infectious or containing infectious agents. All travellers, if requested, must submit themselves to a health officer. Failure to do so is against the law and is subject to arrest and prosecution. 0 - 325

102 The law allows for health officers who have reasonable grounds to detain, isolate, quarantine anyone or anything believed to be infected, and to restrict any articles from leaving a designated quarantine area. He/she may also order the Civil Aviation Department to prohibit the landing or leaving, embarking or disembarking of an aircraft. This power also extends to land, sea or air crossings. 0 - 394

103 Under the same ordinance, any police officer, health officer, member of the Civil Aid Service, or member of the Auxiliary Medical Service can arrest a person who obstructs or escapes from detention. 0 - 198

104 0 - 0

105 0 - 0

106 === United Kingdom === 0 - 22

107 To reduce the risk of introducing rabies from continental Europe, the United Kingdom used to require that dogs, and most other animals introduced to the country, spend six months in quarantine at an HM Customs and Excise pound; this policy was abolished in 2000 in favour of a scheme generally known as Pet Passports, where animals can avoid quarantine if they have documentation showing they are up to date on their appropriate vaccinations. 0 - 442

108 0 - 0

109 0 - 0

110 ==== British maritime quarantine rules 1711–1896 ==== 0 - 53

111 The plague had disappeared from England for more than thirty years before the practice of quarantine against it was definitely established by the Quarantine Act 1710 (9 Ann.). The first act was called for due to fears that the plague might be imported from Poland and the Baltic region. The second act of 1721 was due to the prevalence of plague at Marseille and other places in Provence, France. It was renewed in 1733 after a new outbreak in continental Europe, and again in 1743, due to an epidemic in Messina. In 1752 a rigorous quarantine clause was introduced into an act regulating trade with the Levant, and various arbitrary orders were issued during the next twenty years to meet the supposed danger of infection from the Baltic region. Although no plague cases ever came to England during that period, the restrictions on traffic became more stringent, and in 1788 a very strict Quarantine Act was passed, with provisions affecting cargoes in particular. The act was revised in 1801 and 1805, and in 1823–24 an elaborate inquiry was followed by an act making quarantine only at discretion of the privy council, which recognised yellow fever or other highly infectious diseases as calling for quarantine, along with plague. The threat of cholera in 1831 was the last occasion in England of the use of quarantine restrictions. Cholera affected every country in Europe, despite all efforts to keep it out. When cholera returned to England in 1849, 1853 and 1865–66, no attempt was made to seal the ports. In 1847 the privy council ordered all arrivals with a clean bill of health from the Black Sea and the Levant to be admitted, provided there had been no case of plague during the voyage, and afterwards the practice of quarantine was discontinued.After the passing of the first Quarantine Act (1710) the protective practices in England were haphazard and arbitrary. In 1721 two vessels carrying cotton goods from Cyprus, then affected by the plague, were ordered to be burned with their cargoes, the owners receiving an indemnity. By the clause in the Levant Trade Act of 1752, ships arriving in the United Kingdom with a "foul bill" (i.e. coming from a country where plague existed) had to return to the lazarets of Malta, Venice, Messina, Livorno, Genoa, or Marseille, to complete a quarantine or to have their cargoes opened and aired. Since 1741 Stangate Creek (on the Medway) had been the quarantine station but it was available only for vessels with clean bills of health. In 1755 lazarets in the form of floating hulks were established in England for the first time, the cleansing of cargo (particularly by exposure to dews) having been done previously on the ship's deck. N

o medical inspections were conducted, but control was the responsibility of the Offi cers of Royal Customs and quarantine. In 1780, when plague was in Poland, even vesse ls with grain from the Baltic region had to spend forty days in quarantine, and unpa ck and air their cargoes, but due to complaints mainly from Edinburgh and Leith, an exception was made for grain after that date. About 1788 an order of the council req uired every ship liable to quarantine to hoist a yellow flag in the daytime and show a light at the main topmast head at night, in case of meeting any vessel at sea, or upon arriving within four leagues of the coast of Great Britain or Ireland.After 180 0, ships from plague-affected countries (or with foul bills) were permitted to compl ete their quarantine in the Medway instead of at a Mediterranean port on the way, an d an extensive lazaret was built on Chetney Hill near Chatham (although it was later demolished). The use of floating hulks as lazarets continued as before. In 1800 two ships with hides from Mogador in Morocco were ordered to be sunk with their cargoes at the Nore, the owners receiving an indemnity. Animal hides were suspected of harbo uring infections, along with a long list of other items, and these had to be exposed on the ship's deck for twenty-one days or less (six days for each instalment of the cargo), and then transported to the lazaret, where they were opened and aired for an other forty days. The whole detention of the vessel was from sixty to sixty-five day s, including the time for reshipment of her cargo. Pilots had to pass fifteen days o n board a convalescent ship. From 1846 onwards the quarantine establishments in the United Kingdom were gradually reduced, while the last vestige of the British quarant ine law was removed by the Public Health Act of 1896, which repealed the Quarantine Act of 1825 (with dependent clauses of other acts), and transferred from the privy c ouncil to the Local Government Board the powers to deal with ships arriving infected with yellow fever or plague. The powers to deal with cholera ships had been already transferred by the Public Health Act 1875.British regulations of 9 November 1896 app lied to yellow fever, plague and cholera. Officers of the Customs, as well as of Roy al Coast Guard and the Board of Trade (for signalling), were empowered to take the i nitial steps. They certified in writing the master of a supposedly infected ship, an d detained the vessel provisionally for not more than twelve hours, giving notice me anwhile to the port sanitary authority. The medical officer of the port boarded the ship and examined every person in it. Every person found infected was taken to a hos pital and quarantined under the orders of the medical officer, and the vessel remain ed under his orders. Every person suspected could be detained on board for 48 hours or removed to the hospital for a similar period. All others were free to land upon g iving the addresses of their destinations to be sent to the respective local authori ties, so that the dispersed passengers and crew could be kept individually under obs ervation for a few days. The ship was then disinfected, dead bodies buried at sea, i nfected clothing, bedding, etc., destroyed or disinfected, and bilge-water and water -ballast pumped out at a suitable distance before the ship entered a dock or basin. Mail was subject to no detention. A stricken ship within 3 miles of the shore had to fly a yellow and black flag at the main mast from sunrise to sunset. 0 - 6209
112 0 - 0
113 0 - 0
114 === United States === 0 - 21
115 In the United States, authority to quarantine people with infectious diseases is split between the state and federal governments. States (and tribal governments reco gnised by the federal government) have primary authority to quarantine people within their boundaries. Federal jurisdiction only applies to people moving across state or national borders, or people on federal property. 0 - 383
116 0 - 0
117 0 - 0
118 ==== Federal rules ==== 0 - 23
119 Communicable diseases for which apprehension, detention, or conditional release of people are authorised must be specified in Executive Orders of the President. As of 2014, these include Executive Orders 13295 13375, and 13674; the latest executive order specifies the following infectious diseases: cholera, diphtheria, infectious t uberculosis, plague, smallpox, yellow fever, viral haemorrhagic fevers (Lassa, Marbu rg, Ebola, Crimean-Congo, South American, and others not yet isolated or named), sev ere acute respiratory syndromes (SARS), and influenza from a novel or re-emergent so urce.The Department of Health and Human Services is responsible for quarantine decis ions, specifically the Centers for Disease Control and Prevention's Division of Glob al Migration and Quarantine. As of 21 March 2017, Centers for Disease Control and Pr evention (CDC) regulations specify: 0 - 873

120 All commercial passenger flights must report deaths or illnesses to the CDC. 0 - 76

121 Individuals must apply for a travel permit if they are under a Federal quarantine, isolation, or conditional release order. 0 - 123

122 When an individual who is moving between U.S. states is "reasonably believed to be infected" with a quarantinable communicable disease in a "qualifying stage", the CDC may apprehend or examine that individual for potential infection. 0 - 233

123 This includes new regulatory authority permitting the CDC Director to prohibit the importation of animals or products that pose a threat to public health.The rules: 0 - 164

124 0 - 0

125 Do not authorise compulsory medical testing, vaccination, or medical treatment without prior informed consent. 0 - 110

126 Require CDC to advise individuals subject to medical examinations that they will be conducted by an authorised health worker and with prior informed consent. 0 - 157

127 Include strong due process protections for individuals subject to public health orders, including a right to counsel for indigent individuals. 0 - 142

128 Limit to 72 hours the amount of time that an individual may be apprehended pending the issuance of a federal order for isolation, quarantine, or conditional release. 0 - 165

129 0 - 0

130 0 - 0

131 ==== US quarantine facilities ==== 0 - 34

132 The Division of Global Migration and Quarantine (DGMQ) of the US Centers for Disease Control (CDC) operates small quarantine facilities at a number of US ports of entry. As of 2014, these included one land crossing (in El Paso, Texas) and 19 international airports. 0 - 265

133 Besides the port of entry where it is located, each station is also responsible for quarantining potentially infected travellers entering through any ports of entry in its assigned region. These facilities are fairly small; each one is operated by a few staff members and capable of accommodating 1–2 travellers for a short observation period. Cost estimates for setting up a temporary larger facility, capable of accommodating 100 to 200 travellers for several weeks, have been published by the Airport Cooperative Research Program (ACRP) in 2008 of the Transportation Research Board. 0 - 585

134 0 - 0

135 0 - 0

136 ==== US quarantine of imported goods ==== 0 - 41

137 The United States puts immediate quarantines on imported products if a contagious disease is identified and can be traced back to a certain shipment or product. All imports will also be quarantined if the disease appears in other countries. According to Title 42 U.S.C. §§264 and 266 Archived 24 September 2015 at the Wayback Machine, these statutes provide the Secretary of Health and Human Services peacetime and wartime authority to control the movement of people into and within the United States to prevent the spread of communicable disease. 0 - 547

138 0 - 0

139 0 - 0

140 ==== History of quarantine laws in the US ==== 0 - 46

141 0 - 0

142 Quarantine law began in Colonial America in 1663, when in an attempt to curb an outbreak of smallpox, the city of New York established a quarantine. In the 1730s, the city built a quarantine station on the Bedloe's Island. The Philadelphia Lazaretto was the first quarantine hospital in the United States, built in 1799, in Tinicum Township, Delaware County, Pennsylvania. There are similar national landmarks such as the Columbia River Quarantine Station, Swinburne Island and Angel Island. The Pest House in Concord, Massachusetts was used as early as 1752 to quarantine those suffering from cholera, tuberculosis and smallpox. 0 - 631

143 In early June 1832, during the cholera epidemic in New York, Governor Enos Throop called a special session of the Legislature for 21 June, to pass a Public Health Act by both Houses of the State Legislature. It included to a strict quarantine along the Upper and Lower New York-Canadian frontier. In addition, New York City Mayor Walter Browne established a quarantine against all peoples and products of Europe and Asia, which prohibited ships from approaching closer than 300 yards to the city, and all vehicles were ordered to stop 1.5 miles away.The Immigrant Inspection Station on

Ellis Island, built in 1892, is often mistakenly assumed to have been a quarantine s
tation, however its marine hospital (Ellis Island Immigrant Hospital) only qualified
as a contagious disease facility to handle less virulent diseases like measles, trac
homa and less advanced stages of tuberculosis and diphtheria; those afflicted with s
mallpox, yellow fever, cholera, leprosy or typhoid fever, could neither be received
nor treated there. Mary Mallon was quarantined in 1907 under the Greater New York Ch
arter, Sections 1169–1170, which permitted the New York City Board of Health to "rem
ove to a proper place…any person sick with any contagious, pestilential or infectiou
s disease."During the 1918 flu pandemic, people were also quarantined. Most commonly
suspect cases of infectious diseases are requested to voluntarily quarantine themsel
ves, and Federal and local quarantine statutes only have been uncommonly invoked sin
ce then, including for a suspected smallpox case in 1963.The 1944 Public Health Serv
ice Act "to apprehend, detain, and examine certain infected persons who are peculiar
ly likely to cause the interstate spread of disease" clearly established the federal
government's quarantine authority for the first time. It gave the United States Publ
ic Health Service responsibility for preventing the introduction, transmission and s
pread of communicable diseases from foreign countries into the United States, and ex
panded quarantine authority to include incoming aircraft. The act states that "...an
y individual reasonably believed to be infected with a communicable disease in a qua
lifying stage and...if found to be infected, may be detained for such time and in su
ch manner as may be reasonably necessary."No federal quarantine orders were issued f
rom 1963 until 2020, as American citizens were evacuated from China during the COVID
-19 pandemic. 0 - 2450
144 0 - 0
145 0 - 0
146 === List of quarantine services in the world === 0 - 48
147 Australian Quarantine and Inspection Service 0 - 44
148 MAF Quarantine Service, in the New Zealand 0 - 42
149 Quarantine, Western Australia 0 - 29
150 Samoa Quarantine Service, in the West Samoa 0 - 43
151 Racehorse & Equine Quarantine Services, A company built & developed by Frankie T
hevarasa Kuala Lumpur Malaysia 0 - 110
152 Federal Service for Supervision of Consumer Rights Protection and Human Welfare,
a Federal Quarantine Service of the Government of Russia. 0 - 138
153 0 - 0
154 0 - 0
155 == Notable quarantines == 0 - 25
156 0 - 0
157 0 - 0
158 === Eyam village, 1665 (plague) === 0 - 35
159 Eyam was a village in Britain that imposed a cordon sanitaire on itself to stop
the spread of the bubonic plague to other communities in 1665. The plague ran its co
urse over 14 months and one account states that it killed at least 260 villagers. Th
e church in Eyam has a record of 273 individuals who were victims of the plague. 0 -
328
160 0 - 0
161 0 - 0
162 === Convict ship Surry, Sydney Harbour, 1814 (typhoid) === 0 - 58
163 0 - 0
164 On 28 July 1814, the convict ship Surry arrived in Sydney Harbour from England.
Forty-six people had died of typhoid during the voyage, including 36 convicts, and t
he ship was placed in quarantine on the North Shore. Convicts were landed, and a cam
p was established in the immediate vicinity of what is now Jeffrey Street in Kirribi
lli. This was the first site in Australia to be used for quarantine purposes. 0 - 40
9
165 0 - 0
166 0 - 0
167 === 'Typhoid Mary' (US), 1907–1910 and 1915–1938 === 0 - 52
168 Mary Mallon was a cook who was found to be a carrier of Salmonella enterica subs
p. enterica, the cause of typhoid fever, and was forcibly isolated from 1907 to 191
0. At least 53 cases of the infection were traced to her, and three deaths. Subseque
ntly she spent a further 23 years in isolation prior to her death in 1938. The prese
nce of the bacteria in her gallbladder was confirmed on autopsy. 0 - 395
169 0 - 0

170 0 - 0
171 === East Samoa, 1918 (flu pandemic) === 0 - 39
172 During the 1918 flu pandemic, the then Governor of American Samoa, John Martin P
oyer, imposed a full protective sequestration of the islands from all incoming ship
s, successfully preventing influenza from infecting the population and thus achievin
g zero deaths within the territory. In contrast, the neighbouring New Zealand-contro
lled Western Samoa was among the hardest hit, with a 90% infection rate and over 20%
of its adults dying from the disease. This failure by the New Zealand government to
prevent and contain the Spanish Flu subsequently rekindled Samoan anti-colonial sent
iments that led to its eventual independence. 0 - 629
173 0 - 0
174 0 - 0
175 === Gruinard Island, 1942–1990 (anthrax) === 0 - 44
176 In 1942, during World War II, British forces tested out their biological weapons
program on Gruinard Island and infected it with anthrax. Subsequently a quarantine o
rder was placed on the island. The quarantine was lifted in 1990, when the island wa
s declared safe, and a flock of sheep was released onto the island. 0 - 316
177 0 - 0
178 0 - 0
179 === Apollo series space explorers, 1969–1971 === 0 - 48
180 Between 24 July 1969 and 9 February 1971, the astronauts of Apollo 11, Apollo 1
2, and Apollo 14, were quarantined (in each case for a total of 21 days) after retur
ning to Earth, initially where they were recovered, and then were transferred to the
Lunar Receiving Laboratory, to prevent possible interplanetary contamination by micr
oorganisms from the Moon. All lunar samples were also held in the biosecure environm
ent of the Lunar Receiving Laboratory for initial assay. 0 - 472
181 0 - 0
182 0 - 0
183 === Yugoslavia, 1972 (smallpox) === 0 - 35
184 The 1972 Yugoslav smallpox outbreak was the final outbreak of smallpox in Europ
e. The World Health Organization fought the outbreak with extensive quarantine and a
cordon sanitaire, and the government instituted martial law. 0 - 224
185 0 - 0
186 0 - 0
187 === Case of Kaci Hickox' return to US, 2014 (Ebola) === 0 - 55
188 In 2014, Kaci Hickox, a Doctors Without Borders nurse from Maine, legally battle
d 21-day quarantines imposed by the states of New Jersey and Maine after returning h
ome from treating Ebola patients in Sierra Leone. "Hickox was sequestered in a medic
al tent for days because New Jersey announced new Ebola regulations the day she arri
ved. She eventually was allowed to travel to Maine, where the state sought to impose
a 'voluntary quarantine' before trying and failing to create a buffer between her an
d others. A state judge rejected attempts to restrict her movements, saying she pose
d no threat as long as she wasn't demonstrating any symptoms of Ebola. Hickox said h
ealth care professionals like those at the U.S. Centers for Disease Control and Prev
ention – not politicians like New Jersey Gov. Chris Christie and Maine Gov. Paul LeP
age – should be in charge of making decisions that are grounded in science, not fea
r." 0 - 923
189 0 - 0
190 0 - 0
191 === COVID-19 pandemic, 2020–present === 0 - 39
192 0 - 0
193 During the COVID-19 pandemic, multiple governmental actors enacted quarantines i
n an effort to curb the rapid spread of the virus. Quarantine-like restrictions on m
ovement included curfews and restrictions variously described as stay-at-home order
s, shelter-in-place orders, shutdowns or lockdowns. 0 - 298
194 On 26 March 2020, 1.7 billion people worldwide were under some form of lockdown,
which increased to 2.6 billion people two days later—around a third of the world's p
opulation. 0 - 175
195 0 - 0
196 0 - 0
197 ==== Hubei ==== 0 - 15
198 0 - 0
199 In Hubei, the origin of the epidemic, a cordon sanitaire was imposed on Wuhan an
d other major cities in China, affecting around 500 million people, which is unprece

dented in scale in human history, to limit the rate of spread of the disease. The 'l ockdown' of Wuhan, and subsequently a wider-scale 'lockdown' throughout Hubei provin ce, began on 23 January 2020. At this stage, the spread of the virus in mainland Chi na was running at approximately 50% growth in cases per day. On 8 February, the dail y rate of spread fell below 10%. For figures, see COVID-19 pandemic in Mainland Chin a. 0 - 586

200 0 - 0

201 0 - 0

202 ==== Italy ==== 0 - 15

203 0 - 0

204 As the outbreak spread there, beginning 22 February 2020, a cordon sanitaire was imposed on a group of at least 10 different municipalities in Northern Italy, effect ively quarantining more than 50,000 people. This followed a second day when the decl ared detected cases leapt enormously (the period from 21 to 23 February saw daily in creases of 567%, 295% and 90% respectively). A week later the rate of increase of ca ses in Italy was significantly reduced (the period from 29 February to 4 March saw d aily increases of 27%, 50%, 20%, 23%, and 23%). 0 - 548

205 On 8 March 2020, a much wider region of Northern Italy was placed under quaranti ne restrictions, involving around 16 million people. On the next day, the quarantin e was extended to the whole of Italy, effective on 10 March 2020, placing roughly 60 million people under quarantine.A team of Chinese experts, together with some 31 ton nes of supplies, arrived in Rome on 13 March 2020 to help Italy fight the virus.On 2 2 March 2020, Russia sent nine Ilyushin 76 planes with expert virologists, epidemiol ogists, medical equipment, and pharmaceuticals in a humanitarian aid operation that Italian media dubbed "From Russia With Love".Eventually the lockdown was extended un til 3 May, although starting from 14 April stationery shops, bookshops, and children clothing's shops were allowed to open.On 26 April 2020, the so-called "Phase 2" was announced, to start from 4 May. Movements across regions were still forbidden, while movements between municipalities were allowed only to visit relatives or for work an d health reasons. Moreover, closed factories could re-open, but schools, bars, resta urants, and barbers were still closed.As at 4 May 2020, when new cases were running around 0.5%, (ca. 1600 persons) per day and consistently falling, it was expected th at museums and retailers might reopen from 18 May, while hairdressers, bars and rest aurants were expected to reopen fully on 1 June.Regional lockdowns were subsequently imposed as further waves of the virus spread through the country. 0 - 1493

206 0 - 0

207 0 - 0

208 ==== Rest of Europe ==== 0 - 24

209 0 - 0

210 As cases of the virus spread to and took hold in more European countries, many f ollowed the earlier examples of China and Italy and began instituting policies of lo ckdown. Notable among these were Ireland (where schools were closed in mid March for the rest of the month, and limits were set on sizes of meetings), Spain (where a loc kdown was announced on 14 March), Czech Republic, Norway, Denmark, Iceland, Poland, Turkey, and France, while the United Kingdom noticeably lagged behind in adopting su ch measures.As of 18 March 2020, more than 250 million people were in lockdown acros s Europe. 0 - 594

211 0 - 0

212 0 - 0

213 ==== Rest of the world ==== 0 - 27

214 0 - 0

215 In the immediate context of the start of the pandemic in Wuhan, countries neighb ouring or close to China adopted a cautious approach. For example, Sri Lanka, Macau, Hong Kong, Vietnam, Japan, and South Korea had all imposed some degree of lockdown b y 19 February. As countries across the world reported escalating case numbers and de aths, more and more countries began to announce travel restrictions and lockdowns. A frica and Latin America were relatively delayed in the spread of the virus, but even on these continents, countries began to impose travel bans and lockdowns. Brazil and Mexico began lockdowns in late February and much of the rest of Latin America follow ed suit in early March. Much of Africa was on lockdown by the start of April. Kenya, for example, blocked certain international flights and subsequently placed a ban on 'global' meetings.As of 1 April 2020, more than 280 million people, or about 86% of the population, were under some form of lockdown in the United States, 59 million pe ople were in lockdown in South Africa, and 1.3 billion people were in lockdown in In

dia. 0 - 1096
216 0 - 0
217 0 - 0
218 == Self-quarantine == 0 - 21
219 0 - 0
220 Self-quarantine (or self-isolation) is a popular term that emerged during the CO
VID-19 pandemic, which spread to most countries in 2020. Citizens able to do so were
encouraged to stay home to curb the spread of the disease. 0 - 223
221 0 - 0
222 0 - 0
223 == Other uses == 0 - 16
224 U.S. President John F. Kennedy euphemistically referred to the U.S. Navy's inter
diction of shipping en route to Cuba during the Cuban Missile Crisis as a "quarantin
e" rather than a blockade, because a quarantine is a legal act in peacetime, whereas
a blockade is defined as an act of aggression under the U.N. Charter.In computer sci
ence, "quarantining" describes putting files infected by computer viruses into a spe
cial directory, so as to eliminate the threat they pose, without irreversibly deleti
ng them.The Spanish term for quarantine, (la) cuarentena, refers also to the period
of postpartum confinement in which a new mother and her baby are sheltered from the
outside world. 0 - 683
225 0 - 0
226 0 - 0
227 == See also == 0 - 14
228 Biosecurity – Set of preventive measures designed to reduce the risk of transmis
sion of infectious diseases 0 - 107
229 Epidemiology – Aspect of health and disease science 0 - 51
230 Extra-Terrestrial Exposure Law – Regulations adopted by NASA to guard the Earth
against any harmful contamination 0 - 113
231 Infection control 0 - 17
232 Isolation (health care) – Measure taken to prevent contagious diseases from bein
g spread 0 - 88
233 Lazaretto – Quarantine station for maritime travellers 0 - 54
234 Lytton Quarantine Station – Heritage-listed former quarantine station in Brisban
e, Queensland, Australia 0 - 104
235 Pest house – Building used for persons afflicted with communicable diseases 0 -
75
236 Protective sequestration – Public health term 0 - 45
237 Quaranup, a former quarantine station in Albany, Western Australia 0 - 66
238 Social distancing – Infection control technique by keeping a distance from each
other 0 - 85
239 0 - 0
240 0 - 0
241 == Notes == 0 - 11
242 0 - 0
243 0 - 0
244 == References == 0 - 16
245 0 - 0
246 0 - 0
247 == Sources == 0 - 13
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holm, Hugh, ed. (1911). "Quarantine". Encyclopædia Britannica (11th ed.). Cambridge
University Press. 0 - 181
249 0 - 0
250 0 - 0
251 == Further reading == 0 - 21
252 Howard Markel (1999). Quarantine!: East European Jewish Immigrants and the New Y
ork City Epidemics of 1892. Johns Hopkins University Press. ISBN 978-0801861802. 0 -
160
253 Rothstein, Mark A. (2015). "From SARS to Ebola: Legal and Ethical Considerations
for Modern Quarantine". Indiana Health Law Review. 12: 227–280. doi:10.18060/18963.
0 - 164
254 Frati, P. (2000). "Quarantine, trade and health policies in Ragusa-Dubrovnik unt
il the age of George Armmenius-Baglivi". Medicina Nei Secoli. 12 (1): 103–27. PMID 1
1624707. 0 - 172

255 0 - 0
256 0 - 0
257 == External links == 0 - 20
258 Ayliffe, Graham A. J.; Mary P. English (2003). Hospital infection, From Miasmas
to MRSA (PDF). Cambridge University Press. – Hardback ISBN 0 521 81935 0; paperback
ISBN 0 521 53178 0 0 - 182
259 Emerging Infectious Diseases – Contents, Volume 11, Number 2 Archived 1 February
2020 at the Wayback Machine, February 2005 0 - 123
260 Quarantine for SARS, Taiwan Archived 1 February 2020 at the Wayback Machine, Feb
ruary 2005, wwwnc.cdc.gov 0 - 105
261 History of quarantine (from PBS NOVA) 0 - 37
262 Cole, Jared P. (9 October 2014). "Federal and State Quarantine and Isolation Aut
hority" (PDF). Congressional Research Service. 0 - 126

In [12]:

```python
file = codecs.open('infect\Quarantine.txt','r','utf8')

nr = 0
for line in file:
    nr = nr+1
    result = re.search('([^ ]*)',line)
    if result:
        print(nr,result.group(0),result.start(),'-',result.end())

file.close()
```

1 A 0 - 1
2 The 0 - 3
3 Ethical 0 - 7
4
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5
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6 == 0 - 2
7 The 0 - 3
8
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9
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10 == 0 - 2
11
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12
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13 === 0 - 3
14 An 0 - 2
15
 0 - 1
16 Anyone 0 - 6
17
 0 - 1
18
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19 === 0 - 3
20 The 0 - 3
21
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22
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23 === 0 - 3
24 The 0 - 3
25 Venice 0 - 6
26
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27
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28 === 0 - 3
29
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30 Epidemics 0 - 9
31
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32 In 0 - 2
33
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34
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35 ==== 0 - 4
36 Since 0 - 5
37 The 0 - 3
38 Sanitary 0 - 8
39
 0 - 1
40
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41 == 0 - 2
42
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43 Plain 0 - 5
44
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45
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46 == 0 - 2
47 The 0 - 3
48
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49
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50 === 0 - 3
51 Guidance 0 - 8
52
 0 - 1
53 respond 0 - 7
54 proportionately 0 - 15
55 be 0 - 2
56 be 0 - 2
57 be 0 - 2
58 only 0 - 4
59
 0 - 1
60 all 0 - 3
61 all 0 - 3
62 all 0 - 3
63 all 0 - 3
64
 0 - 1
65 infected 0 - 8
66 basic 0 - 5
67 communication 0 - 13
68 constraints 0 - 11
69 patients 0 - 8
70
 0 - 1
71
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72 === 0 - 3
73 Quarantine 0 - 10
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74
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75
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76 === 0 - 3
77 Quarantine 0 - 10
78
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79 Civil 0 - 5
80 The 0 - 3
81 New 0 - 3
82
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84 == 0 - 2
85
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86
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87 === 0 - 3
88
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89 Biosecurity 0 - 11
90
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91
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92 === 0 - 3
93 There 0 - 5
94 Under 0 - 5
95 A 0 - 1
96 Under 0 - 5
97 Each 0 - 4
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100 === 0 - 3
101 Under 0 - 5
102 The 0 - 3
103 Under 0 - 5
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106 === 0 - 3
107 To 0 - 2
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110 ==== 0 - 4
111 The 0 - 3
112
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113
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114 === 0 - 3
115 In 0 - 2
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118 ==== 0 - 4
119 Communicable 0 - 12
120 All 0 - 3
121 Individuals 0 - 11
122 When 0 - 4
123 This 0 - 4
124
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125 Do 0 - 2
126 Require 0 - 7
127 Include 0 - 7
128 Limit 0 - 5
129
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130
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131 ==== 0 - 4
132 The 0 - 3
133 Besides 0 - 7
134
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135
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136 ==== 0 - 4
137 The 0 - 3
138
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139
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140 ==== 0 - 4
141
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142 Quarantine 0 - 10
143 In 0 - 2
144
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145
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146 === 0 - 3
147 Australian 0 - 10
148 MAF 0 - 3
149 Quarantine, 0 - 11
150 Samoa 0 - 5
151 Racehorse 0 - 9
152 Federal 0 - 7
153
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154
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155 == 0 - 2
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157
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158 === 0 - 3
159 Eyam 0 - 4
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162 === 0 - 3
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164 On 0 - 2
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165
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167 === 0 - 3
168 Mary 0 - 4
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171 === 0 - 3
172 During 0 - 6
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174
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175 === 0 - 3
176 In 0 - 2
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179 === 0 - 3
180 Between 0 - 7
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182
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183 === 0 - 3
184 The 0 - 3
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187 === 0 - 3
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191 === 0 - 3
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193 During 0 - 6
194 On 0 - 2
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197 ==== 0 - 4
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204 As 0 - 2
205 On 0 - 2
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208 ==== 0 - 4
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210 As 0 - 2
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213 ==== 0 - 4
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215 In 0 - 2
216
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217
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218 == 0 - 2
219
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220 Self-quarantine 0 - 15
221
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222
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223 == 0 - 2
224 U.S. 0 - 4
225
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226
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227 == 0 - 2
228 Biosecurity 0 - 11
229 Epidemiology 0 - 12
230 Extra-Terrestrial 0 - 17
231 Infection 0 - 9
232 Isolation 0 - 9
233 Lazaretto 0 - 9
234 Lytton 0 - 6
235 Pest 0 - 4
236 Protective 0 - 10
237 Quaranup, 0 - 9
238 Social 0 - 6
239
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241 == 0 - 2
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244 == 0 - 2
245
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246
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247 == 0 - 2
248 This 0 - 4
249
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251 == 0 - 2
252 Howard 0 - 6
253 Rothstein, 0 - 10
254 Frati, 0 - 6
255
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256
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257 == 0 - 2
258 Ayliffe, 0 - 8
259 Emerging 0 - 8
260 Quarantine 0 - 10
261 History 0 - 7
262 Cole, 0 - 5
```

In [13]:
```python
file = codecs.open('infect\Quarantine.txt','r','utf8')

nr = 0
for line in file:
    nr = nr+1
    result = re.search('([^()]*)',line)
    if result:
        print(nr,result.group(0),result.start(),'-',result.end())

file.close()
```

```
1 A quarantine is a restriction on the movement of people, animals and goods which i
s intended to prevent the spread of disease or pests. It is often used in connection
to disease and illness, preventing the movement of those who may have been exposed t
o a communicable disease, yet do not have a confirmed medical diagnosis. It is disti
nct from medical isolation, in which those confirmed to be infected with a communica
ble disease are isolated from the healthy population. Quarantine considerations are
often one aspect of border control.
 0 - 539
2 The concept of quarantine has been known since biblical times, and is known to hav
e been practised through history in various places. Notable quarantines in modern hi
story include the village of Eyam in 1665 during the bubonic plague outbreak in Engl
and; East Samoa during the 1918 flu pandemic; the Diphtheria outbreak during the 192
5 serum run to Nome, the 1972 Yugoslav smallpox outbreak, the SARS pandemic, the Ebo
la pandemic and extensive quarantines applied throughout the world during the COVID-
19 pandemic since 2020.
 0 - 526
3 Ethical and practical considerations need to be considered when applying quarantin
e to people. Practice differs from country to country; in some countries, quarantine
is just one of many measures governed by legislation relating to the broader concept
of biosecurity; for example, Australian biosecurity is governed by the single overar
ching Biosecurity Act 2015.
 0 - 364
4
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5
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6 == Etymology and terminology ==
 0 - 32
7 The word quarantine comes from quarantena or quarantaine, meaning "forty days", us
ed in the Venetian language in the 14th and 15th centuries and also in France. The w
ord is designated in the period during which all ships were required to be isolated
before passengers and crew could go ashore during the Black Death plague. The quaran
tena followed the trentino, or "thirty-day isolation" period, first imposed in 1347
in the Republic of Ragusa, Dalmatia  0 - 454
8
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9
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0 - 1

10 == History ==
 0 - 14

11
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12
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13 === Ancient ===
 0 - 16

14 An early mention of isolation occurs in the Biblical book of Leviticus, written i
n the 7th century BC or perhaps earlier, which describes the procedure for separatin
g out people infected with the skin disease Tzaraath. The medical nature of this iso
lation is, however, disputed. As traditional exegesis 0 - 303

15
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16 Anyone with such a defiling disease must wear torn clothes, let their hair be unk
empt, cover the lower part of their face and cry out, "Unclean! Unclean!" As long as
they have the disease they remain unclean. They must live alone; they must live outs
ide the camp.
 0 - 264

17
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18
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19 === Medieval Islamic world ===
 0 - 31

20 The Islamic prophet Muhammad advised quarantine: "Those with contagious diseases
should be kept away from those who are healthy." The Persian polymath Avicenna also
recommended quarantine for patients with infectious diseases, especially tuberculosi
s.The mandatory hospital quarantine of special groups of patients, including those w
ith leprosy, started early in Islamic history. Between 706 and 707 the sixth Umayyad
caliph Al-Walid I built the first hospital in Damascus and issued an order to isolat
e those infected with leprosy from other patients in the hospital. The practice of m
andatory quarantine of leprosy in general hospitals continued until the year 1431, w
hen the Ottomans built a leprosy hospital in Edirne. Incidents of quarantine occurre
d throughout the Muslim world, with evidence of voluntary community quarantine in so
me of these reported incidents.
 0 - 870

21
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22
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23 === Medieval Europe ===
 0 - 24

24 The word "quarantine" originates from quarantena, the Venetian language form, mea
ning "forty days". This is due to the 40-day isolation of ships and people practised
as a measure of disease prevention related to the plague. Between 1348 and 1359, the
Black Death wiped out an estimated 30% of Europe's population, and a significant per
centage of Asia's population. Such a disaster led governments to establish measures
of containment to handle recurrent epidemics. A document from 1377 states that befor
e entering the city-state of Ragusa in Dalmatia 0 - 551

25 Venice took the lead in measures to check the spread of plague, having appointed
three guardians of public health in the first years of the Black Death 0 - 152

26
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27
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28 === Modern history ===
 0 - 23

29
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30 Epidemics of yellow fever ravaged urban communities in North America throughout t
he late-eighteenth and early-nineteenth centuries, the best-known examples being the
1793 Philadelphia yellow fever epidemic and outbreaks in Georgia 0 - 231

31
 0 - 1
32 In the 1830s, both the Ottoman Empire and Egypt established new quarantine system
s. In 1831, Mehmet Ali of Egypt founded the Quarantine Board in Alexandria. In 1838,
the Ottoman government installed the Supreme Council of Health, including the Quaran
tine Administration, in Istanbul. These two institutions set up permanent quarantine
s throughout the eastern Mediterranean, based on the western Mediterranean quarantin
e model. For example, at the port of Izmir, all ships and their cargo would be inspe
cted and those suspected of carrying the plague would be towed to separate docks and
their personnel housed in separate buildings for a determined period of time. In The
ssaly, along the Greek-Turkish border, all travellers entering and exiting the Ottom
an Empire would be quarantined for 9–15 days. Upon appearance of the plague, the qua
rantine stations would be militarised and the Ottoman army would be involved in bord
er control and disease monitoring.
 0 - 958
33
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34
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35 ==== International conventions 1852–1927 ====
 0 - 46
36 Since 1852, several conferences were held involving European powers, with a view
to uniform action in keeping out infection from the East and preventing its spread w
ithin Europe. All but that of 1897 were concerned with cholera. No result came of th
ose at Paris 0 - 262
37 The Venice convention of 30 January 1892 dealt with cholera by the Suez Canal rou
te; that of Dresden of 15 April 1893, with cholera within European countries; that o
f Paris of 3 April 1894, with cholera by the pilgrim traffic; and that of Venice, on
19 March 1897, was in connection with the outbreak of plague in the East, and the co
nference met to settle on an international basis the steps to be taken to prevent, i
f possible, its spread into Europe. An additional convention was signed in Paris on
3 December 1903.A multilateral international sanitary convention was concluded at Pa
ris on 17 January 1912. This convention was most comprehensive and was designated to
replace all previous conventions on that matter. It was signed by 40 countries, and
consisted of 160 articles. Ratifications by 16 of the signatories were exchanged in
Paris on 7 October 1920. Another multilateral convention was signed in Paris on 21 J
une 1926, to replace that of 1912. It was signed by 58 countries worldwide, and cons
isted of 172 articles.In Latin America, a series of regional sanitary conventions we
re concluded. Such a convention was concluded in Rio de Janeiro on 12 June 1904. A s
anitary convention between the governments of Argentina, Brazil, Paraguay, and Urugu
ay was concluded in Montevideo on 21 April 1914. The convention covers cases of Asia
tic cholera, oriental plague and yellow fever. It was ratified by the Uruguayan gove
rnment on 13 October 1914, by the Paraguayan government on 27 September 1917 and by
the Brazilian government on 18 January 1921.
 0 - 1556
38 Sanitary conventions were also concluded between European states. A Soviet-Latvia
n sanitary convention was signed on 24 June 1922, for which ratifications were excha
nged on 18 October 1923. A bilateral sanitary convention was concluded between the g
overnments of Latvia and Poland on 7 July 1922, for which ratifications were exchang
ed on 7 April 1925. Another was concluded between the governments of Germany and Pol
and in Dresden on 18 December 1922, and entered into effect on 15 February 1923. Ano
ther one was signed between the governments of Poland and Romania on 20 December 192
2. Ratifications were exchanged on 11 July 1923. The Polish government also conclude
d such a convention with the Soviet government on 7 February 1923, for which ratific
ations were exchanged on 8 January 1924. A sanitary convention was also concluded be
tween the governments of Poland and Czechoslovakia on 5 September 1925, for which ra
tifications were exchanged on 22 October 1926. A convention was signed between the g
overnments of Germany and Latvia on 9 July 1926, for which ratifications were exchan
ged on 6 July 1927.In 1897, the incubation period for this disease was determined an
d this was to be adopted for administrative purposes. The incubation period was comp
aratively short, some three or four days. After much discussion ten days was accepte
d by a majority. The principle of disease notification was unanimously adopted. Each
government had to notify other governments of the existence of plague within their j
urisdictions and state the measures of prevention being carried out to prevent its s

pread. The area declared infected was limited to the district or village where the d isease prevailed, and no locality was deemed to be infected because of the importati on into it of a few cases of plague while there has been no spread. It was decided d uring the prevalence of plague, every country had the right to close its land border s to traffic. At the Red Sea, it was decided after discussion a healthy vessel could pass through the Suez Canal and continue its voyage in the Mediterranean during the incubation period of the disease and that vessels passing through the Canal in quara ntine might, subject to the use of the electric light, coal up in quarantine at Port Said by night or by day, and that passengers might embark in quarantine at that por t. Infected vessels, if these carry a doctor and a disinfecting stove, have a right to navigate the Canal in quarantine and subject only to the landing of those who are suffering from plague.In the 20th and 21st centuries, people suspected of carrying i nfectious diseases have been quarantined, as in the cases of Andrew Speaker 0 - 268 0

39
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40
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41 == Signals and flags ==
 0 - 24
42
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43 Plain yellow, green, and even black flags have been used to symbolise disease in both ships and ports, with the colour yellow having a longer historical precedent, a s a colour of marking for houses of infection, previous to its use as a maritime mar king colour for disease. The former flag used for the purpose was the "Lima" 0 - 32 6
44
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45
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46 == Ethical and practical considerations ==
 0 - 43
47 The quarantining of people often raises questions of civil rights, especially in cases of long confinement or segregation from society, such as that of Mary Mallon 0 - 164
48
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49
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50 === The United Nations and the Siracusa Principles ===
 0 - 55
51 Guidance on when and how human rights can be restricted to prevent the spread of infectious disease is found in the Siracusa Principles, a non-binding document devel oped by the Siracusa International Institute for Criminal Justice and Human Rights a nd adopted by the United Nations Economic and Social Council in 1984. The Siracusa P rinciples state that restrictions on human rights under the International Covenant o n Civil and Political Rights must meet standards of legality, evidence-based necessi ty, proportionality, and gradualism, noting that public health can be used as ground s for limiting certain rights if the state needs to take measures 'aimed at preventi ng disease or injury or providing care for the sick and injured.' Limitations on rig hts 0 - 757
52
 0 - 1
53 respond to a pressing public or social need 0 - 44
54 proportionately pursue a legitimate aim 0 - 40
55 be the least restrictive means required for achieving the purpose of the limitati on
 0 - 84
56 be provided for and carried out in accordance with the law
 0 - 59
57 be neither arbitrary nor discriminatory
 0 - 40
58 only limit rights that are within the jurisdiction of the state seeking to impose

the limitation.In addition, when quarantine is imposed, public health ethics specify
that:
 0 - 173
59
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60 all restrictive actions must be well-supported by data and scientific evidence
 0 - 79
61 all information must be made available to the public
 0 - 53
62 all actions must be explained clearly to those whose rights are restricted and to
the public
 0 - 93
63 all actions must be subject to regular review and reconsideration.Finally, the st
ate is ethically obligated to guarantee that:
 0 - 127
64
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65 infected people will not be threatened or abused
 0 - 49
66 basic needs such as food, water, medical care, and preventive care will be provid
ed
 0 - 84
67 communication with loved ones and with caretakers will be permitted
 0 - 68
68 constraints on freedom will be applied equally, regardless of social consideratio
ns
 0 - 84
69 patients will be compensated fairly for economic and material losses, including s
alary.
 0 - 88
70
 0 - 1
71
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72 === Psychological impact ===
 0 - 29
73 Quarantine can have adverse psychological effects on the quarantined, including p
ost-traumatic stress, confusion, and anger. According to a "Rapid Review" published
in The Lancet in response to the COVID-19 pandemic, "Stressors included longer quara
ntine duration, infection fears, frustration, boredom, inadequate supplies, inadequa
te information, financial loss, and stigma. Some researchers have suggested long-las
ting effects. In situations where quarantine is deemed necessary, officials should q
uarantine individuals for no longer than required, provide clear rationale for quara
ntine and information about protocols, and ensure sufficient supplies are provided.
Appeals to altruism by reminding the public about the benefits of quarantine to wide
r society can be favourable."
 0 - 783
74
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75
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76 === Short-term quarantines, e.g. for decontamination ===
 0 - 57
77 Quarantine periods can be very short, such as in the case of a suspected anthrax
attack, in which people are allowed to leave as soon as they shed their potentially
contaminated garments and undergo a decontamination shower. For example, an article
entitled "Daily News workers quarantined" describes a brief quarantine that lasted u
ntil people could be showered in a decontamination tent.The February–March 2003 issu
e of HazMat Magazine suggests that people be "locked in a room until proper decon co
uld be performed", in the event of "suspect anthrax".Standard-Times senior correspon
dent Steve Urbon 0 - 602
78
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79 Civil rights activists in some cases have objected to people being rounded up, st

ripped and showered against their will. But Capt. Chmiel said local health authoriti
es have "certain powers to quarantine people".
 0 - 212
80 The purpose of such quarantine-for-decontamination is to prevent the spread of co
ntamination and to contain the contamination such that others are not put at risk fr
om a person fleeing a scene where contamination is suspect. It can also be used to l
imit exposure, as well as eliminate a vector.
 0 - 295
81 New developments for quarantine include new concepts in quarantine vehicles such
as the ambulance bus, mobile hospitals, and lockdown/invacuation 0 - 146
82
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83
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84 == Standard quarantine practices in different countries ==
 0 - 59
85
 0 - 1
86
 0 - 1
87 === Australia ===
 0 - 18
88
 0 - 1
89 Biosecurity in Australia is governed by the Biosecurity Act 2015. The Australian
Quarantine and Inspection Service 0 - 115
90
 0 - 1
91
 0 - 1
92 === Canada ===
 0 - 15
93 There are three quarantine Acts of Parliament in Canada: Quarantine Act 0 - 72
94 Under the Quarantine Act, all travellers must submit to screening and if they bel
ieve they might have come into contact with communicable diseases or vectors, they m
ust disclose their whereabouts to a Border Services Officer. If the officer has reas
onable grounds to believe that the traveller is or might have been infected with a c
ommunicable disease or refused to provide answers, a quarantine officer 0 - 405
95 A QO who has reasonable grounds to believe that the traveller has or might have a
communicable disease or is infested with vectors, after the medical examination of a
traveller, can order him/her into treatment or measures to prevent the person from s
preading the disease. QO can detain any traveller who refuses to comply with his/her
orders or undergo health assessments as required by law.
 0 - 393
96 Under the Health of Animals Act and Plant Protection Act, inspectors can prohibit
access to an infected area, dispose or treat any infected or suspected to be infecte
d animals or plants. The Minister can order for compensation to be given if animals/
plants were destroyed pursuant to these acts.
 0 - 296
97 Each province also enacts its own quarantine/environmental health legislation.
 0 - 79
98
 0 - 1
99
 0 - 1
100 === Hong Kong ===
 0 - 18
101 Under the Prevention and Control of Disease Ordinance 0 - 54
102 The law allows for health officers who have reasonable grounds to detain, isolat
e, quarantine anyone or anything believed to be infected, and to restrict any articl
es from leaving a designated quarantine area. He/she may also order the Civil Aviati
on Department to prohibit the landing or leaving, embarking or disembarking of an ai
rcraft. This power also extends to land, sea or air crossings.
 0 - 395

103 Under the same ordinance, any police officer, health officer, member of the Civi
l Aid Service, or member of the Auxiliary Medical Service can arrest a person who ob
structs or escapes from detention.
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104
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105
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106 === United Kingdom ===
 0 - 23
107 To reduce the risk of introducing rabies from continental Europe, the United Kin
gdom used to require that dogs, and most other animals introduced to the country, sp
end six months in quarantine at an HM Customs and Excise pound; this policy was abol
ished in 2000 in favour of a scheme generally known as Pet Passports, where animals
can avoid quarantine if they have documentation showing they are up to date on their
appropriate vaccinations.
 0 - 443
108
 0 - 1
109
 0 - 1
110 ==== British maritime quarantine rules 1711–1896 ====
 0 - 54
111 The plague had disappeared from England for more than thirty years before the pr
actice of quarantine against it was definitely established by the Quarantine Act 171
0 0 - 166
112
 0 - 1
113
 0 - 1
114 === United States ===
 0 - 22
115 In the United States, authority to quarantine people with infectious diseases is
split between the state and federal governments. States 0 - 137
116
 0 - 1
117
 0 - 1
118 ==== Federal rules ====
 0 - 24
119 Communicable diseases for which apprehension, detention, or conditional release
of people are authorised must be specified in Executive Orders of the President. As
of 2014, these include Executive Orders 13295 13375, and 13674; the latest executive
order specifies the following infectious diseases: cholera, diphtheria, infectious t
uberculosis, plague, smallpox, yellow fever, viral haemorrhagic fevers 0 - 405
120 All commercial passenger flights must report deaths or illnesses to the CDC.
 0 - 77
121 Individuals must apply for a travel permit if they are under a Federal quarantin
e, isolation, or conditional release order.
 0 - 124
122 When an individual who is moving between U.S. states is "reasonably believed to
be infected" with a quarantinable communicable disease in a "qualifying stage", the
CDC may apprehend or examine that individual for potential infection.
 0 - 234
123 This includes new regulatory authority permitting the CDC Director to prohibit t
he importation of animals or products that pose a threat to public health.The rules:
 0 - 165
124
 0 - 1
125 Do not authorise compulsory medical testing, vaccination, or medical treatment w
ithout prior informed consent.
 0 - 111
126 Require CDC to advise individuals subject to medical examinations that they will
be conducted by an authorised health worker and with prior informed consent.

```
 0 - 158
127 Include strong due process protections for individuals subject to public health
orders, including a right to counsel for indigent individuals.
 0 - 143
128 Limit to 72 hours the amount of time that an individual may be apprehended pendi
ng the issuance of a federal order for isolation, quarantine, or conditional releas
e.
 0 - 166
129
 0 - 1
130
 0 - 1
131 ==== US quarantine facilities ====
 0 - 35
132 The Division of Global Migration and Quarantine  0 - 48
133 Besides the port of entry where it is located, each station is also responsible
for quarantining potentially infected travellers entering through any ports of entry
in its assigned region. These facilities are fairly small; each one is operated by a
few staff members and capable of accommodating 1–2 travellers for a short observatio
n period. Cost estimates for setting up a temporary larger facility, capable of acco
mmodating 100 to 200 travellers for several weeks, have been published by the Airpor
t Cooperative Research Program  0 - 533
134
 0 - 1
135
 0 - 1
136 ==== US quarantine of imported goods ====
 0 - 42
137 The United States puts immediate quarantines on imported products if a contagiou
s disease is identified and can be traced back to a certain shipment or product. All
imports will also be quarantined if the disease appears in other countries. Accordin
g to Title 42 U.S.C. §§264 and 266 Archived 24 September 2015 at the Wayback Machin
e, these statutes provide the Secretary of Health and Human Services peacetime and w
artime authority to control the movement of people into and within the United States
to prevent the spread of communicable disease.
 0 - 548
138
 0 - 1
139
 0 - 1
140 ==== History of quarantine laws in the US ====
 0 - 47
141
 0 - 1
142 Quarantine law began in Colonial America in 1663, when in an attempt to curb an
outbreak of smallpox, the city of New York established a quarantine. In the 1730s, t
he city built a quarantine station on the Bedloe's Island. The Philadelphia Lazarett
o was the first quarantine hospital in the United States, built in 1799, in  Tinicum
Township, Delaware County, Pennsylvania. There are similar national landmarks such a
s the Columbia River Quarantine Station, Swinburne Island  and Angel Island. The Pes
t House in Concord, Massachusetts was used as early as 1752 to quarantine those suff
ering from cholera, tuberculosis and smallpox.
 0 - 632
143 In early June 1832, during the cholera epidemic in New York, Governor Enos Throo
p called a special session of the Legislature for 21 June, to pass a Public Health A
ct by both Houses of the State Legislature. It included to a strict quarantine along
the Upper and Lower New York-Canadian frontier. In addition, New York City Mayor Wal
ter Browne established a quarantine against all peoples and products of Europe and A
sia, which prohibited ships from approaching closer than 300 yards to the city, and
all vehicles were ordered to stop 1.5 miles away.The Immigrant Inspection Station on
Ellis Island, built in 1892, is often mistakenly assumed to have been a quarantine s
tation, however its marine hospital  0 - 706
144
 0 - 1
```

145
 0 - 1
146 === List of quarantine services in the world ===
 0 - 49
147 Australian Quarantine and Inspection Service
 0 - 45
148 MAF Quarantine Service, in the New Zealand
 0 - 43
149 Quarantine, Western Australia
 0 - 30
150 Samoa Quarantine Service, in the West Samoa
 0 - 44
151 Racehorse & Equine Quarantine Services, A company built & developed by Frankie T
hevarasa Kuala Lumpur Malaysia
 0 - 111
152 Federal Service for Supervision of Consumer Rights Protection and Human Welfare,
a Federal Quarantine Service of the Government of Russia.
 0 - 139
153
 0 - 1
154
 0 - 1
155 == Notable quarantines ==
 0 - 26
156
 0 - 1
157
 0 - 1
158 === Eyam village, 1665 0 - 23
159 Eyam was a village in Britain that imposed a cordon sanitaire on itself to stop
the spread of the bubonic plague to other communities in 1665. The plague ran its co
urse over 14 months and one account states that it killed at least 260 villagers. Th
e church in Eyam has a record of 273 individuals who were victims of the plague.
 0 - 329
160
 0 - 1
161
 0 - 1
162 === Convict ship Surry, Sydney Harbour, 1814 0 - 45
163
 0 - 1
164 On 28 July 1814, the convict ship Surry arrived in Sydney Harbour from England.
Forty-six people had died of typhoid during the voyage, including 36 convicts, and t
he ship was placed in quarantine on the North Shore. Convicts were landed, and a cam
p was established in the immediate vicinity of what is now Jeffrey Street in Kirribi
lli. This was the first site in Australia to be used for quarantine purposes.
 0 - 410
165
 0 - 1
166
 0 - 1
167 === 'Typhoid Mary' 0 - 19
168 Mary Mallon was a cook who was found to be a carrier of Salmonella enterica subs
p. enterica, the cause of typhoid fever, and was forcibly isolated from 1907 to 191
0. At least 53 cases of the infection were traced to her, and three deaths. Subseque
ntly she spent a further 23 years in isolation prior to her death in 1938. The prese
nce of the bacteria in her gallbladder was confirmed on autopsy.
 0 - 396
169
 0 - 1
170
 0 - 1
171 === East Samoa, 1918 0 - 21
172 During the 1918 flu pandemic, the then Governor of American Samoa, John Martin P

oyer, imposed a full protective sequestration of the islands from all incoming ship
s, successfully preventing influenza from infecting the population and thus achievin
g zero deaths within the territory. In contrast, the neighbouring New Zealand-contro
lled Western Samoa was among the hardest hit, with a 90% infection rate and over 20%
of its adults dying from the disease. This failure by the New Zealand government to
prevent and contain the Spanish Flu subsequently rekindled Samoan anti-colonial sent
iments that led to its eventual independence.
 0 - 630
173
 0 - 1
174
 0 - 1
175 === Gruinard Island, 1942–1990 0 - 31
176 In 1942, during World War II, British forces tested out their biological weapons
program on Gruinard Island and infected it with anthrax. Subsequently a quarantine o
rder was placed on the island. The quarantine was lifted in 1990, when the island wa
s declared safe, and a flock of sheep was released onto the island.
 0 - 317
177
 0 - 1
178
 0 - 1
179 === Apollo series space explorers, 1969–1971 ===
 0 - 49
180 Between 24 July 1969 and 9 February 1971, the astronauts of Apollo 11, Apollo 1
2, and Apollo 14, were quarantined 0 - 114
181
 0 - 1
182
 0 - 1
183 === Yugoslavia, 1972 0 - 21
184 The 1972 Yugoslav smallpox outbreak was the final outbreak of smallpox in Europ
e. The World Health Organization fought the outbreak with extensive quarantine and a
cordon sanitaire, and the government instituted martial law.
 0 - 225
185
 0 - 1
186
 0 - 1
187 === Case of Kaci Hickox' return to US, 2014 0 - 44
188 In 2014, Kaci Hickox, a Doctors Without Borders nurse from Maine, legally battle
d 21-day quarantines imposed by the states of New Jersey and Maine after returning h
ome from treating Ebola patients in Sierra Leone. "Hickox was sequestered in a medic
al tent for days because New Jersey announced new Ebola regulations the day she arri
ved. She eventually was allowed to travel to Maine, where the state sought to impose
a 'voluntary quarantine' before trying and failing to create a buffer between her an
d others. A state judge rejected attempts to restrict her movements, saying she pose
d no threat as long as she wasn't demonstrating any symptoms of Ebola. Hickox said h
ealth care professionals like those at the U.S. Centers for Disease Control and Prev
ention – not politicians like New Jersey Gov. Chris Christie and Maine Gov. Paul LeP
age – should be in charge of making decisions that are grounded in science, not fea
r."
 0 - 924
189
 0 - 1
190
 0 - 1
191 === COVID-19 pandemic, 2020–present ===
 0 - 40
192
 0 - 1
193 During the COVID-19 pandemic, multiple governmental actors enacted quarantines i
n an effort to curb the rapid spread of the virus. Quarantine-like restrictions on m
ovement included curfews and restrictions variously described as stay-at-home order

s, shelter-in-place orders, shutdowns or lockdowns.
 0 - 299
194 On 26 March 2020, 1.7 billion people worldwide were under some form of lockdown, which increased to 2.6 billion people two days later—around a third of the world's p opulation.
 0 - 176
195
 0 - 1
196
 0 - 1
197 ==== Hubei ====
 0 - 16
198
 0 - 1
199 In Hubei, the origin of the epidemic, a cordon sanitaire was imposed on Wuhan an d other major cities in China, affecting around 500 million people, which is unprece dented in scale in human history, to limit the rate of spread of the disease. The 'l ockdown' of Wuhan, and subsequently a wider-scale 'lockdown' throughout Hubei provin ce, began on 23 January 2020. At this stage, the spread of the virus in mainland Chi na was running at approximately 50% growth in cases per day. On 8 February, the dail y rate of spread fell below 10%. For figures, see COVID-19 pandemic in Mainland Chin a.
 0 - 587
200
 0 - 1
201
 0 - 1
202 ==== Italy ====
 0 - 16
203
 0 - 1
204 As the outbreak spread there, beginning 22 February 2020, a cordon sanitaire was imposed on a group of at least 10 different municipalities in Northern Italy, effect ively quarantining more than 50,000 people. This followed a second day when the decl ared detected cases leapt enormously 0 - 286
205 On 8 March 2020, a much wider region of Northern Italy was placed under quaranti ne restrictions, involving around 16 million people. On the next day, the quarantin e was extended to the whole of Italy, effective on 10 March 2020, placing roughly 60 million people under quarantine.A team of Chinese experts, together with some 31 ton nes of supplies, arrived in Rome on 13 March 2020 to help Italy fight the virus.On 2 2 March 2020, Russia sent nine Ilyushin 76 planes with expert virologists, epidemiol ogists, medical equipment, and pharmaceuticals in a humanitarian aid operation that Italian media dubbed "From Russia With Love".Eventually the lockdown was extended un til 3 May, although starting from 14 April stationery shops, bookshops, and children clothing's shops were allowed to open.On 26 April 2020, the so-called "Phase 2" was announced, to start from 4 May. Movements across regions were still forbidden, while movements between municipalities were allowed only to visit relatives or for work an d health reasons. Moreover, closed factories could re-open, but schools, bars, resta urants, and barbers were still closed.As at 4 May 2020, when new cases were running around 0.5%, 0 - 1188
206
 0 - 1
207
 0 - 1
208 ==== Rest of Europe ====
 0 - 25
209
 0 - 1
210 As cases of the virus spread to and took hold in more European countries, many f ollowed the earlier examples of China and Italy and began instituting policies of lo ckdown. Notable among these were Ireland 0 - 205
211
 0 - 1
212

```
 0 - 1
213 ==== Rest of the world ====
 0 - 28
214
 0 - 1
215 In the immediate context of the start of the pandemic in Wuhan, countries neighb
ouring or close to China adopted a cautious approach. For example, Sri Lanka, Macau,
Hong Kong, Vietnam, Japan, and South Korea had all imposed some degree of lockdown b
y 19 February. As countries across the world reported escalating case numbers and de
aths, more and more countries began to announce travel restrictions and lockdowns. A
frica and Latin America were relatively delayed in the spread of the virus, but even
on these continents, countries began to impose travel bans and lockdowns. Brazil and
Mexico began lockdowns in late February and much of the rest of Latin America follow
ed suit in early March. Much of Africa was on lockdown by the start of April. Kenya,
for example, blocked certain international flights and subsequently placed a ban on
'global' meetings.As of 1 April 2020, more than 280 million people, or about 86% of
the population, were under some form of lockdown in the United States, 59 million pe
ople were in lockdown in South Africa, and 1.3 billion people were in lockdown in In
dia.
 0 - 1097
216
 0 - 1
217
 0 - 1
218 == Self-quarantine ==
 0 - 22
219
 0 - 1
220 Self-quarantine  0 - 16
221
 0 - 1
222
 0 - 1
223 == Other uses ==
 0 - 17
224 U.S. President John F. Kennedy euphemistically referred to the U.S. Navy's inter
diction of shipping en route to Cuba during the Cuban Missile Crisis as a "quarantin
e" rather than a blockade, because a quarantine is a legal act in peacetime, whereas
a blockade is defined as an act of aggression under the U.N. Charter.In computer sci
ence, "quarantining" describes putting files infected by computer viruses into a spe
cial directory, so as to eliminate the threat they pose, without irreversibly deleti
ng them.The Spanish term for quarantine,  0 - 542
225
 0 - 1
226
 0 - 1
227 == See also ==
 0 - 15
228 Biosecurity – Set of preventive measures designed to reduce the risk of transmis
sion of infectious diseases
 0 - 108
229 Epidemiology – Aspect of health and disease science
 0 - 52
230 Extra-Terrestrial Exposure Law – Regulations adopted by NASA to guard the Earth
against any harmful contamination
 0 - 114
231 Infection control
 0 - 18
232 Isolation  0 - 10
233 Lazaretto – Quarantine station for maritime travellers
 0 - 55
234 Lytton Quarantine Station – Heritage-listed former quarantine station in Brisban
e, Queensland, Australia
 0 - 105
```

235 Pest house – Building used for persons afflicted with communicable diseases
 0 - 76
236 Protective sequestration – Public health term
 0 - 46
237 Quaranup, a former quarantine station in Albany, Western Australia
 0 - 67
238 Social distancing – Infection control technique by keeping a distance from each
other
 0 - 86
239
 0 - 1
240
 0 - 1
241 == Notes ==
 0 - 12
242
 0 - 1
243
 0 - 1
244 == References ==
 0 - 17
245
 0 - 1
246
 0 - 1
247 == Sources ==
 0 - 14
248 This article incorporates text from a publication now in the public domain: Chis
holm, Hugh, ed. 0 - 96
249
 0 - 1
250
 0 - 1
251 == Further reading ==
 0 - 22
252 Howard Markel 0 - 14
253 Rothstein, Mark A. 0 - 19
254 Frati, P. 0 - 10
255
 0 - 1
256
 0 - 1
257 == External links ==
 0 - 21
258 Ayliffe, Graham A. J.; Mary P. English 0 - 39
259 Emerging Infectious Diseases – Contents, Volume 11, Number 2 Archived 1 February
2020 at the Wayback Machine, February 2005
 0 - 124
260 Quarantine for SARS, Taiwan Archived 1 February 2020 at the Wayback Machine, Feb
ruary 2005, wwwnc.cdc.gov
 0 - 106
261 History of quarantine 0 - 22
262 Cole, Jared P. 0 - 15

In [14]:
```python
file = codecs.open('infect\Quarantine.txt','r','utf8')

nr = 0
for line in file:
    nr = nr+1
    result = re.search('(\w*)',line)
    if result:
        print(nr,result.group(0),result.start(),'-',result.end())
```

```
file.close()
```

```
1 A 0 - 1
2 The 0 - 3
3 Ethical 0 - 7
4   0 - 0
5   0 - 0
6   0 - 0
7 The 0 - 3
8   0 - 0
9   0 - 0
10   0 - 0
11   0 - 0
12   0 - 0
13   0 - 0
14 An 0 - 2
15   0 - 0
16 Anyone 0 - 6
17   0 - 0
18   0 - 0
19   0 - 0
20 The 0 - 3
21   0 - 0
22   0 - 0
23   0 - 0
24 The 0 - 3
25 Venice 0 - 6
26   0 - 0
27   0 - 0
28   0 - 0
29   0 - 0
30 Epidemics 0 - 9
31   0 - 0
32 In 0 - 2
33   0 - 0
34   0 - 0
35   0 - 0
36 Since 0 - 5
37 The 0 - 3
38 Sanitary 0 - 8
39   0 - 0
40   0 - 0
41   0 - 0
42   0 - 0
43 Plain 0 - 5
44   0 - 0
45   0 - 0
46   0 - 0
47 The 0 - 3
48   0 - 0
49   0 - 0
50   0 - 0
51 Guidance 0 - 8
52   0 - 0
53 respond 0 - 7
54 proportionately 0 - 15
55 be 0 - 2
56 be 0 - 2
57 be 0 - 2
58 only 0 - 4
59   0 - 0
60 all 0 - 3
61 all 0 - 3
```

```
62 all 0 - 3
63 all 0 - 3
64  0 - 0
65 infected 0 - 8
66 basic 0 - 5
67 communication 0 - 13
68 constraints 0 - 11
69 patients 0 - 8
70  0 - 0
71  0 - 0
72  0 - 0
73 Quarantine 0 - 10
74  0 - 0
75  0 - 0
76  0 - 0
77 Quarantine 0 - 10
78  0 - 0
79 Civil 0 - 5
80 The 0 - 3
81 New 0 - 3
82  0 - 0
83  0 - 0
84  0 - 0
85  0 - 0
86  0 - 0
87  0 - 0
88  0 - 0
89 Biosecurity 0 - 11
90  0 - 0
91  0 - 0
92  0 - 0
93 There 0 - 5
94 Under 0 - 5
95 A 0 - 1
96 Under 0 - 5
97 Each 0 - 4
98  0 - 0
99  0 - 0
100  0 - 0
101 Under 0 - 5
102 The 0 - 3
103 Under 0 - 5
104  0 - 0
105  0 - 0
106  0 - 0
107 To 0 - 2
108  0 - 0
109  0 - 0
110  0 - 0
111 The 0 - 3
112  0 - 0
113  0 - 0
114  0 - 0
115 In 0 - 2
116  0 - 0
117  0 - 0
118  0 - 0
119 Communicable 0 - 12
120 All 0 - 3
121 Individuals 0 - 11
122 When 0 - 4
123 This 0 - 4
124  0 - 0
125 Do 0 - 2
```

```
126 Require 0 - 7
127 Include 0 - 7
128 Limit 0 - 5
129  0 - 0
130  0 - 0
131  0 - 0
132 The 0 - 3
133 Besides 0 - 7
134  0 - 0
135  0 - 0
136  0 - 0
137 The 0 - 3
138  0 - 0
139  0 - 0
140  0 - 0
141  0 - 0
142 Quarantine 0 - 10
143 In 0 - 2
144  0 - 0
145  0 - 0
146  0 - 0
147 Australian 0 - 10
148 MAF 0 - 3
149 Quarantine 0 - 10
150 Samoa 0 - 5
151 Racehorse 0 - 9
152 Federal 0 - 7
153  0 - 0
154  0 - 0
155  0 - 0
156  0 - 0
157  0 - 0
158  0 - 0
159 Eyam 0 - 4
160  0 - 0
161  0 - 0
162  0 - 0
163  0 - 0
164 On 0 - 2
165  0 - 0
166  0 - 0
167  0 - 0
168 Mary 0 - 4
169  0 - 0
170  0 - 0
171  0 - 0
172 During 0 - 6
173  0 - 0
174  0 - 0
175  0 - 0
176 In 0 - 2
177  0 - 0
178  0 - 0
179  0 - 0
180 Between 0 - 7
181  0 - 0
182  0 - 0
183  0 - 0
184 The 0 - 3
185  0 - 0
186  0 - 0
187  0 - 0
188 In 0 - 2
189  0 - 0
```

```
190  0 - 0
191  0 - 0
192  0 - 0
193 During 0 - 6
194 On 0 - 2
195  0 - 0
196  0 - 0
197  0 - 0
198  0 - 0
199 In 0 - 2
200  0 - 0
201  0 - 0
202  0 - 0
203  0 - 0
204 As 0 - 2
205 On 0 - 2
206  0 - 0
207  0 - 0
208  0 - 0
209  0 - 0
210 As 0 - 2
211  0 - 0
212  0 - 0
213  0 - 0
214  0 - 0
215 In 0 - 2
216  0 - 0
217  0 - 0
218  0 - 0
219  0 - 0
220 Self 0 - 4
221  0 - 0
222  0 - 0
223  0 - 0
224 U 0 - 1
225  0 - 0
226  0 - 0
227  0 - 0
228 Biosecurity 0 - 11
229 Epidemiology 0 - 12
230 Extra 0 - 5
231 Infection 0 - 9
232 Isolation 0 - 9
233 Lazaretto 0 - 9
234 Lytton 0 - 6
235 Pest 0 - 4
236 Protective 0 - 10
237 Quaranup 0 - 8
238 Social 0 - 6
239  0 - 0
240  0 - 0
241  0 - 0
242  0 - 0
243  0 - 0
244  0 - 0
245  0 - 0
246  0 - 0
247  0 - 0
248 This 0 - 4
249  0 - 0
250  0 - 0
251  0 - 0
252 Howard 0 - 6
253 Rothstein 0 - 9
```

```
254 Frati 0 - 5
255  0 - 0
256  0 - 0
257  0 - 0
258 Ayliffe 0 - 7
259 Emerging 0 - 8
260 Quarantine 0 - 10
261 History 0 - 7
262 Cole 0 - 4
```

In [15]:
```python
file = codecs.open('infect\Quarantine.txt','r','utf8')

nr = 0
for line in file:
    nr = nr+1
    result = re.search('\d+. [A-Z][a-zä]+ [12][09][0-9][0-9]',line)
    if result:
        print(nr,result.group(0),result.start(),'-',result.end())

file.close()
```

```
37 17 January 1912 593 - 608
38 24 June 1922 117 - 129
77 14 February 2003 603 - 619
119 21 March 2017 789 - 802
137 24 September 2015 293 - 310
180 24 July 1969 8 - 20
194 26 March 2020 3 - 16
199 23 January 2020 345 - 360
204 22 February 2020 40 - 56
205 10 March 2020 215 - 228
210 18 March 2020 519 - 532
```

In [16]:
```python
file = codecs.open('infect\Quarantine.txt','r','utf8')

nr = 0
for line in file:
    nr = nr+1
    result = re.search('\w+virus',line)
    if result:
        print(nr,result.group(0),result.start(),'-',result.end())

file.close()
```

```
38 coronavirus 3791 - 3802
```

Grouping

Parentheses in the pattern form groups. We can output the matching part in the found text for each group. The whole pattern corresponds to group 0, the remaining groups are numbered from left to right. Groups can be nested!

In [17]:
```python
file = codecs.open('infect\Quarantine.txt','r','utf8')

for line in file:
    result = re.search('([A-Z]\w+) ([A-Z]\w+)(\.|$| [a-z])',line)
    if result:
        print(result.group(0),'|',result.group(1),'|',result.group(2))

file.close()
```

```
East Samoa d | East | Samoa
Black Death p | Black | Death
Evil Speech. | Evil | Speech
Medieval Islamic w | Medieval | Islamic
The Islamic p | The | Islamic
Black Death w | Black | Death
North African t | North | African
North America t | North | America
Ottoman Empire a | Ottoman | Empire
Great Britain f | Great | Britain
The Venice c | The | Venice
The Polish g | The | Polish
Riverside Hospital o | Riverside | Hospital
United Nations a | United | Nations
International Institute f | International | Institute
The Lancet i | The | Lancet
Daily News w | Daily | News
But Capt. | But | Capt
Australian Quarantine a | Australian | Quarantine
Services Agency a | Services | Agency
Services Officer. | Services | Officer
Animals Act a | Animals | Act
HK Laws. | HK | Laws
Aviation Department t | Aviation | Department
Medical Service c | Medical | Service
United Kingdom u | United | Kingdom
Quarantine Act w | Quarantine | Act
Executive Orders o | Executive | Orders
CDC Director t | CDC | Director
Require CDC t | Require | CDC
The Division o | The | Division
Research Board. | Research | Board
United States p | United | States
Colonial America i | Colonial | America
Enos Throop c | Enos | Throop
Australian Quarantine a | Australian | Quarantine
New Zealand | New | Zealand
Western Australia | Western | Australia
West Samoa | West | Samoa
Lumpur Malaysia | Lumpur | Malaysia
Federal Service f | Federal | Service
Sydney Harbour f | Sydney | Harbour
Mary Mallon w | Mary | Mallon
Western Samoa w | Western | Samoa
Gruinard Island a | Gruinard | Island
Receiving Laboratory f | Receiving | Laboratory
Health Organization f | Health | Organization
Without Borders n | Without | Borders
Mainland China. | Mainland | China
Northern Italy w | Northern | Italy
United Kingdom n | United | Kingdom
South Korea h | South | Korea
Missile Crisis a | Missile | Crisis
Western Australia | Western | Australia
University Press. | University | Press
Jewish Immigrants a | Jewish | Immigrants
From SARS t | From | SARS
Nei Secoli. | Nei | Secoli
From Miasmas t | From | Miasmas
State Quarantine a | State | Quarantine
```

More functions

There are three other functions that work with regular expressions:

Split

Splits a string at each occurrence of the pattern. The result is a list of the parts found.

In [18]:
```python
from pprint import pprint
print(re.split('-','multi-drug-resistant'))
text = 'During the 1918 influenza pandemic, some communities instituted protective s
pprint(re.split('[\.,;:]? +',text)) #Notice the space before +!
```

```
['multi', 'drug', 'resistant']
['During',
 'the',
 '1918',
 'influenza',
 'pandemic',
 'some',
 'communities',
 'instituted',
 'protective',
 'sequestration',
 '(sometimes',
 'referred',
 'to',
 'as',
 '"reverse',
 'quarantine")',
 'to',
 'keep',
 'the',
 'infected',
 'from',
 'introducing',
 'influenza',
 'into',
 'healthy',
 'populations.']
```

Match

Tests whether the the string starts with the search pattern.

Findall

Finds all occurrences and not just the first one. The result is a list of strings if no groups are used. If groups were used, the result is a list of lists of strings.

In the following we use one additional pair of parentheses to access the entire match.

In [19]:
```python
file = codecs.open('infect\Quarantine.txt','r','utf8')

nr = 0
for line in file:
    nr = nr+1
    #fundliste = re.findall('[12][09][0-9][0-9]',zeile)
    resultlist = re.findall('((19|20)\d{2})',line)
    if len(resultlist) > 0:
        for result in resultlist:
```

```
            print(nr,result[0])

 file.close()
```

```
2 1918
2 1925
2 1972
2 2020
3 2015
30 1901
30 1918
35 1927
37 1903
37 1912
37 1920
37 1926
37 1912
37 1904
37 1914
37 1914
37 1917
37 1921
38 1922
38 1923
38 1922
38 1925
38 1922
38 1923
38 1922
38 1923
38 1923
38 1924
38 1925
38 1926
38 1926
38 1927
38 2007
38 2014
38 1957
38 1968
38 1994
38 2016
38 2019
38 2020
47 1907
51 1984
77 2003
77 2003
89 2015
93 2005
107 2000
119 2014
119 2017
132 2014
133 2008
137 2015
143 1907
143 1918
143 1963
143 1944
143 1963
143 2020
167 1907
167 1910
```

```
167 1915
167 1938
168 1907
168 1910
168 1938
171 1918
172 1918
175 1942
175 1990
176 1942
176 1990
179 1969
179 1971
180 1969
180 1971
183 1972
184 1972
187 2014
188 2014
191 2020
194 2020
199 2020
204 2020
205 2020
205 2020
205 2020
205 2020
205 2020
205 2020
210 2020
215 2020
220 2020
248 1911
252 1999
253 2015
254 2000
258 2003
258 1935
259 2020
259 2005
260 2020
260 2005
262 2014
```

A small application

Finally, let's build a small application.

We build a KWIC table for viruses. KWIC stands for Keyword in Context and is used to clarify the meaning of a word through the context and to show possible uses of a word.

In [20]:
```python
import glob

filelist = glob.glob("infect/*.txt")
for f in filelist:
    result = re.search(r'.*\\([\w,_\-\'\(\)]+)\.txt',f) # Wir brauchen hier ein magi
    title = result.group(1)

    file = codecs.open(f,'r','utf8')
    #Jetzt suchen wir alle Viren
    for line in file:
```

```python
        start = 0
        line = line.strip()
        resultlist = re.findall(r'([\w-]*[Vv]irus(es)?)\b',line)
        if len(resultlist) > 0:
            for result in resultlist:
                virus = result[0]
                #now we need to find the position of the result in the line
                position = re.search(r'\b'+virus+r'\b',line[start:])
                start = start + position.start()
                end = start + position.end()
                left_context = ' '*max(0,20-start)  + line[max(0,start-20):start]
                right_context = line[end:end+20]
                virus = virus + max(0,18-len(virus))*' '
                print(left_context,virus,right_context, '('+ title +')', sep = '\t')
                start += 1
    file.close()
```

```
ds on the strain of      virus                        (ACAM2000)
ed from the Vaccina      virus             M2000 vaccine cannot    (ACAM2000)
ontain the smallpox      virus             d, is not dead like     (ACAM2000)
nes containing live      viruses           io and chickenpox.Th    (ACAM2000)
kenpox.The vaccinia      virus             ed via a typical sho    (ACAM2000)
r arm. The vaccinia      virus             ird week, leaving a     (ACAM2000)
ncing symptoms, the      virus             her the host is show    (Asymptomati
c_carrier)
    === Epstein-Barr     virus                     (Asymptomatic_carrier)
ted with persistent      viruses            of the herpes virus    (Asymptomati
c_carrier)
uch as Epstein-Barr      virus             es virus family. Stu    (Asymptomati
c_carrier)
ember of the herpes      virus             % of adults have ant    (Asymptomati
c_carrier)
e infected with the      virus                     (Asymptomatic_carrier)
e to produce active      virus              virus unintentional    (Asymptomati
c_carrier)
s of the attenuated      virus             with weak immune sys    (Asymptomati
c_carrier)
read the attenuated      virus             mmunity; however som    (Asymptomati
c_carrier)
plants, human Lassa      virus                     (Barrier_nursing)
ore specific deadly      viruses           ts because of the ca    (Barrier_nur
sing)
r if the disease or      virus             ursing the patients     (Barrier_nur
sing)
ious agents such as      viruses           other vector, are mo    (Blood-borne
_disease)
 in particular, all      viruses            the CDC-NIOSH: HIV,    (Blood-borne
_disease)
s include West Nile      virus                     (Blood-borne_disease)
re are 26 different      viruses           o present in healthc    (Blood-borne
_disease)
an immunodeficiency      virus             ar access. These inc    (Blood-borne
_disease)
caused by bacteria,      viruses                   (Blood-borne_disease)
ients with AIDS are      poliovirus                (Brain_abscess)
ple, is caused by a      virus             animals. Infected ca    (Cat_bite)
ir surface, such as      virus                     (Cell-mediated_immunity)
fective in removing      virus                     (Cell-mediated_immunity)
rected primarily at      viruses           le for activating ma    (Cell-mediat
ed_immunity)
eria, protozoa, and      viruses                   (Cell-mediated_immunity)
ncer drugs. Several      viruses                   (CendR)
nd it is known that      viruses                   (CendR)
d rodents.: 29  The      viruses                   (Climate_change_and_infectio
```

	us_diseases)			
uitoes carrying the	virus	isk for complication	(Climate_cha	
nge_and_infectious_diseases)				
se caused by dengue	viruses	by the mosquito Aed	(Climate_cha	
nge_and_infectious_diseases)				
ted with the dengue	virus	y effective vector o	(Climate_cha	
nge_and_infectious_diseases)				
pread of the dengue	virus	and variation in tem	(Climate_cha	
nge_and_infectious_diseases)				
different types of	viruses	. This is because so	(Climate_cha	
nge_and_infectious_diseases)				
one type of dengue	virus	but will have short	(Climate_cha	
nge_and_infectious_diseases)				
that type of dengue	virus	r. Some of the sympt	(Climate_cha	
nge_and_infectious_diseases)				
ado tick fever (CTF	virus	ention (CDC) is cond	(Climate_cha	
nge_and_infectious_diseases)				
==	Coronavirus	sease ==	(Climate_change_and_	
infectious_diseases)				
nment Programme the	Coronavirus	mals to humans. Such	(Climate_cha	
nge_and_infectious_diseases)				
zoonotic, e.g., the	virus	re occurring more fr	(Climate_cha	
nge_and_infectious_diseases)				
c diseases like the	coronavirus	en climate change an	(Climate_cha	
nge_and_infectious_diseases)				
ked questions about	coronavirus		(Climate_change_and_infectio	
us_diseases)				
n epidemic like the	coronavirus	m and humans. This c	(Climate_cha	
nge_and_infectious_diseases)				
the transmission of	viruses	in humidity and tem	(Climate_cha	
nge_and_infectious_diseases)				
ther and to humans.	Viruses	ecame more dangerous	(Climate_cha	
nge_and_infectious_diseases)				
t species harboring	coronaviruses	o caused severe dise	(Climate_cha	
nge_and_infectious_diseases)				
ors transmission of	viruses	use the pandemic. In	(Climate_cha	
nge_and_infectious_diseases)				
itate the spread of	viruses	an increase due to s	(Climate_cha	
nge_and_infectious_diseases)				
n body to fight the	virus	emic can increase du	(Climate_cha	
nge_and_infectious_diseases)				
.The origins of the	virus	e countries with lar	(Climate_cha	
nge_and_infectious_diseases)				
ts what facilitates	virus	arger land areas, mo	(Climate_cha	
nge_and_infectious_diseases)				
ne of the deadliest	viruses	reak and eventually	(Climate_cha	
nge_and_infectious_diseases)				
y rate of the Ebola	virus	liable for the upti	(Climate_cha	
nge_and_infectious_diseases)				
with humans. Ebola	virus	t waves, floods, lan	(Climate_cha	
nge_and_infectious_diseases)				
bodily fluids. The	virus	ong winds, thunderst	(Climate_cha	
nge_and_infectious_diseases)				
ct contact with the	virus	storms, heat waves,	(Climate_cha	
nge_and_infectious_diseases)				
e infected with the	virus		(Climate_change_and_infectio	
us_diseases)				
atic filariasis and	viruses	inal and altitudinal	(Climate_cha	
nge_and_infectious_diseases)				
e the O'nyong'nyong	virus	nge are such factors	(Climate_cha	
nge_and_infectious_diseases)				
cell by two or more	virus	infection.Global pre	(Coinfectio	
n)				
ls with hepatitis B	virus	lowed by superinfect	(Coinfectio	

```
n)
rus and hepatitis D    virus             rementally by initia    (Coinfectio
n)
en co-infected with    rhinovirus                (Coinfection)
spiratory syncytial    virus             irus have lower nasa    (Coinfectio
n)
ry syncytial virus,    metapneumovirus   rainfluenza virus ha    (Coinfectio
n)
us or parainfluenza    virus             an those with rhinov    (Coinfectio
n)
ads than those with    rhinovirus                (Coinfection)
              ==       Poliovirus                (Coinfection)
                       Poliovirus         is a positive singl    (Coinfectio
n)
single-stranded RNA    virus             ns appear to be comm    (Coinfectio
n)
e demonstrated that    poliovirus        ost cell.  Kirkegaar    (Coinfectio
n)
ion.  That is, when    polioviruses      ns of host cells, vi    (Coinfectio
n)
hat inactivated the    virus             d evidence that RNA-    (Coinfectio
n)
 single infections.    Poliovirus        ination when at leas    (Coinfectio
n)
ecombination in RNA    viruses                   (Coinfection)
undamaged genome to    virus                     (Coinfection)
                GB     virus                     (Coinfection)
were ill with other    coronaviruses     strains, certain vir    (Coinfectio
n)
s include bacteria,    viruses           examination. Patient    (Community-a
cquired_pneumonia)
cteria. CAP-causing    viruses                   (Community-acquired_pneumoni
a)
ild; herpes simplex    virus             enterovirus can also    (Community-a
cquired_pneumonia)
oviridae, mumps and    enterovirus       achomatis, which, th    (Community-a
cquired_pneumonia)
spiratory syncytial    virus                     (Community-acquired_pneumoni
a)
 virus (RSV), human    metapneumovirus   n parainfluenza viru    (Community-a
cquired_pneumonia)
an metapneumovirus,    adenovirus        uenza viruses, influ    (Community-a
cquired_pneumonia)
human parainfluenza    viruses            RSV is a common sou    (Community-a
cquired_pneumonia)
uses, influenza and    rhinovirus        source of illness an    (Community-a
cquired_pneumonia)
n are different for    viruses                   (Community-acquired_pneumoni
a)
             ===       Viruses                   (Community-acquired_pneumoni
a)
an be attributed to    viruses           nfluenza, human resp    (Community-a
cquired_pneumonia)
spiratory syncytial    virus             lude chickenpox, SAR    (Community-a
cquired_pneumonia)
cytial virus, human    metapneumovirus   rus. Less common vir    (Community-a
cquired_pneumonia)
metapneumovirus and    adenovirus        es which may cause s    (Community-a
cquired_pneumonia)
ovirus. Less common    viruses           s illness include ch    (Community-a
cquired_pneumonia)
SARS, avian flu and    hantavirus        nd invades the cells    (Community-a
cquired_pneumonia)
avirus.Typically, a    virus             gh the inhalation of    (Community-a
```

```
                        cquired_pneumonia)
s are killed by the     virus               ytokines which cause    (Community-a
                        cquired_pneumonia)
 on the lungs, many     viruses                                     (Community-acquired_pneumoni
                        a)
 the herpes simplex     virus                                       (Community-acquired_pneumoni
                        a)
 microorganisms are     viruses              investigated, howev    (Community-a
                        cquired_pneumonia)
iseases caused by a     virus                      (Contagious_disease)
n outbreak of Ebola     virus               town with troops and    (Cordon_sani
                        taire_(medicine))
stern African Ebola     virus               ital, Monrovia, and     (Cordon_sani
                        taire_(medicine))
reak, an Ebola-like     virus               n a small town in Ca    (Cordon_sani
                        taire_(medicine))
meningoencephalitis     virus                      (Cordon_sanitaire_(medicin
                        e))
ntain an infectious     virus                      (Cordon_sanitaire_(medicin
                        e))
aused by the cowpox     virus               is closely related t    (Cowpox)
x virus (CPXV). The     virus               us Orthopoxvirus, is    (Cowpox)
, part of the genus     Orthopoxvirus       the vaccinia virus.     (Cowpox)
ted to the vaccinia     virus               ferable between spec    (Cowpox)
vaccinia virus. The     virus               ic, meaning that it     (Cowpox)
ity to the smallpox     virus                      (Cowpox)
x virus, or Variola     virus               inations and later i    (Cowpox)
ide. Other orthopox     viruses                    (Cowpox)
 such as the cowpox     virus                      (Cowpox)
azil, and monkeypox     virus                      (Cowpox)
th humanized cowpox     virus               orth America. A tube    (Cowpox)
ly-occurring cowpox     virus                W. F. Elgin of the     (Cowpox)
.At some point, the     virus                      (Cowpox)
vaccinia and cowpox     virus               e virus is not commo    (Cowpox)
nearly the same.The     virus               K. Human cases today    (Cowpox)
 domestic cats. The     virus                domestic cats contr    (Cowpox)
rvoir hosts for the     virus               estic cats contract     (Cowpox)
ct and transmit the     virus                      (Cowpox)
fection with cowpox     virus                is prevalent in lat    (Cowpox)
s 9 to 10 days. The     virus                      (Cowpox)
he similar horsepox     virus               English medical prac    (Cowpox)
horsepox and cowpox     viruses                    (Cowpox)
ple of the smallpox     virus               heory. It was later     (Cowpox)
gainst the smallpox     virus               ears, Jenner popular    (Cowpox)
on using the cowpox     virus               ter infection by the    (Cowpox)
ction by the cowpox     virus               rom its antigens and    (Cowpox)
he similar smallpox     virus               ently.The cowpox vir    (Cowpox)
iciently.The cowpox     virus                makes cowpox one of    (Cowpox)
he most complicated     viruses              is so lethal. The v    (Cowpox)
ethal. The vaccinia     virus                      (Cowpox)
ent from the cowpox     virus                      (Cowpox)
nsidered a separate     virus                      (Cowpox)
        Today, the      virus               n Europe, mainly in     (Cowpox)
essed patients. The     virus               ions. Symptoms of in    (Cowpox)
rvoir hosts for the     virus               the virus from these    (Cowpox)
c cats contract the     virus               orelimbs, and paws,     (Cowpox)
fection with cowpox     virus               ate summer and autum    (Cowpox)
ne to ten days. The     virus                      (Cowpox)
e now uses vaccinia     virus                      (Cowpox)
vaccinia virus, the     poxviruses          ar enough that the b    (Cowpox)
ical science.  Many     viruses             the United States, a    (Discovery_o
                        f_disease-causing_pathogens)
ile an unidentified     virus                etiologic agent, th    (Discovery_o
                        f_disease-causing_pathogens)
```

Left context	Keyword	Right context	Reference
an immunodeficiency	virus		(Discovery_of_disease-causing_pathogens)
he discovery of the	virus	the earliest known i	(Discovery_of_disease-causing_pathogens)
ecies or strains of	virus	s conditions leading	(Emerging_infectious_disease)
f virus (e.g. novel	coronaviruses	IV). Some EIDs evolv	(Emerging_infectious_disease)
ovel coronaviruses,	ebolaviruses	IDs evolve from a kn	(Emerging_infectious_disease)
ance, most emergent	viruses		(Emerging_infectious_disease)
whereas other novel	viruses	without being recog	(Emerging_infectious_disease)
onference "Emerging	Viruses	of Viruses and Viral	(Emerging_infectious_disease)
s: The Evolution of	Viruses	1–3 May 1989 in Was	(Emerging_infectious_disease)
onference "Emerging	Viruses	oteSurprisingly, mos	(Emerging_infectious_disease)
s: The Evolution of	Viruses	] It was convened to	(Emerging_infectious_disease)
ngly, most emergent	viruses	us animal hosts to m	(Emerging_infectious_disease)
quent source of new	viruses	ce is human behavior	(Emerging_infectious_disease)
lity of transfer of	viruses	through the AIDS epi	(Emerging_infectious_disease)
ference on emerging	viruses	raphic spread of an	(Emerging_infectious_disease)
r the 1989 Emerging	Viruses	the Program for Mon	(Emerging_infectious_disease)
stern African Ebola	virus	ared the world was t	(Emerging_infectious_disease)
as vaccine-derived	poliovirus		(Emerging_infectious_disease)
	Filovirus	diseases (Ebola vir	(Emerging_infectious_disease)
rus diseases (Ebola	virus	s disease)	(Emerging_infectious_disease)
disease and Marburg	virus		(Emerging_infectious_disease)
pathogenic emerging	Coronaviruses	nd SARS)	(Emerging_infectious_disease)
Nipah	virus	tion	(Emerging_infectious_disease)
ncephalitis include	viruses	sis of cerebrospinal	(Encephalitis)
h as herpes simplex	virus	acteria, fungi, or p	(Encephalitis)
ex virus and rabies	virus	eria, fungi, or para	(Encephalitis)
phalitis are rabies	virus		(Encephalitis)
s are rabies virus,	poliovirus	measles virus.Additi	(Encephalitis)
ovirus, and measles	virus	ral causes are arbov	(Encephalitis)
auses are arboviral	flavivirus	us (La Crosse strain	(Encephalitis)
phalitis, West Nile	virus	(lymphocytic choriom	(Encephalitis)
, West Nile virus),	bunyavirus	osse strain), arenav	(Encephalitis)
(La Crosse strain),	arenavirus	virus), reovirus (C	(Encephalitis)

```
                    s)
ic choriomeningitis    virus             enipavirus infection    (Encephaliti
                    s)
omeningitis virus),     reovirus          ado tick virus), and    (Encephaliti
                    s)
irus (Colorado tick     virus             ctions. The Powassan    (Encephaliti
                    s)
do tick virus), and     henipavirus       . The Powassan virus    (Encephaliti
                    s)
tions. The Powassan     virus                  (Encephalitis)
nduced by bacteria,     viruses           n be obtained throug    (Evolution_o
                    f_Infectious_Disease)
st endures due to a     virus                          (Evolution_of_Infectious_Dis
                    ease)
portions which were     viruses                        (Evolution_of_Infectious_Dis
                    ease)
origin.Human herpes     viruses           promised as well as     (Fever_of_un
                    known_origin)
h one study showing     Cytomegalovirus   7) being present in     (Fever_of_un
                    known_origin)
virus, Epstein-Barr     Virus             , human herpesvirus     (Fever_of_un
                    known_origin)
n-Barr Virus, human     herpesvirus       human herpesvirus 7     (Fever_of_un
                    known_origin)
us 6 (HHV-6), human     herpesvirus       15%, 10%, 14% and 4.    (Fever_of_un
                    known_origin)
r more human herpes     viruses            middle aged adults     (Fever_of_un
                    known_origin)
an immunodeficiency     virus                     (Fever_of_unknown_origin)
athogenic bacteria,     viruses           istory because of in    (Fomite)
athogenic bacteria,     viruses           luid, vomit, or fece    (Fomite)
e contaminated with     virus                   (Fomite)
dults infected with     rhinovirus              (Fomite)
mission of specific     viruses                 (Fomite)
ansmit bacteria and     viruses           and trap the contagi    (Fomite)
 that the influenza     virus                   (Fomite)
e of fomites in the     virus             Control, Cambridge:     (Fomite)
irus transmission",     Viruses           Risks, Surveillance     (Fomite)
d Symptoms of Human     Herpersviruses    ning, ISBN 978-1-284    (Fomite)
ses", Understanding     Viruses           Learning, ISBN 978-1    (Fomite)
s usually caused by     viruses           sually not needed.Pr    (Gastroenter
                    itis)
ritis. In children,     rotavirus         ommon causes. Eating    (Gastroenter
                    itis)
disease. In adults,     norovirus          food, drinking cont    (Gastroenter
                    itis)
of human waste. The     rotavirus         n children. Antibiot    (Gastroenter
                    itis)
 agent. If due to a     virus             ause severe abdomina    (Gastroenter
                    itis)
ldren infected with     rotavirus         is is called "prolon    (Gastroenter
                    itis)
                        Viruses            (particularly rotav    (Gastroenter
                    itis)
ruses (particularly     rotavirus         cherichia coli and C    (Gastroenter
                    itis)
                        Rotaviruses       , noroviruses, adeno    (Gastroenter
                    itis)
        Rotaviruses,     noroviruses       es, and astroviruses    (Gastroenter
                    itis)
ruses, noroviruses,     adenoviruses      iruses are known to     (Gastroenter
                    itis)
, adenoviruses, and     astroviruses      se viral gastroenter    (Gastroenter
                    itis)
```

Left context	Match	Right context	Category
al gastroenteritis.	Rotavirus	en, and produces sim	(Gastroenteritis)
d developing world.	Viruses	d immunity. Noroviru	(Gastroenteritis)
ediatric age group.	Rotavirus	about 18% of all cas	(Gastroenteritis)
acquired immunity.	Norovirus	astroenteritis accou	(Gastroenteritis)
developed countries.	Norovirus	en groups of people	(Gastroenteritis)
diarrhea has ended.	Norovirus		(Gastroenteritis)
ecommended that the	rotavirus	e are in development	(Gastroenteritis)
lly. Two commercial	rotavirus	ia these vaccines re	(Gastroenteritis)
implementation of a	rotavirus	otoxigenic Escherich	(Gastroenteritis)
talities are due to	rotavirus	ses caused 4.6 milli	(Gastroenteritis)
ar with that due to	rotavirus		(Gastroenteritis)
ble gastroenteritis	coronavirus		(Gastroenteritis)
se disease, such as	viruses		(Germ_theory_of_disease)
nic microorganisms (	viruses		(Germ_theory_of_disease)
theory of disease.	Viruses		(Germ_theory_of_disease)
ury, at a time when	viruses		(Germ_theory_of_disease)
iseases, especially	viruses		(Germ_theory_of_disease)
ologists agree that	poliovirus	on that the poliovir	(Germ_theory_of_disease)
conviction that the	poliovirus		(Germ_theory_of_disease)
le is the West Nile	virus	oreign lands, contra	(Globalization_and_disease)
as able to spread a	virus	accines are made par	(Globalization_and_disease)
already global. The	virus	es spread the virus	(Globalization_and_disease)
mployees spread the	virus	mission.As medicine	(Globalization_and_disease)
ade partly from the	virus	complete immunizati	(Globalization_and_disease)
lf, when an unknown	virus	onment, it takes tim	(Globalization_and_disease)
tbreaks and unknown	viruses	illion in the United	(Globalization_and_disease)
"swine flu" or H1N1	virus	e, and human flu.Glo	(Globalization_and_disease)
es alone. H1N1 is a	virus	is important to targ	(Globalization_and_disease)
n the spread of the	coronavirus	sion system.	(Globalization_and_disease)
, the spread of the	coronavirus	smission system.	(Globalization_and_disease)
bal recessions. The	coronavirus	ional disconnect in	(Globalization_and_disease)
contagious airborne	virus	d nasal fluids. When	(Globalization_and_disease)
used by the Variola	virus	a minor, haemorrhagi	(Globalization_and_disease)
ubation period. The	virus	s (coughing, sneezin	(Globalization_and_disease)
known where the HIV	virus	is believed that HI	(Globalization_and_disease)
other, less harmful	virus	almost 110,000 in th	(Globalization_and_disease)
The	virus	break originated in	(Globalization_and_disease)

on_and_disease)			
called it COVID-19 (	coronavirus	. The World Health O	(Globalizati
on_and_disease)			
also warned of the	virus	ppear all over the w	(Globalizati
on_and_disease)			
tegorized among the	viruses	to the World Health	(Globalizati
on_and_disease)			
ers transmitted the	virus	was detected in Wuha	(Globalizati
on_and_disease)			
fication of a novel	coronavirus	ess in January and F	(Globalizati
on_and_disease)			
e new center of the	coronavirus	ave affected almost	(Globalizati
on_and_disease)			
tially carrying the	virus	a new environment. R	(Globalizati
on_and_disease)			
ravel and carry the	virus	ve been marked Level	(Globalizati
on_and_disease)			
do not travel". The	coronavirus	ol the number of con	(Globalizati
on_and_disease)			
chard Dawkins as a "	Virus		(Horizontal_transmission)
reas for nosocomial	rotavirus	policy causes poor-	(Hospital-ac
quired_infection)			
tion, rather than a	virus	y by 1–2 weeks. (Hospital-acquired_p	
neumonia)			
spiratory syncytial	virus	– cause 10–20% of in	(Hospital-ac
quired_pneumonia)			
nocompromised host,	cytomegalovirus	(Hospital-acquired_pneumoni	
a)			
ction number of the	virus	Health Organization	(Human-to-hu
man_transmission)			
nt pathogens may be	viruses	they may be spread t	(Human-to-hu
man_transmission)			
owed that influenza	virus	ian influenza surviv	(Human-to-hu
man_transmission)			
	Norovirus	(Human-to-human_transmissio	
n)			
e of fomites in the	virus	Control. Cambridge:	(Human-to-hu
man_transmission)			
irus transmission".	Viruses	Risks, Surveillance	(Human-to-hu
man_transmission)			
the panel of human	viruses	and again in 2016,	(Human-to-pr
imate_transmission)			
, in incubation the	virus	not replicate. An e	(Incubation_
period)			
rmancy in which the	virus	toms and show no sig	(Incubation_
period)			
nently bacteria and	viruses	ctions with an innat	(Infection)
	Viruses	and related agents	(Infection)
ch as viroids (HIV,	Rhinovirus	and Severe acute res	(Infection)
s (HIV, Rhinovirus,	Lyssaviruses	bies virus, Ebolavir	(Infection)
uses such as Rabies	virus	te respiratory syndr	(Infection)
ch as Rabies virus,	Ebolavirus	evere acute respirat	(Infection)
espiratory syndrome	coronavirus	(Infection)	
ion. There are some	viruses	(Infection)	
s of the body. Some	viruses	in nerves and becom	(Infection)
ample is the herpes	virus	stances arise.Persis	(Infection)
e, Giardia species,	rotaviruses	(Infection)	
e identification of	viruses	infected. The bug is	(Infection)
in culture that the	virus	, a region of dead c	(Infection)
nimals unnecessary.	Viruses	e of the vector of t	(Infection)
re or animals. Some	viruses	the use of a vector	(Infection)
le of identifying a	virus	(Infection)	
face protein from a	virus	(Infection)	
destruction of the	virus	(Infection)	

transmission of the	virus	e existence of peopl	(Infection)
ical origins of the	virus	resistant to HIV inf	(Infection)
to identifying the	virus		(Infection)
and monitoring the	virus	of infected individ	(Infection)
an strains of Ebola	virus	victims transmit the	(Infection)
on zone. Also, this	virus	the spread of Ebola	(Infection)
an immunodeficiency	virus		(Infection)
ictims transmit the	virus	its victims to trav	(Infection)
the foot-and-mouth	virus		(Infection)
neutralization of	viruses	anisms cannot enter	(Infection)
ed clearance of the	virus		(Infection)
otype 1 hepatitis C	virus		(Infection)
a and do not affect	viruses		(Infection)
athogens, including	viruses		(Infection)
e precipitated by a	norovirus		(Infections_associated_with_ diseases)
ctious bacteria and	viruses		(Infections_associated_with_ diseases)
ering of cases. The	virus		(Infections_associated_with_ diseases)
ficile, influenza A	virus	c hygienic measure i	(Infection_p revention_and_control)
influenza A virus,	adenovirus	fungi. As a public h	(Infection_p revention_and_control)
A	virus	hat can cause cancer	(Infectious_ causes_of_cancer)
cancer is called an	oncovirus	n papillomavirus, wh	(Infectious_ causes_of_cancer)
oncovirus or tumor	virus	he human papillomavi	(Infectious_ causes_of_cancer)
e include the human	papillomavirus	ical carcinoma and n	(Infectious_ causes_of_cancer)
inoma; Epstein-Barr	virus	aposi's sarcoma herp	(Infectious_ causes_of_cancer)
ety of Epstein-Barr	virus	ma herpesvirus, whic	(Infectious_ causes_of_cancer)
s; Kaposi's sarcoma	herpesvirus	lymphoma; hepatitis	(Infectious_ causes_of_cancer)
s B and hepatitis C	viruses	t T-cell leukemia/ly	(Infectious_ causes_of_cancer)
man T-cell leukemia	virus	virus, which is asso	(Infectious_ causes_of_cancer)
and bovine leukemia	virus	ment and Public Heal	(Infectious_ causes_of_cancer)
of bovine leukemia	virus	rongly associated wi	(Infectious_ causes_of_cancer)
ectious hepatitis B	virus	er.	(Infectious_causes_of_cance r)
V) plus hepatitis C	virus	largely caused by H	(Infectious_ causes_of_cancer)
below for oncogenic	viruses		(Infectious_causes_of_cance r)
==	Viruses		(Infectious_causes_of_cance r)
	Viruses	are one of the most	(Infectious_ causes_of_cancer)
n by some hepatitis	viruses	about 1 in 200 of pe	(Infectious_ causes_of_cancer)
aharan Africa.Human	papillomaviruses	ranulomatoses and, i	(Infectious_ causes_of_cancer)
sts to identify the	virus	virus-positive muco	(Infectious_ causes_of_cancer)
are also available.	Herpesviruses	mmon cancer-causing	(Infectious_ causes_of_cancer)

mmon cancer-causing causes_of_cancer)	viruses	ancer: the Epstein-	(Infectious_
ruses. Two types of causes_of_cancer)	herpesviruses	with cancer: the E	(Infectious_
: the Epstein-Barr causes_of_cancer)	virus	nonkeratinizing nas	(Infectious_
rus (EBV) and human causes_of_cancer)	herpesvirus	ars to cause all non	(Infectious_
nomas, Epstein-Barr causes_of_cancer)	virus	ated with chronic in	(Infectious_
ation, Epstein-Barr causes_of_cancer)	virus	ll lymphomas. It als	(Infectious_
ent. Both of these causes_of_cancer)	herpesviruses	ared to a control sa	(Infectious_
effusion lymphoma. causes_of_cancer)	Herpesviruses	photropic virus (HTL	(Infectious_
T cell lymphotropic causes_of_cancer)	virus	uses Adult T-cell le	(Infectious_
was the first human causes_of_cancer)	retrovirus	lleagues at NIH. Th	(Infectious_
eagues at NIH. The causes_of_cancer)	virus	suki and colleagues	(Infectious_
man T-cell leukemia causes_of_cancer)	virus	ing sensitive PCR me	(Infectious_
a virus, is another causes_of_cancer)	deltaretrovirus	virus (BLV), which	(Infectious_
us, bovine leukemia causes_of_cancer)	virus	he expected criteria	(Infectious_
cancer.Merkel cell causes_of_cancer)	polyomavirus	s; the remaining tum	(Infectious_
overed human cancer causes_of_cancer)	virus	the same group that	(Infectious_
used by Merkel cell causes_of_cancer)	polyomavirus	V does not directly	(Infectious_
er of this group of causes_of_cancer)	viruses	but it is associated	(Infectious_
an cancer but other causes_of_cancer)	polyomaviruses	uses.HIV does not di	(Infectious_
g additional cancer causes_of_cancer)	viruses	ed with a number of	(Infectious_
is caused by human causes_of_cancer)	herpesvirus	ifest as cancer. Cer	(Infectious_
nly caused by human causes_of_cancer)	papillomavirus	the infections mani	(Infectious_
le to control these causes_of_cancer)	viruses	ble immunodeficiency	(Infectious_
== Common oncogenic r)	viruses	(Infectious_causes_of_cance	
ed countries, human causes_of_cancer)	papillomavirus	patitis C virus (HCV	(Infectious_
(HPV), hepatitis B causes_of_cancer)	virus	) are the most frequ	(Infectious_
BV) and hepatitis C causes_of_cancer)	virus	tly encountered onco	(Infectious_
tered oncogenic DNA r)	viruses	(Infectious_causes_of_cance	
==== Human r)	papillomavirus	(Infectious_causes_of_cance	
groups, individual r)	viruses	(Infectious_causes_of_cance	
g the HPV high-risk causes_of_cancer)	viruses	E7 oncoproteins can	(Infectious_
s B and hepatitis C r)	viruses	(Infectious_causes_of_cance	

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        Hepatitis       virus               d hepatocarcinogenes    (Infectious_
causes_of_cancer)
actors: hepatitis C     virus               orld-wide, liver can    (Infectious_
causes_of_cancer)
 (22%), hepatitis B     virus               47%).  In 2017 there    (Infectious_
causes_of_cancer)
 due to hepatitis B     virus               ng 9% of all cancer     (Infectious_
causes_of_cancer)
 due to hepatitis C     virus               l use (30%).  World-    (Infectious_
causes_of_cancer)
     In addition to     viruses              of bacteria can cau    (Infectious_
causes_of_cancer)
n with Epstein-Barr     virus                the parasite's. Thi    (Infectious_
causes_of_cancer)
 The herpes simplex     virus               instituting an eight    (Infectious_
diseases_(athletes))
n with Epstein-Barr     virus               in-Barr virus infect    (Infectious_
diseases_(athletes))
ics of Epstein-Barr     virus               udy demonstrated tha    (Infectious_
diseases_(athletes))
ies to Epstein-Barr     virus                       (Infectious_diseases_(athlet
es))
an immunodeficiency     virus                       (Infectious_diseases_(athlet
es))
an immunodeficiency     virus               eases.  Unlike hepat    (Infectious_
diseases_(athletes))
mple, the Hepatitis     virus                mounts immune respo    (Infectious_
period)
 such as Ebola, the     virus                       (Infectious_period)
virions (individual     virus                period starts befor    (Infectious_
period)
 air (e.g., rubeola     virus                       (Isolation_(health_care))
measles], varicella     virus               osis, and possibly S    (Isolation_
(health_care))
g., smallpox, Ebola     virus               atients must be plac    (Isolation_
(health_care))
 Health Protection (    Coronavirus                 (Isolation_(health_care))
anine parainfluenza     virus                       (Kennel_cough)
esser extent canine     coronavirus         dult dogs may displa    (Kennel_coug
h)
om canine distemper     virus               CDV and CAV. It typi    (Kennel_coug
h)
rus (CDV) or canine     adenovirus          urs most regularly i    (Kennel_coug
h)
influenza or canine     coronavirus         ; however, respirato    (Kennel_coug
h)
cinating for canine     adenovirus           or disinfecting iss    (Kennel_coug
h)
that contain canine     adenovirus                  (Kennel_cough)
anine parainfluenza     virus               rmula of vaccination    (Kennel_coug
h)
stulates, including     viruses                     (Koch's_postulates)
ologists agree that     poliovirus                  (Koch's_postulates)
n in pure culture.      Viruses                     (Koch's_postulates)
ury, at a time when     viruses                     (Koch's_postulates)
ialism. The role of     oncoviruses         l opportunist" Candi    (Koch's_post
ulates)
 and there are many     viruses             re silenced when a n    (Koch's_post
ulates)
s, Somni cells, and     viruses             hods, and these alte    (Koch's_post
ulates)
le, Somni cells and     viruses             uitable host.Byrd an    (Koch's_post
ulates)
s is similar to how     viruses             ld. Their revisions     (Koch's_post
```

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ulates)
 in axenic culture:      viruses                    ulture is not a suit     (Koch's_post
ulates)
ow the link between      viruses                    have suggested a set     (Koch's_post
ulates)
postulates are: the      virus                      me of experimentatio     (Koch's_post
ulates)
t indicate that the      virus                      o believe that a fif     (Koch's_post
ulates)
 very low levels of      viruses                              (Koch's_postulates)
sociations, such as      papillomavirus                       (Koch's_postulates)
e various microbes,      viruses                    can infect a host vi     (Laboratory-
acquired_infection)
 handling microbes,      viruses                    curity measures in o     (Laboratory-
acquired_infection)
caution on handling      viruses                              (Laboratory-acquired_infecti
on)
h as radiation or a      virus                      e), the term "latent     (Latent_peri
od_(epidemiology))
fornia encephalitis      virus                              (List_of_infections_of_the_c
entral_nervous_system)
            Nipah        virus                      halitis (List_of_infections_of_the_c
entral_nervous_system)
            Slow         virus                      ctions, which includ     (List_of_inf
ections_of_the_central_nervous_system)
isease (Coxsackie B      virus                              (List_of_infectious_diseases
_causing_flu-like_syndrome)
                         Cytomegalovirus                     (List_of_infectious_diseases
_causing_flu-like_syndrome)
equine encephalitis      virus                              (List_of_infectious_diseases
_causing_flu-like_syndrome)
fornia encephalitis      virus                              (List_of_infectious_diseases
_causing_flu-like_syndrome)
                         Enteroviruses                       (List_of_infectious_diseases
_causing_flu-like_syndrome)
            Hendra       virus                              (List_of_infectious_diseases
_causing_flu-like_syndrome)
Human parainfluenza      viruses                            (List_of_infectious_diseases
_causing_flu-like_syndrome)
            Human        rhinovirus                         (List_of_infectious_diseases
_causing_flu-like_syndrome)
             MERS        coronavirus                        (List_of_infectious_diseases
_causing_flu-like_syndrome)
spiratory syncytial      virus                              (List_of_infectious_diseases
_causing_flu-like_syndrome)
             SARS        coronavirus                        (List_of_infectious_diseases
_causing_flu-like_syndrome)
             SARS        coronavirus                        (List_of_infectious_diseases
_causing_flu-like_syndrome)
ns depending on the      virus                      aemophilus influenza     (Lower_respi
ratory_tract_infection)
                         Adenovirus                         (Lower_respiratory_tract_inf
ection)
       Influenza A       virus                              (Lower_respiratory_tract_inf
ection)
       Influenza B       virus                              (Lower_respiratory_tract_inf
ection)
Human parainfluenza      viruses                            (Lower_respiratory_tract_inf
ection)
spiratory syncytial      virus                              (Lower_respiratory_tract_inf
ection)
espiratory syndrome      coronavirus                        (Lower_respiratory_tract_inf
ection)
espiratory syndrome      coronavirus                        (Lower_respiratory_tract_inf
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                        ection)
espiratory syndrome     coronavirus                a        (Lower_respiratory_tract_inf
                        ection)
y against influenza     viruses                    us influenzae, dipht     (Lower_respi
ratory_tract_infection)
 influenza viruses,     adenoviruses               s, rubella, streptoc     (Lower_respi
ratory_tract_infection)
sed by parasites or     viruses                      patients with acute    (Lower_respi
ratory_tract_infection)
of the Epstein-Barr     virus                             (Molecular_mimicry)
          The HIV-1     virus                      shown to cause disea     (Molecular_m
imicry)
n gp41 of the HIV-1     virus                      to cause CNS disease     (Molecular_m
imicry)
e encephalomyelitis     virus                      rteen amino acid seq     (Molecular_m
imicry)
rated the CNS. This     virus                      destruction of the m     (Molecular_m
imicry)
CNS. The TMEV mouse     virus                       virus specific Th1      (Molecular_m
imicry)
damage is caused by     virus                       variant. As a resul     (Molecular_m
imicry)
lve the hepatitis B     virus                             (Molecular_mimicry)
nd the Epstein-Barr     virus                      n around blood vesse     (Molecular_m
imicry)
 the herpes simplex     virus                      tibody made against      (Molecular_m
imicry)
V suggests that the     virus                      bunit. Despite this,     (Molecular_m
imicry)
oplasma capsulatum;     viruses                          (Necrotizing_pneumonia)
 like Influenza and     Adenovirus                       (Necrotizing_pneumonia)
neumonia. Influenza     virus                        is observed that NP    (Necrotizing
_pneumonia)
ome (MERS-CoV), and     coronavirus                      (Negative_room_pressure)
 pathogens, such as     viruses                    In sub-Saharan Afric     (Neglected_t
ropical_diseases)
nthiasis); and (iv)     viruses                          (Neglected_tropical_disease
s)
–100 million dengue     virus                      er is usually not fa     (Neglected_t
ropical_diseases)
ever is caused by a     flavivirus                 stralia.Chikungunya      (Neglected_t
ropical_diseases)
pti mosquitoes. The     virus                      with dengue and incl     (Neglected_t
ropical_diseases)
n 1952. Chikungunya     virus                      ungunya is from the      (Neglected_t
ropical_diseases)
member of the genus     Alphavirus                 ord chikungunya is f     (Neglected_t
ropical_diseases)
. It is caused by a     lyssavirus                 iratory arrest occur     (Neglected_t
ropical_diseases)
ction are bacteria,     viruses                          (Neonatal_infection)
               ===      Viruses                          (Neonatal_infection)
an immunodeficiency     virus                       can occur during la    (Neonatal_in
fection)
table levels of the     virus                            (Neonatal_infection)
              ====      Cytomegalovirus                  (Neonatal_infection)
                        cytomegalovirus             (CMV). Infection is     (Neonatal_in
fection)
    Herpes simplex      virus                      ct the infant during     (Neonatal_in
fection)
ever is caused by a     virus                      other and then trans     (Neonatal_in
fection)
spiratory syncytial     virus                      enza (PIV), and huma     (Neonatal_in
fection)
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cytial virus (RSV),	metapneumovirus	novirus, parainfluen	(Neonatal_in fection)
pneumovirus (hMPV),	rhinovirus	and human coronaviru	(Neonatal_in fection)
za (PIV), and human	coronavirus	h recurrent wheezing	(Neonatal_in fection)
he isolation of the	virus	act is diagnostic. V	(Neonatal_in fection)
ract is diagnostic.	Virus	The presence of the	(Neonatal_in fection)
The presence of the	virus	materials used for i	(Neonatal_in fection)
he detection of the	virus	ng the RSV virus has	(Neonatal_in fection)
identifying the RSV	virus	udies confirm this s	(Neonatal_in fection)
garding the role of	viruses	n microbiomes and th	(Neonatal_in fection)
Herpes simplex	virus		(Non-gonococcal_urethritis)
rpes simplex virus,	Adenovirus		(Non-gonococcal_urethritis)
	Cytomegalovirus		(Non-gonococcal_urethritis)
roorganisms such as	viruses	g neurotoxins, immun	(Occupationa l_safety_and_health)
ch as the West Nile	virus	pneumoconiotic agen	(Occupationa l_safety_and_health)
===	Coronavirus		(Occupational_safety_and_hea lth)
fungi, parasites or	viruses	rom a variety of sou	(Opportunist ic_infection)
===	Viruses		(Opportunistic_infection)
	Cytomegalovirus	is a family of oppo	(Opportunist ic_infection)
ly of opportunistic	viruses	y infection.	(Opportunistic_infec tion)
Human	polyomavirus	so known as JC virus	(Opportunist ic_infection)
2 (also known as JC	virus	multifocal leukoence	(Opportunist ic_infection)
Human	herpesvirus	so known as Kaposi s	(Opportunist ic_infection)
sarcoma-associated	herpesvirus	cancer.	(Opportunistic_infec tion)
d herpesvirus) is a	virus	Kaposi sarcoma, a ty	(Opportunist ic_infection)
HIV is a	virus	gets T cells of the	(Opportunist ic_infection)
by feline leukemia	virus	tions can be treated	(Opportunist ic_infection)
ne immunodeficiency	virus	ated with lymphocyte	(Opportunist ic_infection)
herpes simplex	virus		(Parinaud's_oculoglandular_s yndrome)
or agent, such as a	virus	However, these anima	(Pathogen)
ansmissibility of a	virus		(Pathogen)
ed with virusoid or	virus	s pathogens known. T	(Pathogen)
===	Viruses		(Pathogen)
	Viruses	are small particles	(Pathogen)
taining RNA or DNA.	Viruses	llpox, influenza, mu	(Pathogen)
COVID-19.Pathogenic	viruses	habdoviridae, and To	(Pathogen)
dae, Papovaviridae,	Polyomavirus		(Pathogen)
Bacteriophages are	viruses	that was infected.	(Pathogen)
gen types including	viruses	t viruses include th	(Pathogen)
ants. Notable plant	viruses	f damage to farmers	(Pathogen)
the Papaya ringspot	virus	rs of damage to farm	(Pathogen)

Left context	Keyword	Right context	Label
the Tobacco mosaic	virus	erious problem causi	(Pathogen)
k to coin the term "	virus	using leaf spots, bl	(Pathogen)
s including prions,	viruses	animals. It is estim	(Pathogen)
that are caused by	viruses		(Pathogen)
an immunodeficiency	virus		(Pathogen)
s including prions,	viruses	se symptoms such as	(Pathogen)
acteria, and fungi.	Viruses	ans can cause sympto	(Pathogen)
s are caused by the	virus		(Pathogen)
===	Virus		(Pathogen)
host encounters the	virus	ral infections often	(Pathogen)
Vaccines exist for	viruses	s HIV, dengue, and c	(Pathogen)
mumps, and rubella	viruses	HIV, dengue, and chi	(Pathogen)
s and the influenza	virus	V, dengue, and chiku	(Pathogen)
fluenza virus. Some	viruses	V, dengue, and chiku	(Pathogen)
eatment against the	virus		(Pathogen)
tococcus neoformans.	Viruses		(Pathogen)
ation. Examples of	viruses	e repair of genomic	(Pathogen)
are herpes simplex	virus	he sexual processes	(Pathogen)
an immunodeficiency	virus	al processes in bact	(Pathogen)
virus, and vaccinia	virus	es in bacteria, micr	(Pathogen)
ial eukaryotes, and	viruses	s to facilitate the	(Pathogen)
ith Confirmed Ebola	Virus		(Patient_under_investigation)
ion with 2019 Novel	Coronavirus		(Patient_under_investigation)
Testing Persons for	Coronavirus		(Patient_under_investigation)
ation for the novel	coronavirus		(Patient_under_investigation)
	Adenovirus	is the most common	(Pharyngitis)
by the Epstein–Barr	virus	is with marked redne	(Pharyngitis)
Herpes simplex	virus	iple mouth ulcers.	(Pharyngitis)
Common cold:	rhinovirus	, respiratory syncyt	(Pharyngitis)
n cold: rhinovirus,	coronavirus	ry syncytial virus,	(Pharyngitis)
spiratory syncytial	virus	e infection of the t	(Pharyngitis)
, and parainfluenza	virus	the throat, ear, and	(Pharyngitis)
Picardy sweat, "the	virus		(Picardy_sweat)
predicted that the	virus		(Picardy_sweat)
at we know today as	hantavirus		(Picardy_sweat)
virus infections. A	hantavirus	s spread mainly thro	(Picardy_sweat)
romes. Each type of	hantavirus	he phylogeny of thei	(Picardy_sweat)
lationships between	hantaviruses		(Picardy_sweat)
d by infection with	viruses	d, such as community	(Pneumonia)
rily by bacteria or	viruses	00 strains of infect	(Pneumonia)
nfections with both	viruses	ion-based surveillan	(Pneumonia)
ctedly, respiratory	viruses	actors that predispo	(Pneumonia)
23% had one or more	viruses	a fungal or mycobact	(Pneumonia)
athogens were human	rhinovirus	inflammation of the	(Pneumonia)
atients), influenza	virus	n 5%)."The term pneu	(Pneumonia)
===	Viruses		(Pneumonia)
In adults,	viruses	r about one third of	(Pneumonia)
ated agents include	rhinoviruses	auses pneumonia, exc	(Pneumonia)
clude rhinoviruses,	coronaviruses	irus, respiratory sy	(Pneumonia)
aviruses, influenza	virus	virus (RSV), adenovi	(Pneumonia)
spiratory syncytial	virus	influenza. Herpes si	(Pneumonia)

cytial virus (RSV),	adenovirus	fluenza. Herpes simp	(Pneumonia)
nza. Herpes simplex	virus	ch as newborns, pers	(Pneumonia)
e are high rates of	cytomegalovirus	inate at different t	(Pneumonia)
present. Different	viruses	acute respiratory sy	(Pneumonia)
Outbreaks of other	viruses		(Pneumonia)
sionally, including	hantaviruses	ry syndrome coronavi	(Pneumonia)
ng hantaviruses and	coronaviruses	espiratory syndrome	(Pneumonia)
espiratory syndrome	coronavirus		(Pneumonia)
	Viruses	may reach the lung	(Pneumonia)
spiratory syncytial	virus	eir eyes or nose. Ot	(Pneumonia)
e upper airway, the	viruses	ying degrees of cell	(Pneumonia)
ng parenchyma. Some	viruses	of cell death. When	(Pneumonia)
ing the lungs, many	viruses		(Pneumonia)
her body functions.	Viruses	ial pneumonia can oc	(Pneumonia)
ction of either the	virus		(Pneumonia)
are exposed to the	virus		(Pneumonia)
caused by influenza	viruses	for other types of c	(Pneumonia)
nias including SARS	coronavirus	amivir, zanamivir or	(Pneumonia)
g SARS coronavirus,	adenovirus	, and parainfluenza	(Pneumonia)
avirus, adenovirus,	hantavirus	nfluenza virus. Infl	(Pneumonia)
, and parainfluenza	virus	with rimantadine or	(Pneumonia)
aused by the rabies	virus	s of the Rhabdovirid	(Prevalence_ of_rabies)
s virus. The rabies	virus	Lyssavirus genus of	(Prevalence_ of_rabies)
us, a member of the	Lyssavirus	ridae family, surviv	(Prevalence_ of_rabies)
iers for the rabies	virus		(Prevalence_of_rabies)
m and Thailand, the	virus		(Prevalence_of_rabies)
ed symptoms. Rabies	virus		(Prevalence_of_rabies)
d due to the rabies	virus		(Prevalence_of_rabies)
a transgenic rabies	virus		(Prevalence_of_rabies)
s due to the rabies	virus	ination of canine ra	(Prevalence_ of_rabies)
education about the	virus	e of the U.S. Human	(Prevalence_ of_rabies)
an exposures to the	virus	animals accounted f	(Prevalence_ of_rabies)
e prevalence of the	virus	ncidence and distrib	(Prevalence_ of_rabies)
ular variant of the	virus	utheastern United St	(Prevalence_ of_rabies)
t in some cases the	virus	m a dog or raccoon,	(Prevalence_ of_rabies)
ic strain of rabies	virus	ween 2010 and 2016 h	(Prevalence_of_rabies)
portant species for	virus	ween 2010 and 2016 h	(Prevalence_ of_rabies)
kunk and fox rabies	virus		(Prevalence_of_rabies)
were exposed to the	virus		(Prevalence_of_rabies)
ng the European bat	lyssavirus	ases had received an	(Prevalence_ of_rabies)
es caused by rabies	virus	ny post-exposure pro	(Prevalence_ of_rabies)
Asia.A rabies-like	lyssavirus		(Prevalence_of_rabies)
called European bat	lyssavirus	003. In 2002, there	(Prevalence_ of_rabies)
n with European bat	lyssavirus		(Prevalence_of_rabies)
019 from the rabies	virus	200 years. She contr	(Prevalence_ of_rabies)
She contracted the	virus	puppy they had rescu	(Prevalence_ of_rabies)
ated Australian bat	lyssavirus	eloping ABLV and dyi	(Prevalence_ of_rabies)
ated Australian bat	lyssavirus	resent in bat popula	(Prevalence_

of_rabies)			
erine McIlrath. His	virus	(Prince_Henry_Hospital,_Sydn	
ey)			
gitis and the polio	virus	(Prince_Henry_Hospital,_Sydn	
ey)			
stern African Ebola	virus	(Quarantine)	
5 million) – in the	coronavirus	irus had already spr	(Quarantine)
. By late 2020, the	virus	(Quarantine)	
rapid spread of the	virus	lter-in-place orders	(Quarantine)
, the spread of the	virus	(Quarantine)	
elp Italy fight the	virus	lled "Phase 2" was a	(Quarantine)
urther waves of the	virus	(Quarantine)	
As cases of the	virus	ook hold in more Eur	(Quarantine)
n the spread of the	virus	he United States, 59	(Quarantine)
nfected by computer	viruses	(Quarantine)	
on the distance the	virus	very rarely infected	(Rabies)
Rabies is caused by	lyssaviruses	bites or scratches a	(Rabies)
ncluding the rabies	virus	is spread when an i	(Rabies)
and Australian bat	lyssavirus	nfected animal bites	(Rabies)
name of the rabies	virus	(Rabies)	
f the rabies virus,	Lyssavirus	(Rabies)	
d and the amount of	virus	itation, abnormal be	(Rabies)
l infected with the	virus	(Rabies)	
liva and water, the	virus	of rabies that is m	(Rabies)
used by a number of	lyssaviruses	Australian bat lyssa	(Rabies)
ncluding the rabies	virus	uvenhage lyssavirus	(Rabies)
and Australian bat	lyssavirus	ay cause a rabies-li	(Rabies)
ssavirus. Duvenhage	lyssavirus	ike infection.The ra	(Rabies)
nfection.The rabies	virus	mily Rhabdoviridae,	(Rabies)
type species of the	Lyssavirus	dae, order Mononegav	(Rabies)
e RNA genome of the	virus	d allows entry of th	(Rabies)
the membrane of the	virus	then uses the acidi	(Rabies)
allows entry of the	virus	nd single-strand RNA	(Rabies)
of an endosome. The	virus	cessary, of that end	(Rabies)
or nerve cell, the	virus	d into their corresp	(Rabies)
ter envelope of the	virus	(Rabies)	
virus particle. The	virus	cell.From the point	(Rabies)
point of entry, the	virus	the central nervous	(Rabies)
nervous system. The	virus	licate without being	(Rabies)
system. Once enough	virus	port, as its P prote	(Rabies)
cular junction. The	virus	a protein present i	(Rabies)
rve cells. Once the	virus	the virus travels ce	(Rabies)
in is infected, the	virus	(Rabies)	
ted with the rabies	virus	4; however, infected	(Rabies)
nfected mammals.The	virus	attle, wolves, coyot	(Rabies)
be infected by the	virus	ogs. Other sources o	(Rabies)
ure than the rabies	virus	of the symptoms. On	(Rabies)
ized eutherians.The	virus	may attack without p	(Rabies)
ection by bite, the	virus	atment is almost nev	(Rabies)
ing this phase, the	virus	the brain, it rapidl	(Rabies)
ic rabies. When the	virus	matic, treatment is	(Rabies)
hylaxis. But as the	virus	(Rabies)	
ification of rabies	virus	Negri bodies are 100	(Rabies)
ular infection with	viruses	(Rabies)	
ith viruses such as	herpesviruses	, and arboviruses su	(Rabies)
h as herpesviruses,	enteroviruses	ses such as West Nil	(Rabies)
enteroviruses, and	arboviruses	virus. The most imp	(Rabies)
s such as West Nile	virus	to rule out are herp	(Rabies)
The most important	viruses	implex virus type on	(Rabies)
are herpes simplex	virus	(less commonly) ent	(Rabies)
e, varicella zoster	virus	ses, including coxsa	(Rabies)
and (less commonly)	enteroviruses	es, echoviruses, pol	(Rabies)
oviruses, including	coxsackieviruses	ses, and human enter	(Rabies)
g coxsackieviruses,	echoviruses	nd human enterovirus	(Rabies)

ruses, echoviruses,	polioviruses	enteroviruses 68 to	(Rabies)
oviruses, and human	enteroviruses	viral encephalitis	(Rabies)
40% caused by Nipah	virus	ates. Epidemiologic	(Rabies)
a newly recognized	paramyxovirus	ruses may be introdu	(Rabies)
ikewise, well-known	viruses	, as is illustrated	(Rabies)
is due to West Nile	virus	ge, travel history,	(Rabies)
its, from which the	virus	culture vaccines.	(Rabies)
ended to reduce the	virus		(Rabies)
ough Australian bat	lyssavirus	alian native bat pop	(Rabies)
the raccoon rabies	virus	to dog bites during	(Rabies)
ic awareness of the	virus	ure prophylaxis, inc	(Rabies)
aign eliminated the	virus		(Rabies)
t for a rabies-like	virus	ous rabies was in 19	(Rabies)
ted into a stronger	virus		(Rabies)
shell of the rabies	virus	and thus unable to	(Rabies)
	Virus	Pathogen Database a	(Rabies)
"Rabies	virus	Taxonomy Browser. 11	(Rabies)
ot created to treat	viruses	in, are just as effe	(Respiratory_tract_infection)
om days per episode.	Viruses		(Respiratory_tract_infection)
in human behaviors.	Viruses	cause respiratory i	(Respiratory_tract_infection)
of influenza.Of the	viruses	-round, rhinoviruses	(Respiratory_tract_infection)
e. Influenza, Human	orthopneumovirus	r year-round, rhinov	(Respiratory_tract_infection)
us (RSV), and human	coronaviruses	. Human bocavirus a	(Respiratory_tract_infection)
n the winter. Human	bocavirus	ruses (which cause t	(Respiratory_tract_infection)
ocavirus and Human	metapneumovirus	hinoviruses (which c	(Respiratory_tract_infection)
s occur year-round,	rhinoviruses	cur mostly in the sp	(Respiratory_tract_infection)
human parainfluenza	viruses	s, tend to peak in t	(Respiratory_tract_infection)
he specific strain.	Enteroviruses	mer.	(Respiratory_tract_infection)
th the exception of	rhinoviruses		(Respiratory_tract_infection)
r resources such as	viruses		(Reverse_zoonosis)
at) and influenza A	viruses	erence as the infect	(Reverse_zoonosis)
====	Arboviruses		(Reverse_zoonosis)
Yellow fever	viruses	r viruses, and Zika	(Reverse_zoonosis)
ruses, Dengue fever	viruses	e of the Flavivirus	(Reverse_zoonosis)
r viruses, and Zika	viruses	virus genera and Chi	(Reverse_zoonosis)
viruses are of the	Flavivirus	gunya virus is of th	(Reverse_zoonosis)
era and Chikungunya	virus	of them are conside	(Reverse_zoonosis)
nya virus is of the	Alphavirus	them are considered	(Reverse_zoonosis)
them are considered	arboviruses	ough arthropod vecto	(Reverse_zoonosis)
smission cycles for	arboviruses	mans could be dead-e	(Reverse_zoonosis)
eemergence of these	viruses		(Reverse_zoonosis)
nd can transmit the	virus		(Reverse_zoonosis)
s and transmits the	virus		(Reverse_zoonosis)

onotic cycle of the	virus		(Reverse_zoonosis)
al reservoir of the	virus	level in the blood t	(Reverse_zoonosis)
aintains a suitable	virus	ow the infection of	(Reverse_zoonosis)
eas could carry the	virus		(Reverse_zoonosis)
ika fever: The Zika	virus	gle stranded RNA Fla	(Reverse_zoonosis)
single stranded RNA	Flavivirus	to infect other huma	(Reverse_zoonosis)
hosts. A 2015 zika	virus	ntraamniotically. Bo	(Reverse_zoonosis)
fever: Yellow fever	virus	te of an infected Ae	(Reverse_zoonosis)
ya: The Chikungunya	virus	havirus typically tr	(Reverse_zoonosis)
single stranded RNA	alphavirus	Aedes mosquitoes to	(Reverse_zoonosis)
se with the similar	arbovirus	antibodies.	(Reverse_zoonosis)
e fever: The Dengue	virus	nsmissible by Aedes	(Reverse_zoonosis)
e Dengue virus is a	flavivirus	smissible by Aedes m	(Reverse_zoonosis)
nfections of dengue	viruses	had an 89% to 99% si	(Reverse_zoonosis)
nfected with dengue	virus		(Reverse_zoonosis)
nfected with dengue	virus	th antibodies dengue	(Reverse_zoonosis)
h antibodies dengue	viruses		(Reverse_zoonosis)
tibodies for dengue	virus	cle.	(Reverse_zoonosis)
==== Influenza A	virus	=	(Reverse_zoonosis)
an influenza B like	virus		(Reverse_zoonosis)
==== Influenza A	virus	=	(Reverse_zoonosis)
s to the SARS-CoV-2	coronavirus		(Reverse_zoonosis)
Cats: The	virus	ansmitted in the air	(Reverse_zoonosis)
isolates, that the	virus	ction revealed mild	(Reverse_zoonosis)
==== Influenza A	virus	=	(Reverse_zoonosis)
====	Coronavirus		(Reverse_zoonosis)
outbreak of alpaca	coronavirus	ning at a national a	(Reverse_zoonosis)
en human and alpaca	coronaviruses	a human coronavirus	(Reverse_zoonosis)
und that the alpaca	coronavirus	uggesting that an al	(Reverse_zoonosis)
similar to a human	coronavirus	t an alpaca coronavi	(Reverse_zoonosis)
ting that an alpaca	coronavirus	ess in herds undetec	(Reverse_zoonosis)
ing proved that the	virus		(Reverse_zoonosis)
====	Coronaviruses		(Reverse_zoonosis)
ission of the human	coronavirus	ytes verus) living i	(Reverse_zoonosis)
ging to the species	Betacoronavirus	ing yet another inte	(Reverse_zoonosis)
ertently spread the	virus		(Reverse_zoonosis)
nother interface in	coronavirus		(Reverse_zoonosis)
====	Rhinovirus	==	(Reverse_zoonosis)
man pathogen, human	Rhinovirus	ons in chimpanzees i	(Reverse_zoonosis)
s susceptibility to	rhinovirus		(Reverse_zoonosis)
ans. If respiratory	viruses	non-human primates,	(Reverse_zoonosis)

====	Pneumoviruses	(Reverse_zoonosis)	
orts of respiratory	viruses	Pan troglodytes schw	(Reverse_zoo nosis)
e caused by a human	metapneumovirus	a virus 3).	(Reverse_zoonosis)
MPV, Pneumoviridae,	Metapneumovirus	Paramyxoviridae, Res	(Reverse_zoo nosis)
ovirus) and a human	respirovirus	myxoviridae, Respiro	(Reverse_zoo nosis)
3, Paramyxoviridae,	Respirovirus	(Reverse_zoonosis)	
wn as parainfluenza	virus	(Reverse_zoonosis)	
including bacteria,	viruses	possible location o	(Sepsis)
fection with fungi,	viruses	(Sepsis)	
issue, viremia for	viruses	73.It was discovered	(Sepsis)
million SARS-CoV-2	virus	(Social_distancing)	
n outbreak of Ebola	virus	town with troops and	(Social_dist ancing)
closures during the	coronavirus	(Social_distancing)	
genic dengue type 3	virus	(Sporadic_disease)	
. The type 3 Dengue	virus	(Sporadic_disease)	
stinal parasite, or	virus	infected individual	(Subclinical _infection)
ical Infection with	Rotavirus	(Subclinical_infection)	
nd herpes simplex 2	virus	fection has been com	(Superspread ing_event)
of the frequency of	coronavirus	ARS-CoV-2 infection	(Superspread ing_event)
ent resulted in the	virus	cases and at least 2	(Superspread ing_event)
n half of SARS-CoV2	coronavirus	ng the first coronav	(Superspread ing_event)
ction number of the	virus	easures, is between	(Superspread ing_event)
becoming the first	coronavirus	ents from 20 village	(Superspread ing_event)
an for bringing the	virus	e majority being fro	(Superspread ing_event)
ly March 2020 was a	coronavirus	ases of COVID-19 lin	(Superspread ing_event)
had contracted the	virus	t least 67 people te	(Superspread ing_event)
had contracted the	virus	Canada, Singapore, T	(Superspread ing_event)
ntagious, air-borne	virus	lations. In one Finn	(Superspread ing_event)
ed with Hepatitis C	virus	fetime. (Supervised_injection_site)	
pact on blood-borne	viruses	(Supervised_injection_site)	
creased blood-borne	virus	on incidence, no imp	(Supervised_ injection_site)
an immunodeficiency	virus	(Syphilis)	
ens (e.g. bacteria,	viruses	ng alcohol-based han	(Transmissio n-based_precautions)
VRE, C. difficile,	noroviruses	(Transmission-based_precauti ons)	
ertussis, influenza	virus	r a simple mask (a r	(Transmissio n-based_precautions)
s, influenza virus,	adenovirus	ovirus, N. meningiti	(Transmissio n-based_precautions)
virus, adenovirus,	rhinovirus	itidis, and group A	(Transmissio n-based_precautions)
air (e.g., rubeola	virus	tions is in an airbo	(Transmissio n-based_precautions)
measles], varicella	virus	osis, and possibly S	(Transmissio n-based_precautions)
of cases are due to	norovirus	rease diarrhea. Hosp	(Travelers'_

Left context	Keyword	Right context	Category
		diarrhea)	
bout 80% of cases.	Viruses	enterotoxigenic Esch	(Travelers'_ diarrhea)
ira sequences.While	viruses		(Travelers'_diarrhea)
ll active bacteria,	viruses	method is to combine	(Travelers'_ diarrhea)
d protozoa, but not	viruses		(Travelers'_diarrhea)
gainst bacteria and	viruses		(Travelers'_diarrhea)
ective against both	viruses	orks in clear water,	(Travelers'_ diarrhea)
asite, bacterium or	virus		(Tropical_disease)
ver and the Marburg	virus	h.	(Tropical_disease)
nsult (for example;	virus		(T_helper_cell)
pically bacteria or	viruses	is a dendritic cell	(T_helper_ce ll)
st immunity against	viruses	L-10. Their key effe	(T_helper_ce ll)
s' ADCC to apoptose	virus		(T_helper_cell)
nscription to avoid	virus	sensitivity. Myasthe	(T_helper_ce ll)
ir response against	viruses	llular auto-immune d	(T_helper_ce ll)
t viruses, and some	viruses	d of causing auto-im	(T_helper_ce ll)
an immunodeficiency	virus	such as macrophages	(T_helper_ce ll)
HIV infection, the	virus	rophages), resulting	(T_helper_ce ll)
e marrow). Once the	virus	ted by HIV are permi	(T_helper_ce ll)
y infected with the	virus	pyroptosis (a highly	(T_helper_ce ll)
susceptible to most	viruses	CD4+ T cells are no	(T_helper_ce ll)
ells results in the	virus	kly), increasing the	(T_helper_ce ll)
roliferation of the	virus		(T_helper_cell)
In	coronavirus	sease 2019 (COVID-19	(T_helper_ce ll)
neezing.Symptoms of	rhinovirus	oat does not usually	(Upper_respi ratory_tract_infection)
of pathophysiology,	rhinovirus	ne response. The vir	(Upper_respi ratory_tract_infection)
mmune response. The	viruses	ory tract, but rathe	(Upper_respi ratory_tract_infection)
ls. This allows the	virus	d by bacteria, most	(Upper_respi ratory_tract_infection)
n against influenza	viruses	s may prevent them f	(Upper_respi ratory_tract_infection)
influenza viruses,	adenoviruses	s, rubella, Streptoc	(Upper_respi ratory_tract_infection)
Herpes simplex	virus		(Urethritis)
	Cytomegalovirus		(Urethritis)
Human	papillomavirus	tion	(Vaccine-preventable_disease s)
	Rotavirus	gastroenteritis	(Vaccine-pre ventable_diseases)
Canine	parvovirus		(Vaccine-preventable_disease s)
Feline	calicivirus		(Vaccine-preventable_disease s)
of the quantity of	virus	not to be confused w	(Viral_load)
uring the infective	virus	ly fluids from which	(Viral_load)
, the viral load of	norovirus	or infectious parti	(Viral_load)

Left context	Match	Right context	Label
on garden produce.	Norovirus	vive in the environm	(Viral_load)
on. The quantity of	virus		(Viral_load)
the live amount of	virus	es per millilitre of	(Viral_load)
vailable for HIV-1,	cytomegalovirus	does not implicate a	(Viral_load)
ovirus, hepatitis B	virus	al load monitoring f	(Viral_load)
us, and hepatitis C	virus	g for HIV is of part	(Viral_load)
he concentration of	virus		(Viral_load)
reaction marks the	virus		(Viral_load)
ulate the amount of	virus		(Viral_load)
eks to 1 year. The	virus		(Viral_load)
A	virus	s a submicroscopic i	(Virus)
lls of an organism.	Viruses		(Virus)
the tobacco mosaic	virus	ironment. Viruses ar	(Virus)
98, more than 9,000	virus	s of types of viruse	(Virus)
illions of types of	viruses	th and are the most	(Virus)
in the environment.	Viruses	ecosystem on Earth a	(Virus)
ntity. The study of	viruses		(Virus)
ies of the original	virus	m of independent par	(Virus)
f infecting a cell,	viruses	genetic material, i	(Virus)
oteins by which the	virus	simple helical and i	(Virus)
The shapes of these	virus	are one-hundredth t	(Virus)
ex structures. Most	virus	size of most bacteri	(Virus)
The origins of	viruses	onary history of lif	(Virus)
eria. In evolution,	viruses	cause they carry gen	(Virus)
exual reproduction.	Viruses	on, although they la	(Virus)
all such qualities,	viruses	by blood-sucking in	(Virus)
and as replicators.	Viruses	s known as vectors:	(Virus)
ctors: for example,	viruses	be carried by blood-	(Virus)
such as aphids; and	viruses	-2, chickenpox, smal	(Virus)
cking insects. Many	viruses	and measles, spread	(Virus)
including influenza	viruses	allpox, and measles,	(Virus)
ghing and sneezing.	Norovirus	assed by hand-to-mou	(Virus)
zing. Norovirus and	rotavirus	es of viral gastroen	(Virus)
infectious dose of	norovirus	. The variety of hos	(Virus)
V is one of several	viruses	t a virus can infect	(Virus)
f host cells that a	virus	s, or broad, meaning	(Virus)
e narrow, meaning a	virus	nfecting many.Viral	(Virus)
nates the infecting	virus	PV infection, and vi	(Virus)
ral infection. Some	viruses	ral classes of antiv	(Virus)
re the discovery of	viruses		(Virus)
e English plural is	viruses	noun, which has no	(Virus)
the tobacco mosaic	virus	d the experiments an	(Virus)
introduced the word	virus	eria, formed discret	(Virus)
nck maintained that	viruses	later discredited by	(Virus)
ed the first animal	virus	t bacteria, now call	(Virus)
first animal virus,	aphthovirus	agent of foot-and-mo	(Virus)
scovered a group of	viruses	acteria on an agar p	(Virus)
d'Herelle described	viruses	scovered that the hi	(Virus)
suspension of these	viruses	dead organisms. Cou	(Virus)
t dilutions (lowest	virus	ormed discrete areas	(Virus)
ulate the number of	viruses	of bacterial resist	(Virus)
f the 19th century,	viruses	s in fragments of gu	(Virus)
t for living hosts.	Viruses	and in 1913 E. Stei	(Virus)
od to grow vaccinia	virus	grown on a large sca	(Virus)
tland grew vaccinia	virus	rus was grown on a l	(Virus)
ntil the 1950s when	poliovirus	pathologist Ernest	(Virus)
a and several other	viruses	solid animal tissue	(Virus)
derick Robbins grew	poliovirus	al tissue or eggs. T	(Virus)
c tissue, the first	virus	ilary Koprowski, and	(Virus)
The first images of	viruses	dith Stanley examine	(Virus)
the tobacco mosaic	virus		(Virus)
rt time later, this	virus		(Virus)
The tobacco mosaic	virus	e crystallised and i	(Virus)
of the crystallised	virus	n 1955. In the same	(Virus)

ll structure of the	virus	themselves to form f	(Virus)
fied tobacco mosaic	virus	echanism was probabl	(Virus)
to form functional	viruses	viruses were create	(Virus)
means through which	viruses	olden age of virus d	(Virus)
s the golden age of	virus	during these years.	(Virus)
lant, and bacterial	viruses	vine virus diarrhoea	(Virus)
ars. In 1957 equine	arterivirus	re discovered. In 19	(Virus)
the cause of Bovine	virus	overed. In 1963 the	(Virus)
virus diarrhoea (a	pestivirus	In 1963 the hepatit	(Virus)
963 the hepatitis B	virus	rd Temin described t	(Virus)
described the first	retrovirus	RNA, was first desc	(Virus)
se, the enzyme that	retroviruses	scribed in 1970 by T	(Virus)
first isolated the	retrovirus	are found wherever	(Virus)
	Viruses		
lved. The origin of	viruses	ddition, viral genet	(Virus)
trace back ancient	viruses		(Virus)
lain the origins of	viruses		(Virus)
	Viruses	may have once been	(Virus)
ng cells that, like	viruses	ll. This is also cal	(Virus)
Some	viruses	have evolved from bi	(Virus)
the origin of some	viruses		(Virus)
is also called the '	virus	oposes that viruses	(Virus)
' and proposes that	viruses	of protein and nucle	(Virus)
e not classified as	viruses	st machinery for the	(Virus)
e common to several	viruses	code for proteins bu	(Virus)
The hepatitis delta	virus	icate independently	(Virus)
ed from hepatitis B	virus	rus genome may repli	(Virus)
refore, a defective	virus	ce inside a host cel	(Virus)
ugh hepatitis delta	virus	ntly once inside a h	(Virus)
help of hepatitis B	virus	virophage is depend	(Virus)
age is dependent on	mimivirus	the host cell, are	(Virus)
castellanii. These	viruses	st cell, are called	(Virus)
e presence of other	virus	d may represent evol	(Virus)
ates of viroids and	viruses	the smallest of cell	(Virus)
tes do not resemble	viruses	uses in that they re	(Virus)
other structures on	virus	t cells. Viruses are	(Virus)
irus particles. The	virus	ntravened the defini	(Virus)
d the definition of	viruses	cognised as ancient	(Virus)
require host cells.	Viruses	ving origins that pr	(Virus)
s between different	viruses	se hypotheses is cor	(Virus)
ancestors of modern	viruses		(Virus)
all currently known	viruses	s in the past by one	(Virus)
ommon ancestor, and	viruses	res that interact wi	(Virus)
s differ on whether	viruses	herit genetic mutati	(Virus)
basic unit of life.	Viruses	as self-assembling	(Virus)
reproduce, whereas	viruses	elf-assembling organ	(Virus)
natural selection.	Virus	display a wide dive	(Virus)
	Viruses	inside an Escherich	(Virus)
ogies'. In general,	viruses	e been studied are s	(Virus)
usand bacteriophage	viruses	0 and 300 nanometres	(Virus)
terium's cell. Many	viruses	st viruses cannot be	(Virus)
00 nanometres. Some	filoviruses	se them. To increase	(Virus)
y about 80 nm. Most	viruses	vered with the stain	(Virus)
he contrast between	viruses	gical distinction. V	(Virus)
und only.A complete	virus	distinction. Virall	(Virus)
called capsomeres.	Viruses	ally (physically) pr	(Virus)
the presence of the	virus	at assist in the con	(Virus)
rus genome. Complex	viruses		(Virus)
e capsid and entire	virus		(Virus)
main morphological	virus	omposed of a single	(Virus)
These	viruses		(Virus)
died tobacco mosaic	virus	mples of helical vir	(Virus)
co mosaic virus and	inovirus		(Virus)
examples of helical	viruses		

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         Most animal    viruses        dral or near-spheric   (Virus)
e icosahedron. Many     viruses        e called hexons. Hex   (Virus)
ny viruses, such as     rotavirus        60 capsomers and ap  (Virus)
     Some species of    virus          ves in a modified fo   (Virus)
the host. Influenza     virus                     (Virus)
espiratory syndrome     coronavirus    are dependent on the   (Virus)
egy. Most enveloped     viruses                   (Virus)
              These     viruses        ss a capsid that is    (Virus)
e into the cell.The     poxviruses                (Virus)
  are large, complex    viruses        ogy. The viral genom   (Virus)
known function. The     virus                     (Virus)
         ==== Giant     viruses                   (Virus)
                        Mimivirus        is one of the large  (Virus)
rgest characterised     viruses        ilaments measuring 1   (Virus)
  largest then known    virus           about twice as larg   (Virus)
Provisionally named     Megavirus      ile and Australia, a   (Virus)
scope. In 2013, the     Pandoravirus   e as Megavirus and M   (Virus)
t twice as large as     Megavirus      s: Mimiviridae, Pith   (Virus)
ge as Megavirus and     Mimivirus      iruses have dsDNA ge   (Virus)
imivirus. All giant     viruses        and they are classif   (Virus)
dnaviridae, and the     Mollivirus     ranging from spindle   (Virus)
llivirus genus.Some     viruses        have complex structu   (Virus)
o any other form of     virus           viruses that resemb   (Virus)
haped structures to     viruses        the tailed bacteriop   (Virus)
les. Other archaeal     viruses                   (Virus)
  different types of    viruses         virus has either a    (Virus)
uary 2021, the NCBI     Virus          e to be discovered.A   (Virus)
  to be discovered.A    virus           RNA genomes. Plant    (Virus)
and is called a DNA     virus          s have RNA genomes.    (Virus)
DNA virus or an RNA     virus           The vast majority o   (Virus)
he vast majority of     viruses        have single-stranded   (Virus)
  RNA genomes. Plant    viruses        NA genomes and bacte   (Virus)
circular, as in the     polyomaviruses  the genome is often   (Virus)
r linear, as in the     adenoviruses   vant to the shape of   (Virus)
e genome. Among RNA     viruses        e it is called segme   (Virus)
ses and certain DNA     viruses        ivided up into separ   (Virus)
  segmented. For RNA    viruses        ments are not requir   (Virus)
same virion for the     virus          le-stranded (ss) or    (Virus)
ted by brome mosaic     virus          ective of nucleic ac   (Virus)
several other plant     viruses         of nucleic acid typ   (Virus)
us to a ladder. The     virus          (called the 'minus-    (Virus)
s particles of some     virus          e belonging to the H   (Virus)
e-stranded.For most     viruses        or negative-sense (c   (Virus)
NA nomenclature for     viruses                   (Virus)
  of ssDNA and ssRNA    viruses                   (Virus)
e. Examples include     geminiviruses             (Virus)
ich are ssDNA plant     viruses        iruses of animals.     (Virus)
A plant viruses and     arenaviruses    ssRNA viruses of an   (Virus)
es, which are ssRNA     viruses                   (Virus)
  smallest—the ssDNA    circoviruses   size of only two kil   (Virus)
es; the largest—the     pandoraviruses re arranged in the g   (Virus)
bout 2500 proteins.     Virus          ral, RNA viruses hav   (Virus)
lap.In general, RNA     viruses        aximum upper size li   (Virus)
nome sizes than DNA     viruses        cating, and have a m   (Virus)
licating render the     virus          he chance that an er   (Virus)
  To compensate, RNA    viruses        into smaller molecul   (Virus)
e. In contrast, DNA     viruses        xtreme of the ssRNA    (Virus)
. Single-strand DNA     viruses        se.      (Virus)
xtreme of the ssRNA     virus                     (Virus)
                        Viruses          undergo genetic cha  (Virus)
n the genome of the     virus          nome can shuffle and   (Virus)
pens with influenza     viruses        same species but wit   (Virus)
s might result. RNA     viruses        ms of viruses of the   (Virus)
pecies or swarms of     viruses         genome nucleoside s   (Virus)
```

localhost:8889/nbconvert/html/Downloads/RegEx.ipynb?download=false 71/85

ferent strains of a	virus	hich a strand of DNA	(Virus)
and produce progeny	viruses	r 'viral sex'.Geneti	(Virus)
This can occur when	viruses	(Virus)	
to both RNA and DNA	viruses	(Virus)	
ies of the original	virus	infects a limited r	(Virus)
e of host cell of a	virus	nfect only cells in	(Virus)
ved to favour those	viruses	o enter.Penetration	(Virus)
es of non-enveloped	virus	of animal cells. Pl	(Virus)
eins that allow the	virus	follows attachment:	(Virus)
of chitin, so most	viruses	rus must breach to i	(Virus)
l. Nearly all plant	viruses	f single-stranded nu	(Virus)
h as tobacco mosaic	virus	ell to cell, in the	(Virus)
g cell walls that a	virus	nome into the bacter	(Virus)
smaller size, some	viruses	is a process in whic	(Virus)
acid.Replication of	viruses	with larger genomes,	(Virus)
positive-sense RNA	viruses	viruses with larger	(Virus)
llowed, for complex	viruses	self-assembly of the	(Virus)
elf-assembly of the	virus	be released from the	(Virus)
ns often occurs. In	viruses	s after the virus ha	(Virus)
n) occurs after the	virus	cell by lysis, a pr	(Virus)
host cell.Release –	Viruses	ess that kills the c	(Virus)
ial and some animal	viruses	s a "provirus" or, i	(Virus)
nimal viruses. Some	viruses	sogenic cycle where	(Virus)
is then known as a "	provirus	e provirus or propha	(Virus)
At some point, the	provirus	us acquires its enve	(Virus)
rise to the active	virus	es (e.g., HIV) typic	(Virus)
st cells. Enveloped	viruses	st cell by budding.	(Virus)
g this process, the	virus	. (Virus)	
tic material within	virus	y which the material	(Virus)
different types of	viruses	(Virus)	
DNA	viruses	(Virus)	
ication of most DNA	viruses	If the cell has the	(Virus)
its surface, these	viruses	eceptor-mediated end	(Virus)
ell membrane (e.g.,	herpesviruses	irely dependent on t	(Virus)
docytosis. Most DNA	viruses	nery and RNA process	(Virus)
ocessing machinery.	Viruses	cell's nuclear membr	(Virus)
enter the cell.RNA	viruses	(Virus)	
Replication of RNA	viruses	e in the cytoplasm.	(Virus)
the cytoplasm. RNA	viruses	ng on their modes of	(Virus)
single-stranded RNA	viruses	to create copies of	(Virus)
e-stranded. All RNA	viruses	(Virus)	
everse transcribing	viruses	(Virus)	
everse transcribing	viruses	idae, Metaviridae, P	(Virus)
everse transcribing	viruses	ng genome replicatio	(Virus)
s with RNA genomes (	retroviruses	to replicate, wherea	(Virus)
e with DNA genomes (	pararetroviruses	scriptase, or RNA-de	(Virus)
ic acid conversion.	Retroviruses	pecially plant parar	(Virus)
he host genome as a	provirus	copies of especiall	(Virus)
eplication process;	pararetroviruses	especially plant par	(Virus)
of especially plant	pararetroviruses	at inhibit the rever	(Virus)
rise to infectious	virus	at inhibit the rever	(Virus)
is HIV, which is a	retrovirus	(Virus)	
ncludes Hepatitis B	virus	(Virus)	
emical effects that	viruses	'cytopathic effects	(Virus)
thic effects'. Most	virus	e cell lysis, altera	(Virus)
e of suppression by	virus	as papillomaviruses	(Virus)
e components of the	virus	radual. Some viruses	(Virus)
ss is gradual. Some	viruses	ignancy, while other	(Virus)
uch as Epstein–Barr	virus	ate without causing	(Virus)
ile others, such as	papillomaviruses	(Virus)	
Some	viruses	e no apparent change	(Virus)
Cells in which the	virus	mally. This causes p	(Virus)
infections and the	virus	(Virus)	
he case with herpes	viruses	(Virus)	

```
                           Viruses                     are by far the most       (Virus)
        Different types of  viruses               s, such as rabies vi          (Virus)
     e, such as smallpox     virus                e. Other viruses, su          (Virus)
     w host range. Other    viruses               t infect plants are           (Virus)
     ses, such as rabies     virus                species of mammals a          (Virus)
      a broad range. The    viruses               s are harmless to hu          (Virus)
     o animals, and most    viruses               range of some bacter          (Virus)
     The complete set of    viruses                      (Virus)
      example, all human    viruses                      (Virus)
     be the diversity of    viruses               arities. In 1962, An          (Virus)
      develop a means of     virus                re grouped according          (Virus)
     genus, and species.    Viruses               tional Committee on           (Virus)
     ttee on Taxonomy of    Viruses                difficult to determ          (Virus)
     mall genome size of    viruses               to be used to supple          (Virus)
     lationships between    viruses                      (Virus)
     r weight on certain     virus                been established. On          (Virus)
     tem for classifying    viruses               21, 6 realms, 10 kin          (Virus)
      total diversity of    viruses               , 39 classes, 65 ord          (Virus)
     d 10,434 species of    viruses               s are unused, wherea          (Virus)
     ---------------------------------------------------------------------------
     AttributeError                       Traceback (most recent call last)
     ~\AppData\Local\Temp/ipykernel_900/1483450043.py in <module>
         17                  #now we need to find the position of the result in the line
         18                  position = re.search(r'\b'+virus+r'\b',line[start:])
     ---> 19                  start = start + position.start()
         20                  end = start + position.end()
         21                  left_context = ' '*max(0,20-start)  + line[max(0,start-20):s
     tart]

     AttributeError: 'NoneType' object has no attribute 'start'
```

Another application

We also could count which virus is mentioned how often:

```
In [21]:  from collections import Counter

          viruscount = Counter()

          filelist = glob.glob("infect/*.txt")
          for f in filelist:
              file = codecs.open(f,'r','utf8')

              for line in file:
                  line = line.strip()
                  resultlist = re.findall(r'(([A-Z][a-z]+( |-)){,2}[\w-]*[Vv]irus(es)?)\b',lin

                  if len(resultlist) > 0:
                      for result in resultlist:
                          virus = result[0]
                          viruscount.update([virus])

          viruscount.most_common()
```

```
Out[21]:  [('virus', 482),
           ('viruses', 347),
           ('Viruses', 58),
           ('coronavirus', 41),
           ('The virus', 25),
           ('Some viruses', 13),
           ('rhinovirus', 11),
           ('rotavirus', 11),
```

```
('Barr virus', 10),
('Ebola virus', 10),
('lyssavirus', 10),
('West Nile virus', 9),
('poliovirus', 9),
('coronaviruses', 9),
('adenovirus', 9),
('herpesvirus', 9),
('Virus', 8),
('Epstein-Barr virus', 8),
('Coronavirus', 6),
('Many viruses', 6),
('Cytomegalovirus', 6),
('Norovirus', 6),
('These viruses', 6),
('metapneumovirus', 5),
('hantavirus', 5),
('norovirus', 5),
('adenoviruses', 5),
('papillomavirus', 5),
('herpesviruses', 5),
('polyomavirus', 5),
('Nipah virus', 4),
('Rotavirus', 4),
('cytomegalovirus', 4),
('retrovirus', 4),
('Adenovirus', 4),
('Plant viruses', 4),
('The viruses', 3),
('Poliovirus', 3),
('African Ebola virus', 3),
('Emerging Viruses', 3),
('Marburg virus', 3),
('Coronaviruses', 3),
('flavivirus', 3),
('Rhinovirus', 3),
('Rabies virus', 3),
('Herpesviruses', 3),
('polyomaviruses', 3),
('rhinoviruses', 3),
('Lyssavirus', 3),
('enteroviruses', 3),
('arboviruses', 3),
('retroviruses', 3),
('provirus', 3),
('pararetroviruses', 3),
('polioviruses', 2),
('Variola virus', 2),
('ebolaviruses', 2),
('Rotaviruses', 2),
('noroviruses', 2),
('The coronavirus', 2),
('oncovirus', 2),
('Human papillomaviruses', 2),
('Human papillomavirus', 2),
('Hepatitis virus', 2),
('Enteroviruses', 2),
('Influenza virus', 2),
('Chikungunya virus', 2),
('Alphavirus', 2),
('hantaviruses', 2),
('lyssaviruses', 2),
('Flavivirus', 2),
('Canine parvovirus', 2),
```

```
('Most virus', 2),
('Most viruses', 2),
('Mimivirus', 2),
('Megavirus', 2),
('Retroviruses', 2),
('Other viruses', 2),
('-virus', 2),
('Plant virus', 2),
('Vaccina virus', 1),
('Lassa virus', 1),
('Several viruses', 1),
('enterovirus', 1),
('Orthopoxvirus', 1),
('poxviruses', 1),
('Filovirus', 1),
('bunyavirus', 1),
('arenavirus', 1),
('reovirus', 1),
('henipavirus', 1),
('The Powassan virus', 1),
('Epstein-Barr Virus', 1),
('Human Herpersviruses', 1),
('Understanding Viruses', 1),
('The rotavirus', 1),
('astroviruses', 1),
('Lyssaviruses', 1),
('Ebolavirus', 1),
('rotaviruses', 1),
('deltaretrovirus', 1),
('oncoviruses', 1),
('Slow virus', 1),
('Hendra virus', 1),
('Human rhinovirus', 1),
('This virus', 1),
('Human polyomavirus', 1),
('Human herpesvirus', 1),
('Pathogenic viruses', 1),
('Polyomavirus', 1),
('Confirmed Ebola Virus', 1),
('Novel Coronavirus', 1),
('Different viruses', 1),
('His virus', 1),
('Duvenhage lyssavirus', 1),
('coxsackieviruses', 1),
('echoviruses', 1),
('paramyxovirus', 1),
('Human orthopneumovirus', 1),
('Human bocavirus', 1),
('Human metapneumovirus', 1),
('Arboviruses', 1),
('Zika viruses', 1),
('The Zika virus', 1),
('The Chikungunya virus', 1),
('alphavirus', 1),
('arbovirus', 1),
('The Dengue virus', 1),
('Betacoronavirus', 1),
('Pneumoviruses', 1),
('Metapneumovirus', 1),
('respirovirus', 1),
('Respirovirus', 1),
('Dengue virus', 1),
('While viruses', 1),
('In coronavirus', 1),
```

```
        ('Feline calicivirus', 1),
        ('aphthovirus', 1),
        ('arterivirus', 1),
        ('Bovine virus', 1),
        ('pestivirus', 1),
        ('mimivirus', 1),
        ('Some filoviruses', 1),
        ('Complex viruses', 1),
        ('inovirus', 1),
        ('The poxviruses', 1),
        ('Giant viruses', 1),
        ('Pandoravirus', 1),
        ('Mollivirus', 1),
        ('geminiviruses', 1),
        ('arenaviruses', 1),
        ('circoviruses', 1),
        ('pandoraviruses', 1),
        ('In viruses', 1),
        ('Enveloped viruses', 1),
        ('papillomaviruses', 1),
        ('Adenoviruses', 1),
        ('Poxviruses', 1),
        ('Parvoviruses', 1),
        ('Reoviruses', 1),
        ('Picornaviruses', 1),
        ('Togaviruses', 1),
        ('Orthomyxoviruses', 1),
        ('Rhabdoviruses', 1),
        ('Hepadnaviruses', 1),
        ('bornavirus', 1),
        ('Although viruses', 1),
        ('Filoviruses', 1),
        ('marburgviruses', 1),
        ('Other coronaviruses', 1),
        ('Cancer viruses', 1),
        ('Hepatitis viruses', 1),
        ('Because viruses', 1),
        ('Such viruses', 1),
        ('Animal viruses', 1),
        ('Bacterial viruses', 1),
        ('Archaeal viruses', 1),
        ('caliciviruses', 1),
        ('parvoviruses', 1),
        ('Synthetic viruses', 1)]
```

In [22]:
```python
len(viruscount)
```

Out[22]: 180

In [23]:
```python
sum(viruscount.values())
```

Out[23]: 1374

Exercises

- Find a list of all diseases ending with -itis

In [24]:
```python
filelist = glob.glob("infect/*.txt")
```

```python
l_diseases = []
for f in filelist:
    file = codecs.open(f,'r','utf8')
    for line in file:
        result = re.search('(\w)+itis',line)
        if result:
            l_diseases.append(result.group(0))

pprint(list(set(l_diseases)))
```

```
['aortitis',
 'lymphangitis',
 'peribronchitis',
 'osteomyelitis',
 'pharyngitis',
 'peritonitis',
 'encephalitis',
 'chorioretinitis',
 'Appendicitis',
 'pulpitis',
 'Discitis',
 'cellulitis',
 'cervicitis',
 'Urethritis',
 'parasitis',
 'rhinotracheitis',
 'Gastroenteritis',
 'tonsillitis',
 'lymphadenitis',
 'Britis',
 'laryngitis',
 'Rhinitis',
 'Cellulitis',
 'Poliomyelitis',
 'bronchiolitis',
 'Endocarditis',
 'rhinitis',
 'pancreatitis',
 'urethritis',
 'whitis',
 'rectocolitis',
 'Periostitis',
 'gastroenteritis',
 'immitis',
 'conjunctivitis',
 'osteitis',
 'panencephalitis',
 'Myocarditis',
 'Enterocolitis',
 'cystitis',
 'cerebritis',
 'Encephalitis',
 'arthritis',
 'tendinitis',
 'pyelonephritis',
 'prostatitis',
 'fasciitis',
 'epiglottitis',
 'colitis',
 'hepatitis',
 'Pancreatitis',
 'Tracheobronchitis',
 'polyangiitis',
 'bronchitis',
```

```
            'Pneumonitis',
            'arteritis',
            'pneumonitis',
            'endocarditis',
            'adenitis',
            'otitis',
            'keratitis',
            'Adenitis',
            'poliomyelitis',
            'Cholangitis',
            'Pericoronitis',
            'cholangitis',
            'uveitis',
            'Pharyngitis',
            'tracheobronchitis',
            'Rhinotracheitis',
            'enteritis',
            'Pyelonephritis',
            'Hepatitis',
            'encephalomyelitis',
            'Meningitis',
            'epididymitis',
            'Mastitis',
            'meningoencephalitis',
            'Bronchitis',
            'appendicitis',
            'discitis',
            'tenosynovitis',
            'chorioamnionitis',
            'Diverticulitis',
            'meningitis']
```

Hearst Patterns

In [30]:
```python
list_patterns = ['\w+ such as (the)? \w+ ((and | or) \w+)?','\w+(,?) especially \w+
                '\w+(,?) including \w+ ((and | or) \w+)?', '((\w+(,?))+ and other \
                '((\w+(,?))+ or other \w+)']

filelist = glob.glob("infect/*.txt")

for item in list_patterns:
    count = 0
    for f in filelist:
        file = codecs.open(f,'r','utf8')
        for line in file:
            result = re.search(item, line)
            if result:
                print(result.group(0))
                count += 1
    print('\n')
    print('Number of supporting examples in regular expression ', count)
    print('\n------------------------------------\n')
```

```
Organizations such as the American
resistance such as the potential
rules such as the pneumonia
terms such as the infective
criteria such as the Bradford
organisms such as the African
animals such as the West
problems such as the growing
countries such as the US
```

```
responses such as the SOS
elements such as the Little
phase such as the Rehabilitation
wards such as the Heffron
sites such as the Lazzarettos
vehicles such as the ambulance
landmarks such as the Columbia
strains such as the highly
people such as the elderly
profiles such as the Th3
others such as the National
Cells such as the macrophage
pandemics such as the 1918
```

```
Number of supporting examples in regular expression   22
```

```
------------------------------------
```

```
administered, especially if
enforced, especially in
fear especially if
are especially associated
is especially susceptible
obstruction, especially in
more, especially with
or especially severe
resolve, especially in
people, especially those
important, especially in
Drinks especially high
diseases, especially viruses
are especially damaged
is especially common
be especially troublesome
disease, especially prevalent
vector, especially in
is especially useful
prove especially useful
is especially infective
be especially troublesome
viruses, especially hepatitis
pylori, especially if
Africa, especially when
countries, especially in
disease, especially in
circumstances, especially in
routinely, especially during
diseases, especially viral
administration, especially with
is especially true
eradication, especially for
partnerships, especially if
infections, especially when
be especially beneficial
fatalities, especially in
were especially high
health, especially when
OSHA, especially for
used, especially in
is especially important
animals, especially those
was especially necessary
disease, especially in
```

```
        furious, especially when
        relationships, especially within
        unique, especially the
        rights, especially in
        is especially important
        stray, especially if
        bat, especially in
        but especially in
        physicians, especially after
        are especially vulnerable
        panic, especially for
        sex, especially sexual
        pathogens, especially those
        is especially important
        tests, especially those
        months, especially in
        is especially good
        infections, especially in
        of especially plant
        risk, especially in
        products, especially pork


        Number of supporting examples in regular expression   66

        ------------------------------------

        testing, including failure
        antibiotics, including the
        reasons including cost
        instruments, including balloons
        hazards, including needles
        yeast, including those
        regions, including the
        countries, including countries
        populations including children
        change, including the
        ways including by
        causes including Streptococcus
        infection, including bacterial
        microbes, including novel
        bacteria, including Klebsiella
        symptoms including reduced
        science, including epidemiology
        lifestyle, including their
        ailments including rheumatism
        syndrome including parasites
        organisms, including Clostridium
        peens, including half
        groups, including Roman
        symptoms including cough
        microorganisms, including bacteria
        Ascomycota, including yeasts
        Basidiomycota, including the
        association including studies
        surfaces including medical
        of including all
        body, including the
        throat, including the
        antibiotics, including penicillin
        agents, including certain
        agents, including epidemiologically
        transmission, including proper
        organisms, including CDV
```

administration, including parenteral
postulates, including viruses
rate, including specific
infection including lung
symptoms, including abdominal
packages including four
HIV, including previous
biohazards, including animal
pathologies, including impetigo
infections, including tuberculosis
organisms, including microscopic
humans including Candida
bacteria including both
occasionally, including hantaviruses
lungs, including Toxoplasma
pneumonias including SARS
factors, including the
wildlife, including the
War, including the
them, including Matron
Avenue, including retaining
Avenue, including ornamental
setting, including adjacent
setting, including associated
setting, including sandstone
Group, including former
Coastline, including coastal
Cemetery including its
Site including Critical
elements, including rock
plans including retaining
time including separate
buildings, including Heffron
hospital, including Ward
personnel, including Dr
buildings, including the
features, including Pine
community, including the
evidence, including oral
institutions, including the
activity, including motor
patients, including those
Health, including the
days, including the
orders, including a
then, including for
voyage, including 36
lyssaviruses, including the
lyssaviruses including the
environments, including the
infections, including environmental
mosquitoes including Haemagogus
processes, including excessive
sepsis, including people
individuals, including the
used, including the
all, including essential
and including complete
measures, including closing
services including special
factors including a
locals, including 19
cities, including 30
General including the

extremities, including the
subspecies, including yaws
testing, including email
figures, including Franz
literature including John
resuscitation including the
agents, including certain
agents, including epidemiologically
Toxins including Tropical
viruses, including HIV
tract, including the
UTIs including acute
fluoroquinolones, including a
fluid, including biological
microorganisms, including bacteria
viruses, including influenza
families, including both
species including tomatoes
phytoplankton including harmful
roundworm, including species

Number of supporting examples in regular expression 121

----

blotting, and other DNA
epidermidis and other opportunistic
fever and other virulent
blood and other body
care and other case
pathogens and other diseases
devices and other sharps
species, and other anaerobes
kidneys, and other organs
cats, and other animals
vasculature and other tissues
IPPC and other policy
humans and other animals
humans and other animals
viruses and other microorganisms
lung and other affected
therapy, and other symptoms
1989 and other areas
diseases and other infectious
Kingdom and other parts
syphilis and other various
syphilis and other STDs
spacecraft and other property
fever and other inflammatory
home and other consequences
animals, and other living
eye, and other infectious
smallpox and other diseases
this and other silkworm
these and other diseases
forces and other groups
crusaders and other travelers
legal and other contextual
this and other effects
bloodstream and other parts
sepsis and other severe
washing, and other preventive
bloodstream, and other parts

skin and other superficial
omics, and other advanced
community, and other epidemiological
individuals and other interactions
insects and other animals
Ships and other cargo
eye, and other infectious
bacteriologists and other specialists
diet and other lifestyle
monitors and other general
tabs and other modifications
microbiology and other online
blood and other materials
Japan and other neurological
AIDS and other forms
facility, and other shared
monitors and other general
food and other necessities
hospitals and other medical
atelectasis and other severe
penicillin and other penicillin
methicillin, and other beta
antigen and other antigens
Chromoblastomycosis and other deep
trichomoniasis, and other neglected
Chromoblastomycosis and other deep
diseases and other communicable
NTDs and other diseases
companies and other private
infection and other sexually
membranes and other obstetrical
skin and other human
bone and other internal
literature, and other evidence
postures, and other disease
economic and other benefits
surfaces and other hazards
Pesticides and other chemicals
foundries and other harmful
Regulations and other subsidiary
customers and other stakeholders
ideas and other different
hazards and other relevant
browning and other issues
tonsils and other parts
smoke and other air
vary, and other patterns
penicillin and other antibiotics
muzzling, and other measures
dogs and other wild
pollens and other microflora
wood and other natural
Marseille and other places
Wuhan and other major
humans and other mammals
weasels, and other wild
reactions, and other intense
excreta, and other substrata
humans and other animals
humans and other animals
gatherings and other social
leprosy and other contagious
theatres, and other places
theaters, and other public

```
behavior and other signs
housekeepers, and other contacts
syphilis and other sexually
patient and other patients
depression and other mood
coffee, and other hot
lettuce and other uncooked
vendors and other establishments
campers and other outdoor
travel and other tourism
insects and other vectors
tropical and other communicable
poison and other noxious
capsids and other structures
humans and other animals
humans and other species
cells and other mechanisms
lamivudine and other anti
humans and other animals
zoos, and other settings
```

Number of supporting examples in regular expression 122

```
person or other organism
insect or other vector
blood or other bodily
cats or other pets
failure or other types
vaccine, or other means
animal or other form
criteria or other diagnostic
insects or other creatures
guns or other weapons
clothing or other fabrics
hospital or other health
invasive or other patient
neurologic, or other disease
blood or other potentially
saliva, or other bodily
hairbrush or other source
blood or other bodily
feces or other bodily
medicines or other shopping
food or other essentials
feces or other bodily
people or other occupied
penicillin or other antibiotics
milk, or other body
drugs, or other medical
fever or other highly
human or other animals
pressure or other evidence
cancer or other illness
mosquitoes or other insects
heroin or other opioid
cancres or other wounds
HBV, or other blood
incontinence, or other discharges
water or other clear
cells or other allergic
humans or other animals
```

insects or other vectors

Number of supporting examples in regular expression 39