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 [1]:
```
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 [2]:
```
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
re passengers and crew could go ashore during the Black Death plague. The quarantena
followed the trentino, or "thirty-day isolation" period, first imposed in 1347 in th
e Republic of Ragusa, Dalmatia (modern Dubrovnik in Croatia).Merriam-Webster gives v
arious meanings to the noun form, including "a period of 40 days", several relating
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
ord is also used as a verb.Quarantine is distinct from medical isolation, in which t
hose confirmed to be infected with a communicable disease are isolated from the heal
thy population.Quarantine may be used interchangeably with cordon sanitaire, and alt
hough the terms are related, cordon sanitaire refers to the restriction of movement
of people into or out of a defined geographic area, such as a community, in order to
prevent an infection from spreading.
-----
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
he mandatory hospital quarantine of special groups of patients, including those with
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
```

```
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 [3]:

```
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
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
re passengers and crew could go ashore during the Black Death plague. The quarantena
followed the trentino, or "thirty-day isolation" period, first imposed in 1347 in th
e Republic of Ragusa, Dalmatia (modern Dubrovnik in Croatia).Merriam-Webster gives v
arious meanings to the noun form, including "a period of 40 days", several relating
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
ord is also used as a verb.Quarantine is distinct from medical isolation, in which t
hose confirmed to be infected with a communicable disease are isolated from the heal
thy population.Quarantine may be used interchangeably with cordon sanitaire, and alt
hough the terms are related, cordon sanitaire refers to the restriction of movement
of people into or out of a defined geographic area, such as a community, in order to
prevent an infection from spreading.
-----
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
he mandatory hospital quarantine of special groups of patients, including those with
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
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.
-----
```

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 [4]:
```
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 [5]:
```
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 [6]:
```
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'

1. [A-Z]{3}

This regular expression will list all the words with only 3 characters and each character is uppercase i.e. A - Z

In [7]:

```
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
```

2. [A-Z]{3,}

This regular expression will list all the words with atleast/minimum 3 characters and atmost any number of characters and each character is uppercase i.e. A - Z

In [8]:

```
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
```

3. (.*)

This regular expression will just group each line in the file seperatly

In [9]:

```
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 - 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
tena followed the trentino, or "thirty-day isolation" period, first imposed in 1347
in the Republic of Ragusa, Dalmatia (modern Dubrovnik in Croatia).Merriam-Webster gi
ves various meanings to the noun form, including "a period of 40 days", several rela
ting to ships, "a state of enforced isolation", and as "a restriction on the movemen
t of people and goods which is intended to prevent the spread of disease or pests".
The word is also used as a verb.Quarantine is distinct from medical isolation, in wh
ich those confirmed to be infected with a communicable disease are isolated from the
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 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 - 869
21  0 - 0
22  0 - 0
23 === Medieval Europe === 0 - 23
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 (modern Dubrovnik in Croatia), newco
mers had to spend 30 days (a trentine) in a restricted place (originally nearby isla
nds) waiting to see whether the symptoms of Black Death would develop. In 1448 the V
enetian Senate prolonged the waiting period to 40 days, thus giving birth to the ter
m "quarantine". The forty-day quarantine proved to be an effective formula for handl
ing outbreaks of the plague. Dubrovnik was the first city in Europe to set up quaran
tine sites such as the Lazzarettos of Dubrovnik where arriving ship personnel were h
eld for up to 40 days. According to current estimates, the bubonic plague had a 37-d
ay period from infection to death; therefore, the European quarantines would have be
en highly successful in determining the health of crews from potential trading and s
upply 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 syphi
lis in northern Europe after 1492, the advent of yellow fever in Spain at the beginn
ing 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 n
ext record of preventive measures comes from Reggio/Modena in 1374. Venice founded t
he first lazaret (on a small island adjoining the city) in 1403. In 1467 Genoa follo
wed the example of Venice, and in 1476 the old leper hospital of Marseille was conve
rted into a plague hospital. The great lazaret of Marseille, perhaps the most comple
te of its kind, was founded in 1526 on the island of Pomègues. The practise at all t
he 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 se
t up at western ports; notably, a very extensive establishment near Bordeaux. Afterw
```

```
ards, 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 t
he 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 meas
ure to control the movement of people into and out of affected communities. During t
he 1918 influenza pandemic, some communities instituted protective sequestration (so
metimes referred to as "reverse quarantine") to keep the infected from introducing i
nfluenza 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 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 - 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 w
ithin Europe. All but that of 1897 were concerned with cholera. No result came of th
ose 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 fo
r 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, Gi
braltar, Malta, and Cyprus, being under the same influence). The aim of each interna
tional sanitary convention had been to bind the governments to a uniform minimum of
preventive action, with further restrictions permissible to individual countries. Th
e minimum specified by international conventions was very nearly the same as the Bri
tish practice, which had been in turn adapted to continental opinion in the matter o
f the importation of rags. 0 - 1118
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 - 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 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 world, with many not knowing where or how they were infected. 0 - 4353
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 deri

```
ves 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 prat
ique', i.e. that declares itself free of quarantinable disease, and requests boardin
g 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 quarantin
ed 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 hea lth officer may seize articles they believe to be infectious or containing infectiou s 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 - 32 5
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 - 394
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. 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 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 - 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 pr actice of quarantine against it was definitely established by the Quarantine Act 171 0 (9 Ann.). The first act was called for due to fears that the plague might be impor ted from Poland and the Baltic region. The second act of 1721 was due to the prevale nce of plague at Marseille and other places in Provence, France. It was renewed in 1 733 after a new outbreak in continental Europe, and again in 1743, due to an epidemi c in Messina. In 1752 a rigorous quarantine clause was introduced into an act regula ting 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. Althou gh no plague cases ever came to England during that period, the restrictions on traf fic 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, an d in 1823–24 an elaborate inquiry was followed by an act making quarantine only at d iscretion of the privy council, which recognised yellow fever or other highly infect ious 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 r

eturned 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 d uring the voyage, and afterwards the practice of quarantine was discontinued.After t he passing of the first Quarantine Act (1710) the protective practices in England we re haphazard and arbitrary. In 1721 two vessels carrying cotton goods from Cyprus, t hen 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 arrivin g 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 avail able only for vessels with clean bills of health. In 1755 lazarets in the form of fl oating 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 quarantin e, 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 t he 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 w ithout 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 pendi ng the issuance of a federal order for isolation, quarantine, or conditional releas e. 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 Dis ease Control (CDC) operates small quarantine facilities at a number of US ports of e ntry. As of 2014, these included one land crossing (in El Paso, Texas) and 19 intern ational 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 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 (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 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 - 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 station, however its marine hospital (Ellis Island Immigrant Hospital) only qualified as a contagious disease facility to handle less virulent diseases like measles, trachoma and less advanced stages of tuberculosis and diphtheria; those afflicted with smallpox, 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 Charter, Sections 1169–1170, which permitted the New York City Board of Health to "remove to a proper place…any person sick with any contagious, pestilential or infectious disease."During the 1918 flu pandemic, people were also quarantined. Most commonly suspect cases of infectious diseases are requested to voluntarily quarantine themselves, and Federal and local quarantine statutes only have been uncommonly invoked since then, including for a suspected smallpox case in 1963.The 1944 Public Health Service Act "to apprehend, detain, and examine certain infected persons who are peculiarly 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 Public Health Service responsibility for preventing the introduction, transmission and spread of communicable diseases from foreign countries into the United States, and expanded quarantine authority to include incoming aircraft. The act states that "...any individual reasonably believed to be infected with a communicable disease in a qualifying stage and...if found to be infected, may be detained for such time and in such manner as may be reasonably necessary."No federal quarantine orders were issued from 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 Thevarasa 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 course over 14 months and one account states that it killed at least 260 villagers. The 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
```

```
248 This article incorporates text from a publication now in the public domain: Chis
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
```

4. ([^]*)

This regular expression will list all lines either starting with space or without space

In [10]:

```
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
 0 - 1
5
 0 - 1
6 == 0 - 2
7 The 0 - 3
8
 0 - 1
9
 0 - 1
10 == 0 - 2
11
 0 - 1
12
 0 - 1
13 === 0 - 3
```

```
14 An 0 - 2
15
 0 - 1
16 Anyone 0 - 6
17
 0 - 1
18
 0 - 1
19 === 0 - 3
20 The 0 - 3
21
 0 - 1
22
 0 - 1
23 === 0 - 3
24 The 0 - 3
25 Venice 0 - 6
26
 0 - 1
27
 0 - 1
28 === 0 - 3
29
 0 - 1
30 Epidemics 0 - 9
31
 0 - 1
32 In 0 - 2
33
 0 - 1
34
 0 - 1
35 ==== 0 - 4
36 Since 0 - 5
37 The 0 - 3
38 Sanitary 0 - 8
39
 0 - 1
40
 0 - 1
41 == 0 - 2
42
 0 - 1
43 Plain 0 - 5
44
 0 - 1
45
 0 - 1
46 == 0 - 2
47 The 0 - 3
48
 0 - 1
49
 0 - 1
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
 0 - 1
72 === 0 - 3
73 Quarantine 0 - 10
74
 0 - 1
75
 0 - 1
76 === 0 - 3
77 Quarantine 0 - 10
78
 0 - 1
79 Civil 0 - 5
80 The 0 - 3
81 New 0 - 3
82
 0 - 1
83
 0 - 1
84 == 0 - 2
85
 0 - 1
86
 0 - 1
87 === 0 - 3
88
 0 - 1
89 Biosecurity 0 - 11
90
 0 - 1
91
 0 - 1
92 === 0 - 3
93 There 0 - 5
94 Under 0 - 5
95 A 0 - 1
96 Under 0 - 5
97 Each 0 - 4
98
 0 - 1
99
 0 - 1
100 === 0 - 3
101 Under 0 - 5
102 The 0 - 3
103 Under 0 - 5
104
 0 - 1
105
```

```
 0 - 1
106 === 0 - 3
107 To 0 - 2
108
 0 - 1
109
 0 - 1
110 ==== 0 - 4
111 The 0 - 3
112
 0 - 1
113
 0 - 1
114 === 0 - 3
115 In 0 - 2
116
 0 - 1
117
 0 - 1
118 ==== 0 - 4
119 Communicable 0 - 12
120 All 0 - 3
121 Individuals 0 - 11
122 When 0 - 4
123 This 0 - 4
124
 0 - 1
125 Do 0 - 2
126 Require 0 - 7
127 Include 0 - 7
128 Limit 0 - 5
129
 0 - 1
130
 0 - 1
131 ==== 0 - 4
132 The 0 - 3
133 Besides 0 - 7
134
 0 - 1
135
 0 - 1
136 ==== 0 - 4
137 The 0 - 3
138
 0 - 1
139
 0 - 1
140 ==== 0 - 4
141
 0 - 1
142 Quarantine 0 - 10
143 In 0 - 2
144
 0 - 1
145
 0 - 1
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
 0 - 1
154
 0 - 1
155 == 0 - 2
156
 0 - 1
157
 0 - 1
158 === 0 - 3
159 Eyam 0 - 4
160
 0 - 1
161
 0 - 1
162 === 0 - 3
163
 0 - 1
164 On 0 - 2
165
 0 - 1
166
 0 - 1
167 === 0 - 3
168 Mary 0 - 4
169
 0 - 1
170
 0 - 1
171 === 0 - 3
172 During 0 - 6
173
 0 - 1
174
 0 - 1
175 === 0 - 3
176 In 0 - 2
177
 0 - 1
178
 0 - 1
179 === 0 - 3
180 Between 0 - 7
181
 0 - 1
182
 0 - 1
183 === 0 - 3
184 The 0 - 3
185
 0 - 1
186
 0 - 1
187 === 0 - 3
188 In 0 - 2
189
 0 - 1
190
 0 - 1
191 === 0 - 3
192
 0 - 1
193 During 0 - 6
194 On 0 - 2
```

```
195
 0 - 1
196
 0 - 1
197 ==== 0 - 4
198
 0 - 1
199 In 0 - 2
200
 0 - 1
201
 0 - 1
202 ==== 0 - 4
203
 0 - 1
204 As 0 - 2
205 On 0 - 2
206
 0 - 1
207
 0 - 1
208 ==== 0 - 4
209
 0 - 1
210 As 0 - 2
211
 0 - 1
212
 0 - 1
213 ==== 0 - 4
214
 0 - 1
215 In 0 - 2
216
 0 - 1
217
 0 - 1
218 == 0 - 2
219
 0 - 1
220 Self-quarantine 0 - 15
221
 0 - 1
222
 0 - 1
223 == 0 - 2
224 U.S. 0 - 4
225
 0 - 1
226
 0 - 1
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
```

```
 0 - 1
240
 0 - 1
241 == 0 - 2
242
 0 - 1
243
 0 - 1
244 == 0 - 2
245
 0 - 1
246
 0 - 1
247 == 0 - 2
248 This 0 - 4
249
 0 - 1
250
 0 - 1
251 == 0 - 2
252 Howard 0 - 6
253 Rothstein, 0 - 10
254 Frati, 0 - 6
255
 0 - 1
256
 0 - 1
257 == 0 - 2
258 Ayliffe, 0 - 8
259 Emerging 0 - 8
260 Quarantine 0 - 10
261 History 0 - 7
262 Cole, 0 - 5
```

5. ([^()]*)

This regular expression will list all sentences which dont start with either (or)

In [11]:

```
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
 0 - 1
5
 0 - 1
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
 0 - 1
9
 0 - 1
10 == History ==
 0 - 14
11
 0 - 1
12
 0 - 1
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
 0 - 1
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
 0 - 1
18
 0 - 1
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
 0 - 1
22
```

```
 0 - 1
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
 0 - 1
27
 0 - 1
28 === Modern history ===
 0 - 23
29
 0 - 1
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
 0 - 1
34
 0 - 1
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
 0 - 1
40
 0 - 1
41 == Signals and flags ==
 0 - 24
42
 0 - 1
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
 0 - 1
45
 0 - 1
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
 0 - 1
49
 0 - 1
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
 0 - 1
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
 0 - 1
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
 0 - 1
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
 0 - 1
75
 0 - 1
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
 0 - 1
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
 0 - 1
83
 0 - 1
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.
 0 - 199
104
 0 - 1
105
 0 - 1
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, 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 - 632
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 station, 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 Thevarasa 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 course over 14 months and one account states that it killed at least 260 villagers. The 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
```

6. (\w*)

This regular expression will list all sentences either starting with any word character or not

In [12]:

```
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
```

7. \d+. [A-Z][a-zä]+ [12][09][0-9][0-9]

This regular expression extract all the dates from the file having the format: Date Month Year

In [13]:

```
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
```

8. \w+virus

This regular expression will extract all the words ending with 'virus'

In [14]:
```
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 [15]:
```
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 [16]:

```
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 [17]:

```
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 [18]:

```
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:
        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)
an immunodeficiency     virus                        (Discovery_of_disease-causin
g_pathogens)
he discovery of the     virus                    the earliest known i    (Discovery_o
f_disease-causing_pathogens)
ecies or strains of     virus                    s conditions leading    (Emerging_in
fectious_disease)
f virus (e.g. novel     coronaviruses            IV). Some EIDs evolv    (Emerging_in
fectious_disease)
ovel coronaviruses,     ebolaviruses             IDs evolve from a kn    (Emerging_in
fectious_disease)
ance, most emergent     viruses                      (Emerging_infectious_diseas
e)
whereas other novel     viruses                   without being recog    (Emerging_in
fectious_disease)
onference "Emerging     Viruses                  of Viruses and Viral    (Emerging_in
fectious_disease)
s: The Evolution of     Viruses                   1–3 May 1989 in Was    (Emerging_in
fectious_disease)
onference "Emerging     Viruses                  oteSurprisingly, mos    (Emerging_in
fectious_disease)
s: The Evolution of     Viruses                  ] It was convened to    (Emerging_in
fectious_disease)
ngly, most emergent     viruses                  us animal hosts to m    (Emerging_in
fectious_disease)
quent source of new     viruses                  ce is human behavior    (Emerging_in
fectious_disease)
lity of transfer of     viruses                  through the AIDS epi    (Emerging_in
fectious_disease)
```

```
ference on emerging     viruses                raphic spread of an     (Emerging_in
fectious_disease)
r the 1989 Emerging     Viruses                 the Program for Mon    (Emerging_in
fectious_disease)
stern African Ebola     virus                  ared the world was t    (Emerging_in
fectious_disease)
 as vaccine-derived     poliovirus                    (Emerging_infectious_diseas
e)
                        Filovirus               diseases (Ebola vir    (Emerging_in
fectious_disease)
rus diseases (Ebola     virus                  s disease)      (Emerging_infectious
_disease)
disease and Marburg     virus                         (Emerging_infectious_diseas
e)
pathogenic emerging     Coronaviruses          nd SARS)        (Emerging_infectious
_disease)
               Nipah    virus                  tion    (Emerging_infectious_diseas
e)
ncephalitis include     viruses                sis of cerebrospinal    (Encephaliti
s)
h as herpes simplex     virus                  acteria, fungi, or p    (Encephaliti
s)
ex virus and rabies     virus                  eria, fungi, or para    (Encephaliti
s)
phalitis are rabies     virus                         (Encephalitis)
s are rabies virus,     poliovirus             measles virus.Additi    (Encephaliti
s)
ovirus, and measles     virus                  ral causes are arbov    (Encephaliti
s)
auses are arboviral     flavivirus             us (La Crosse strain    (Encephaliti
s)
phalitis, West Nile     virus                  (lymphocytic choriom    (Encephaliti
s)
, West Nile virus),     bunyavirus             osse strain), arenav    (Encephaliti
s)
(La Crosse strain),     arenavirus              virus), reovirus (C    (Encephaliti
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)
al gastroenteritis.     Rotavirus             en, and produces sim    (Gastroenter
itis)
d developing world.     Viruses               d immunity. Noroviru    (Gastroenter
itis)
ediatric age group.     Rotavirus             about 18% of all cas    (Gastroenter
itis)
 acquired immunity.     Norovirus             astroenteritis accou    (Gastroenter
itis)
developed countries.    Norovirus             en groups of people     (Gastroenter
itis)
diarrhea has ended.     Norovirus                   (Gastroenteritis)
ecommended that the     rotavirus             e are in development    (Gastroenter
itis)
lly. Two commercial     rotavirus             ia these vaccines re    (Gastroenter
itis)
implementation of a     rotavirus             otoxigenic Escherich    (Gastroenter
itis)
talities are due to     rotavirus             ses caused 4.6 milli    (Gastroenter
itis)
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    (Globalizati
on_and_disease)
as able to spread a     virus                accines are made par    (Globalizati
on_and_disease)
already global. The     virus                es spread the virus     (Globalizati
on_and_disease)
mployees spread the     virus                mission.As medicine     (Globalizati
on_and_disease)
ade partly from the     virus                 complete immunizati    (Globalizati
on_and_disease)
lf, when an unknown     virus                onment, it takes tim    (Globalizati
on_and_disease)
tbreaks and unknown     viruses              illion in the United    (Globalizati
on_and_disease)
"swine flu" or H1N1     virus                e, and human flu.Glo    (Globalizati
on_and_disease)
es alone. H1N1 is a     virus                is important to targ    (Globalizati
on_and_disease)
n the spread of the     coronavirus          sion system.    (Globalization_and_d
isease)
, the spread of the     coronavirus          smission system.        (Globalizati
on_and_disease)
bal recessions. The     coronavirus          ional disconnect in     (Globalizati
on_and_disease)
contagious airborne     virus                d nasal fluids. When    (Globalizati
on_and_disease)
used by the Variola     virus                a minor, haemorrhagi    (Globalizati
on_and_disease)
ubation period. The     virus                s (coughing, sneezin    (Globalizati
on_and_disease)
known where the HIV     virus                 is believed that HI    (Globalizati
on_and_disease)
other, less harmful     virus                almost 110,000 in th    (Globalizati
on_and_disease)
                The     virus                break originated in     (Globalizati
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_cancer)
V) plus hepatitis C	virus	largely caused by H	(Infectious_causes_of_cancer)
below for oncogenic	viruses		(Infectious_causes_of_cancer)
==	Viruses		(Infectious_causes_of_cancer)
	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	viruses	ancer: the Epstein–	(Infectious_causes_of_cancer)
ruses. Two types of	herpesviruses	with cancer: the E	(Infectious_causes_of_cancer)
: the Epstein–Barr	virus	nonkeratinizing nas	(Infectious_causes_of_cancer)
rus (EBV) and human	herpesvirus	ars to cause all non	(Infectious_causes_of_cancer)
nomas, Epstein–Barr	virus	ated with chronic in	(Infectious_causes_of_cancer)
ation, Epstein–Barr	virus	ll lymphomas. It als	(Infectious_causes_of_cancer)
ent. Both of these	herpesviruses	ared to a control sa	(Infectious_causes_of_cancer)
effusion lymphoma.	Herpesviruses	photropic virus (HTL	(Infectious_causes_of_cancer)
T cell lymphotropic	virus	uses Adult T-cell le	(Infectious_causes_of_cancer)
was the first human	retrovirus	lleagues at NIH. Th	(Infectious_causes_of_cancer)
eagues at NIH. The	virus	suki and colleagues	(Infectious_causes_of_cancer)
man T-cell leukemia	virus	ing sensitive PCR me	(Infectious_causes_of_cancer)
a virus, is another	deltaretrovirus	virus (BLV), which	(Infectious_causes_of_cancer)
us, bovine leukemia	virus	he expected criteria	(Infectious_causes_of_cancer)

```
 cancer.Merkel cell     polyomavirus            s; the remaining tum    (Infectious_
causes_of_cancer)
overed human cancer     virus                   the same group that    (Infectious_
causes_of_cancer)
used by Merkel cell     polyomavirus            V does not directly    (Infectious_
causes_of_cancer)
er of this group of     viruses                 but it is associated    (Infectious_
causes_of_cancer)
an cancer but other     polyomaviruses          uses.HIV does not di    (Infectious_
causes_of_cancer)
g additional cancer     viruses                 ed with a number of     (Infectious_
causes_of_cancer)
 is caused by human     herpesvirus             ifest as cancer. Cer    (Infectious_
causes_of_cancer)
nly caused by human     papillomavirus          the infections mani    (Infectious_
causes_of_cancer)
le to control these     viruses                 ble immunodeficiency    (Infectious_
causes_of_cancer)
== Common oncogenic     viruses                         (Infectious_causes_of_cance
r)
ed countries, human     papillomavirus          patitis C virus (HCV    (Infectious_
causes_of_cancer)
 (HPV), hepatitis B     virus                   ) are the most frequ    (Infectious_
causes_of_cancer)
BV) and hepatitis C     virus                   tly encountered onco    (Infectious_
causes_of_cancer)
tered oncogenic DNA     viruses                         (Infectious_causes_of_cance
r)
         ==== Human     papillomavirus                  (Infectious_causes_of_cance
r)
 groups, individual     viruses                         (Infectious_causes_of_cance
r)
g the HPV high-risk     viruses                 E7 oncoproteins can     (Infectious_
causes_of_cancer)
s B and hepatitis C     viruses                         (Infectious_causes_of_cance
r)
          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
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
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)
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)
 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_investigatio
n)
ion with 2019 Novel     Coronavirus                     (Patient_under_investigatio
n)
Testing Persons for     Coronavirus                     (Patient_under_investigatio
n)
ation for the novel     coronavirus                     (Patient_under_investigatio
```

```
n)
                        Adenovirus               is the most common     (Pharyngiti
s)
by the Epstein–Barr     virus                    is with marked redne    (Pharyngiti
s)
     Herpes simplex     virus                    iple mouth ulcers.      (Pharyngiti
s)
       Common cold:     rhinovirus               , respiratory syncyt    (Pharyngiti
s)
n cold: rhinovirus,     coronavirus              ry syncytial virus,     (Pharyngiti
s)
spiratory syncytial     virus                    e infection of the t    (Pharyngiti
s)
, and parainfluenza     virus                    the throat, ear, and    (Pharyngiti
s)
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_swe
at)
romes. Each type of     hantavirus               he phylogeny of thei    (Picardy_swe
at)
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                   (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_infectio n)	
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_infectio
n)
th the exception of     rhinoviruses                    (Respiratory_tract_infectio
n)
r resources such as     viruses                         (Reverse_zoonosis)
at) and influenza A     viruses                 erence as the infect    (Reverse_zoo
nosis)
               ====     Arboviruses                     (Reverse_zoonosis)
       Yellow fever     viruses                 r viruses, and Zika     (Reverse_zoo
nosis)
ruses, Dengue fever     viruses                 e of the Flavivirus     (Reverse_zoo
nosis)
r viruses, and Zika     viruses                 virus genera and Chi    (Reverse_zoo
nosis)
 viruses are of the     Flavivirus              gunya virus is of th    (Reverse_zoo
nosis)
era and Chikungunya     virus                    of them are conside    (Reverse_zoo
nosis)
nya virus is of the     Alphavirus               them are considered    (Reverse_zoo
nosis)
them are considered     arboviruses             ough arthropod vecto    (Reverse_zoo
nosis)
smission cycles for     arboviruses             mans could be dead-e    (Reverse_zoo
nosis)
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_zoo
nosis)
aintains a suitable     virus                   ow the infection of     (Reverse_zoo
nosis)
eas could carry the     virus                           (Reverse_zoonosis)
ika fever: The Zika     virus                   gle stranded RNA Fla    (Reverse_zoo
nosis)
single stranded RNA     Flavivirus              to infect other huma    (Reverse_zoo
nosis)
 hosts. A 2015 zika     virus                   ntraamniotically. Bo    (Reverse_zoo
nosis)
fever: Yellow fever     virus                   te of an infected Ae    (Reverse_zoo
nosis)
ya: The Chikungunya     virus                   havirus typically tr    (Reverse_zoo
nosis)
single stranded RNA     alphavirus              Aedes mosquitoes to     (Reverse_zoo
nosis)
se with the similar     arbovirus                antibodies.    (Reverse_zoonosis)
e fever: The Dengue     virus                   nsmissible by Aedes     (Reverse_zoo
nosis)
e Dengue virus is a     flavivirus              smissible by Aedes m    (Reverse_zoo
nosis)
nfections of dengue     viruses                 had an 89% to 99% si    (Reverse_zoo
nosis)
nfected with dengue     virus                           (Reverse_zoonosis)
nfected with dengue     virus                   th antibodies dengue    (Reverse_zoo
nosis)
```

```
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_zoo
nosis)
 isolates, that the     virus                ction revealed mild     (Reverse_zoo
nosis)
   ==== Influenza A     virus                =       (Reverse_zoonosis)
               ====     Coronavirus                  (Reverse_zoonosis)
 outbreak of alpaca     coronavirus          ning at a national a    (Reverse_zoo
nosis)
en human and alpaca     coronaviruses         a human coronavirus    (Reverse_zoo
nosis)
und that the alpaca     coronavirus          uggesting that an al    (Reverse_zoo
nosis)
 similar to a human     coronavirus          t an alpaca coronavi    (Reverse_zoo
nosis)
ting that an alpaca     coronavirus          ess in herds undetec    (Reverse_zoo
nosis)
ing proved that the     virus                        (Reverse_zoonosis)
               ====     Coronaviruses                (Reverse_zoonosis)
ission of the human     coronavirus          ytes verus) living i    (Reverse_zoo
nosis)
ging to the species     Betacoronavirus      ing yet another inte    (Reverse_zoo
nosis)
ertently spread the     virus                        (Reverse_zoonosis)
nother interface in     coronavirus                  (Reverse_zoonosis)
               ====     Rhinovirus           ==      (Reverse_zoonosis)
man pathogen, human     Rhinovirus           ons in chimpanzees i    (Reverse_zoo
nosis)
s susceptibility to     rhinovirus                   (Reverse_zoonosis)
ans. If respiratory     viruses              non-human primates,     (Reverse_zoo
nosis)
               ====     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'_
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)
 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	(Virus)	
	Viruses	are found wherever	(Virus)
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	(Virus)	
ancestors of modern	viruses	se hypotheses is cor	(Virus)
all currently known	viruses	(Virus)	
ommon ancestor, and	viruses	s in the past by one	(Virus)
s differ on whether	viruses	res that interact wi	(Virus)
basic unit of life.	Viruses	herit genetic mutati	(Virus)
reproduce, whereas	viruses	as self-assembling	(Virus)
natural selection.	Virus	elf-assembling organ	(Virus)
	Viruses	display a wide dive	(Virus)
ogies'. In general,	viruses	inside an Escherich	(Virus)
usand bacteriophage	viruses	e been studied are s	(Virus)
terium's cell. Many	viruses	0 and 300 nanometres	(Virus)
00 nanometres. Some	filoviruses	st viruses cannot be	(Virus)
y about 80 nm. Most	viruses	se them. To increase	(Virus)
he contrast between	viruses	vered with the stain	(Virus)
und only.A complete	virus	gical distinction. V	(Virus)
called capsomeres.	Viruses	distinction. Virall	(Virus)
the presence of the	virus	ally (physically) pr	(Virus)
rus genome. Complex	viruses	at assist in the con	(Virus)
e capsid and entire	virus	(Virus)	
main morphological	virus	(Virus)	
These	viruses	omposed of a single	(Virus)
died tobacco mosaic	virus	(Virus)	
co mosaic virus and	inovirus	mples of helical vir	(Virus)
examples of helical	viruses	(Virus)	
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)
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_25548/1483450043.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 [19]:
```
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[19]:
```
[('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 [20]:
```
len(viruscount)
```

Out[20]:
```
180
```

In [21]:
```
sum(viruscount.values())
```

Out[21]:
```
1374
```

Exercises

- Find a list of all diseases ending with -itis

In [22]:
```
file = codecs.open('infect\Quarantine.txt','r','utf8')

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

file.close()
```

```
36 Britis 637 - 643
110 Britis 5 - 11
111 Britis 4444 - 4450
176 Britis 30 - 36
```

Exercise Hearst Patterns

In [23]:
```
import glob

regex = ['\w+ such as (the)? \w+ ((and | or) \w+)?',
         '\w+,? especially \w+ ((and | or)\w+)?',
         '\w+,? including \w+ ((and | or)\w+)?',
         '(\w+(,?))+ and other \w+',
         '(\w+(,?))+ or other \w+']

filelist = glob.glob("infect/*.txt")
for rg in regex:
```

```
    print('\nTaking regular expression:')
    print(rg + '\n')
    count = 0
    for f in filelist:
        file = codecs.open(f,'r','utf8')
        nr = 0
        for line in file:
            nr = nr+1
            result = re.search(rg,line)
            if result:
                count += 1
                print(nr,result.group(0),result.start(),'-',result.end())
        file.close()
    print('\nTotal supporting examples for pattern : {} are {}'.format(rg,count))
```

```
Taking regular expression:
\w+ such as (the)? \w+ ((and | or) \w+)?

10 Organizations such as the American  839 - 874
38 resistance such as the potential  940 - 973
129 rules such as the pneumonia  67 - 95
1 terms such as the infective  547 - 575
1 criteria such as the Bradford  714 - 744
18 organisms such as the African  908 - 938
24 animals such as the West  1132 - 1157
43 problems such as the growing  239 - 268
155 countries such as the US  598 - 623
22 responses such as the SOS  382 - 408
35 elements such as the Little  228 - 256
125 phase such as the Rehabilitation  864 - 897
164 wards such as the Heffron  292 - 318
24 sites such as the Lazzarettos  1012 - 1042
81 vehicles such as the ambulance  67 - 98
142 landmarks such as the Columbia  401 - 432
15 strains such as the highly  300 - 327
5 people such as the elderly  650 - 677
54 profiles such as the Th3  763 - 788
57 others such as the National  986 - 1014
155 Cells such as the macrophage  372 - 401
2 pandemics such as the 1918  438 - 465

Total supporting examples for pattern : \w+ such as (the)? \w+ ((and | or) \w+)? are
22

Taking regular expression:
\w+,? especially \w+ ((and | or)\w+)?

35 administered, especially if  67 - 95
17 enforced, especially in  1023 - 1047
31 fear especially if  60 - 79
17 are especially associated  68 - 94
12 is especially susceptible  90 - 116
73 obstruction, especially in  161 - 188
1 more, especially with  396 - 418
6 or especially severe  358 - 379
1 resolve, especially in  220 - 243
44 people, especially those  214 - 239
54 important, especially in  471 - 496
66 Drinks especially high  425 - 448
71 diseases, especially viruses  432 - 461
14 are especially damaged  3463 - 3486
69 is especially common  717 - 738
48 be especially troublesome  106 - 132
52 disease, especially prevalent  594 - 624
```

```
1 vector, especially in  54 - 76
77 is especially useful  1047 - 1068
91 prove especially useful  29 - 53
136 is especially infective  229 - 253
42 be especially troublesome  199 - 225
18 viruses, especially hepatitis  112 - 142
37 pylori, especially if  1502 - 1524
49 Africa, especially when  509 - 533
10 countries, especially in  113 - 138
66 disease, especially in  86 - 109
5 circumstances, especially in  428 - 457
23 routinely, especially during  293 - 322
11 diseases, especially viral  438 - 465
180 administration, especially with  1402 - 1434
184 is especially true  359 - 378
198 eradication, especially for  188 - 216
211 partnerships, especially if  1043 - 1071
2 infections, especially when  458 - 486
113 be especially beneficial  1571 - 1596
24 fatalities, especially in  365 - 391
33 were especially high  1669 - 1690
58 health, especially when  134 - 158
61 OSHA, especially for  1138 - 1159
308 used, especially in  698 - 718
71 is especially important  54 - 78
81 animals, especially those  18 - 44
14 was especially necessary  1433 - 1458
70 disease, especially in  1158 - 1181
12 furious, especially when  2918 - 2943
176 relationships, especially within  45 - 78
181 unique, especially the  61 - 84
47 rights, especially in  59 - 81
89 is especially important  809 - 833
32 stray, especially if  71 - 92
40 bat, especially in  2417 - 2436
35 but especially in  926 - 944
161 physicians, especially after  1256 - 1285
40 are especially vulnerable  1528 - 1554
97 panic, especially for  145 - 167
105 sex, especially sexual  2030 - 2053
32 pathogens, especially those  1590 - 1618
37 is especially important  1185 - 1209
47 tests, especially those  80 - 104
59 months, especially in  1795 - 1817
46 is especially good  76 - 95
88 infections, especially in  596 - 622
76 of especially plant  667 - 687
28 risk, especially in  69 - 89
18 products, especially pork  1283 - 1309

Total supporting examples for pattern : \w+,? especially \w+ ((and | or)\w+)? are 66

Taking regular expression:
\w+,? including \w+ ((and | or)\w+)?

10 testing, including failure  655 - 682
43 antibiotics, including the  1959 - 1986
51 reasons including cost and regulation 441 - 478
39 instruments, including balloons and baskets 1095 - 1138
26 hazards, including needles  31 - 58
9 yeast, including those  13 - 36
27 regions, including the  670 - 693
40 countries, including countries  188 - 219
54 populations including children and the 2712 - 2750
```

62 change, including the 2410 - 2432
71 ways including by 221 - 239
58 causes including Streptococcus 90 - 121
83 infection, including bacterial 1006 - 1037
1 microbes, including novel 798 - 824
1 bacteria, including Klebsiella and Proteus 174 - 216
1 symptoms including reduced 77 - 104
1 science, including epidemiology and medicine 478 - 522
9 lifestyle, including their 536 - 563
10 ailments including rheumatism and psoriasis 854 - 897
10 syndrome including parasites and fungus 205 - 244
19 organisms, including Clostridium 1480 - 1513
14 peens, including half 2659 - 2681
55 groups, including Roman 191 - 215
69 symptoms including cough 542 - 567
1 microorganisms, including bacteria and fungi 1562 - 1606
12 Ascomycota, including yeasts 0 - 29
13 Basidiomycota, including the 0 - 29
3 association including studies 47 - 77
18 surfaces including medical 90 - 117
65 of including all 386 - 403
18 body, including the 1253 - 1273
26 throat, including the 284 - 306
60 antibiotics, including penicillin and methicillin 100 - 149
27 agents, including certain 284 - 310
29 agents, including epidemiologically 71 - 107
56 transmission, including proper 329 - 360
10 organisms, including CDV and CAV 454 - 486
23 administration, including parenteral and intranasal 378 - 429
1 postulates, including viruses 569 - 599
8 rate, including specific 27 - 52
1 infection including lung 131 - 156
102 symptoms, including abdominal 674 - 704
202 packages including four 773 - 797
100 HIV, including previous 1401 - 1425
24 biohazards, including animal 1020 - 1049
18 pathologies, including impetigo and strep 104 - 145
63 infections, including tuberculosis and meningitis 279 - 328
2 organisms, including microscopic 416 - 449
44 humans including Candida 126 - 151
71 bacteria including both 341 - 365
21 occasionally, including hantaviruses and coronaviruses 931 - 985
31 lungs, including Toxoplasma 38 - 66
126 pneumonias including SARS 215 - 241
130 factors, including the 167 - 190
30 wildlife, including the 339 - 363
20 War, including the 2645 - 2664
24 them, including Matron 225 - 248
42 Avenue, including retaining 5 - 33
49 Avenue, including ornamental 6 - 35
52 setting, including adjacent 65 - 93
53 setting, including associated 80 - 110
54 setting, including sandstone 90 - 119
55 Group, including former 17 - 41
58 Coastline, including coastal 92 - 121
61 Cemetery including its 10 - 33
63 Site including Critical 22 - 46
67 elements, including rock 10 - 35
105 plans including retaining 321 - 347
113 time including separate 394 - 418
121 buildings, including Heffron 766 - 795
134 hospital, including Ward 1053 - 1078
152 personnel, including Dr 71 - 95
160 buildings, including the 12 - 37

```
161 features, including Pine  21 - 46
168 community, including the  51 - 76
177 evidence, including oral  63 - 88
180 institutions, including the  353 - 381
9 activity, including motor and motor 120 - 155
20 patients, including those  306 - 332
32 Health, including the  222 - 244
111 days, including the  4204 - 4224
127 orders, including a  80 - 100
143 then, including for  1515 - 1535
164 voyage, including 36  128 - 149
1 lyssaviruses, including the  774 - 802
15 lyssaviruses including the  32 - 59
24 environments, including the  74 - 102
32 infections, including environmental  169 - 205
49 mosquitoes including Haemagogus  565 - 597
85 processes, including excessive  2488 - 2519
130 sepsis, including people  18 - 43
29 individuals, including the  103 - 130
1 used, including the  969 - 989
42 all, including essential  652 - 677
66 and including complete  591 - 614
83 measures, including closing  648 - 676
97 services including special  1170 - 1197
2 factors including a  420 - 440
38 locals, including 19  2787 - 2808
18 cities, including 30  446 - 467
68 General including the  160 - 182
15 extremities, including the  315 - 342
37 subspecies, including yaws  167 - 194
74 testing, including email and text 570 - 603
106 figures, including Franz  493 - 518
111 literature including John  333 - 359
54 resuscitation including the  504 - 532
1 agents, including certain  297 - 323
32 agents, including epidemiologically  71 - 107
87 Toxins including Tropical  32 - 58
87 viruses, including HIV  133 - 156
1 tract, including the  125 - 146
82 UTIs including acute  614 - 635
90 fluoroquinolones, including a  475 - 505
1 fluid, including biological and environmental 112 - 157
1 microorganisms, including bacteria and archaea 164 - 210
4 viruses, including influenza  1058 - 1087
147 families, including both  187 - 212
184 species including tomatoes and peppers 767 - 805
200 phytoplankton including harmful  1089 - 1121
42 roundworm, including species  599 - 628

Total supporting examples for pattern : \w+,? including \w+ ((and | or)\w+)? are 121

Taking regular expression:
(\w+(,?))+ and other \w+

30 blotting, and other DNA 1545 - 1568
43 epidermidis and other opportunistic 1862 - 1897
13 fever and other virulent 448 - 472
1 blood and other body 79 - 99
21 care and other case 239 - 258
25 pathogens and other diseases 70 - 98
29 devices and other sharps 193 - 217
13 species, and other anaerobes 387 - 415
9 kidneys, and other organs 204 - 229
1 cats, and other animals 49 - 72
```

```
5 vasculature and other tissues 185 - 214
6 IPPC and other policy 528 - 549
13 humans and other animals 59 - 83
53 humans and other animals 34 - 58
79 viruses and other microorganisms 169 - 201
125 lung and other affected 1098 - 1121
153 therapy, and other symptoms 121 - 148
56 1989 and other areas 154 - 174
1 diseases and other infectious 1650 - 1679
34 Kingdom and other parts 11 - 34
39 syphilis and other various 411 - 437
48 syphilis and other STDs 927 - 950
1 spacecraft and other property 352 - 381
5 fever and other inflammatory 3230 - 3258
9 home and other consequences 140 - 167
1 animals, and other living 255 - 280
24 eye, and other infectious 120 - 145
33 smallpox and other diseases 99 - 126
61 this and other silkworm 891 - 914
10 these and other diseases 219 - 243
36 forces and other groups 588 - 611
55 crusaders and other travelers 490 - 519
75 legal and other contextual 1692 - 1718
100 this and other effects 727 - 749
1 bloodstream and other parts 1919 - 1946
20 sepsis and other severe 1335 - 1358
24 washing, and other preventive 81 - 110
52 bloodstream, and other parts 1044 - 1072
12 skin and other superficial 203 - 229
42 omics, and other advanced 354 - 379
63 community, and other epidemiological 514 - 550
158 individuals and other interactions 219 - 253
210 insects and other animals 187 - 212
212 Ships and other cargo 18 - 39
217 eye, and other infectious 501 - 526
222 bacteriologists and other specialists 577 - 614
7 diet and other lifestyle 116 - 140
26 monitors and other general 1429 - 1455
37 tabs and other modifications 1806 - 1834
55 microbiology and other online 288 - 317
85 blood and other materials 140 - 165
18 Japan and other neurological 3045 - 3073
5 AIDS and other forms 150 - 170
12 facility, and other shared 178 - 204
33 monitors and other general 1173 - 1199
66 food and other necessities 1538 - 1564
1 hospitals and other medical 3 - 30
27 atelectasis and other severe 678 - 706
1 penicillin and other penicillin 110 - 141
17 methicillin, and other beta 32 - 59
22 antigen and other antigens 1010 - 1036
1 Chromoblastomycosis and other deep 2024 - 2058
17 trichomoniasis, and other neglected 806 - 841
110 Chromoblastomycosis and other deep 4 - 38
156 diseases and other communicable 416 - 447
180 NTDs and other diseases 783 - 806
206 companies and other private 1381 - 1408
73 infection and other sexually 219 - 247
105 membranes and other obstetrical 205 - 236
113 skin and other human 236 - 256
1 bone and other internal 541 - 564
12 literature, and other evidence 369 - 399
18 postures, and other disease 130 - 157
23 economic and other benefits 28 - 55
```

```
24 surfaces and other hazards 529 - 555
38 Pesticides and other chemicals 512 - 542
85 foundries and other harmful 808 - 835
108 Regulations and other subsidiary 765 - 797
122 customers and other stakeholders 510 - 542
233 ideas and other different 65 - 90
271 hazards and other relevant 1435 - 1461
75 browning and other issues 601 - 626
6 tonsils and other parts 417 - 440
11 smoke and other air 1784 - 1803
70 vary, and other patterns 740 - 764
168 penicillin and other antibiotics 1664 - 1696
1 muzzling, and other measures 182 - 210
6 dogs and other wild 886 - 905
181 pollens and other microflora 176 - 204
89 wood and other natural 526 - 548
111 Marseille and other places 349 - 375
199 Wuhan and other major 72 - 93
1 humans and other mammals 67 - 91
19 weasels, and other wild 884 - 907
24 reactions, and other intense 1083 - 1111
5 excreta, and other substrata 1329 - 1357
21 humans and other animals 975 - 999
35 humans and other animals 206 - 230
1 gatherings and other social 3078 - 3105
70 leprosy and other contagious 86 - 114
83 theatres, and other places 685 - 711
87 theaters, and other public 133 - 159
13 behavior and other signs 19 - 43
38 housekeepers, and other contacts 5019 - 5051
118 syphilis and other sexually 336 - 363
32 patient and other patients 1254 - 1280
70 depression and other mood 139 - 164
27 coffee, and other hot 186 - 207
30 lettuce and other uncooked 32 - 58
31 vendors and other establishments 370 - 402
74 campers and other outdoor 139 - 164
2 travel and other tourism 109 - 133
29 insects and other vectors 43 - 68
97 tropical and other communicable 28 - 59
8 poison and other noxious 53 - 77
25 capsids and other structures 1560 - 1588
135 humans and other animals 2069 - 2093
147 humans and other species 46 - 70
153 cells and other mechanisms 93 - 119
170 lamivudine and other anti 740 - 765
184 humans and other animals 561 - 585
46 zoos, and other settings 134 - 158

Total supporting examples for pattern : (\w+(,?))+ and other \w+ are 122

Taking regular expression:
(\w+(,?))+ or other \w+

1 person or other organism 29 - 53
1 insect or other vector 521 - 543
25 blood or other bodily 139 - 160
29 cats or other pets 34 - 52
97 failure or other types 364 - 386
9 vaccine, or other means 1863 - 1886
3 animal or other form 51 - 71
40 criteria or other diagnostic 53 - 81
2 insects or other creatures 1041 - 1067
8 guns or other weapons 664 - 685
```

```
46 clothing or other fabrics 790 - 815
1 hospital or other health 156 - 180
44 invasive or other patient 685 - 710
76 neurologic, or other disease 182 - 210
10 blood or other potentially 2258 - 2284
37 saliva, or other bodily 181 - 204
40 hairbrush or other source 28 - 53
71 blood or other bodily 70 - 91
3 feces or other bodily 156 - 177
49 medicines or other shopping 101 - 128
51 food or other essentials 33 - 57
7 feces or other bodily 3493 - 3514
6 people or other occupied 820 - 844
17 penicillin or other antibiotics 21 - 52
24 milk, or other body 150 - 169
26 drugs, or other medical 130 - 153
111 fever or other highly 1146 - 1167
1 human or other animals 904 - 926
90 pressure or other evidence 354 - 380
139 cancer or other illness 542 - 565
1 mosquitoes or other insects 1770 - 1797
18 heroin or other opioid 993 - 1015
78 cancres or other wounds 317 - 340
1 HBV, or other blood 635 - 654
32 incontinence, or other discharges 611 - 644
53 water or other clear 431 - 451
75 cells or other allergic 344 - 367
142 humans or other animals 686 - 709
74 insects or other vectors 221 - 245

Total supporting examples for pattern : (\w+(,?))+ or other \w+ are 39
```

In [ ]: