

Plague in 17th Century London

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DEAN

WORSHIPFUL SOCIETY OF APOTHECARIES



Plague in 17th Century London

Biography of a Pestilence

17th Century plague

Dr Thomas Sydenham

Daniel Defoe

Museum of London

Social consequences of Plague

The disease in 21stC and current treatment

Aftermath: Use as a biological weapon?







fine art
america

Plague

Bacterial zoonosis

Causative organism is *Yersinia pestis*, a Gm-ve rod-shaped coccobacillus.

Usually found in small mammals & their fleas

Humans can be infected through:

- the bite of infected vector fleas
- unprotected contact with infectious bodily fluids or contaminated materials
- the inhalation of respiratory droplets/small particles from a patient with pneumonic plague

Very dangerous disease in humans:

- CFR
 - 30-60% for untreated bubonic plague
 - Ca. 100% for untreated septicaemic & pneumonic plague

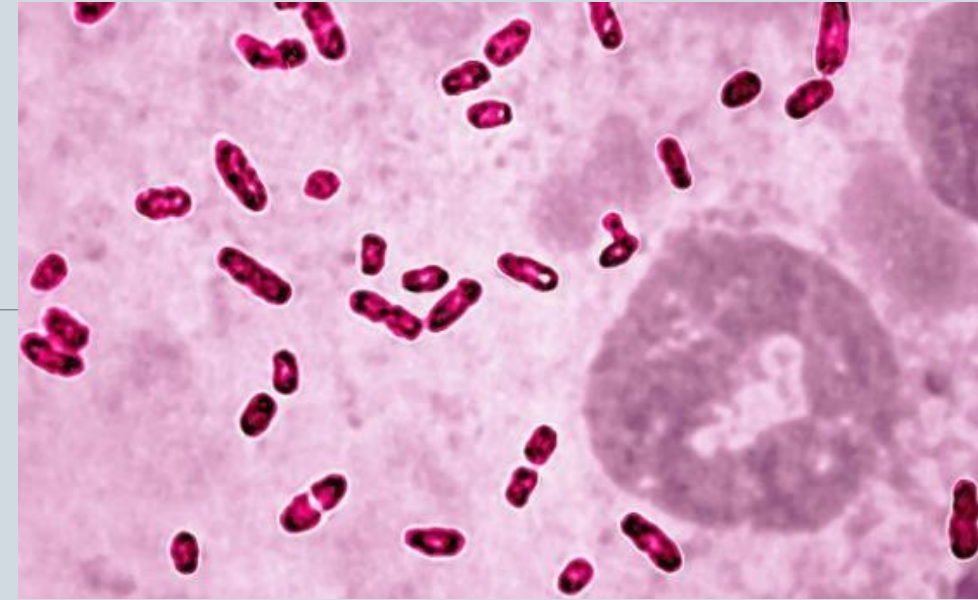
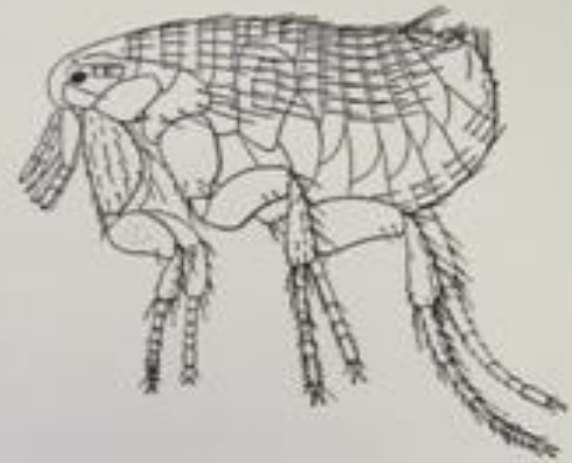


Photo: doc-stock.com



RAT FLEA, *XONOPELLA DELONGI*
A variety of Plague
Magnified 10 times



THE BACILLUS OF PLAGUE
Magnified 1,000 times

The bacilli of Plague occur in the fluid part (plasma) of the blood, and
 not in the corpuscles, which under the microscope appear as flattened
 globules.
 Illustrated by permission of the Trustees of the British Museum

Biography of Plague

Yersinia Pestis – immeasurable human destruction

Sociological changes to human history – demographic change in 14thC Europe demise of feudal system

First global pandemic 6th Century – Egypt in 542 brought destruction on Eastern Roman Empire

Constantinople approx. 40% mortality , Dark Ages?

Second Global pandemic, originated China 1330s, floods, locusts and earthquakes

Plague spread along the Silk Road to Asia Minor 1346

Impact initiated violence between Tartars and Genoese merchants in Crimean coastal city of Kaffa (now Ukraine – Feodosia)

Tartars besieged city and catapulted dead plague victims over the walls. ? Flea infested rats

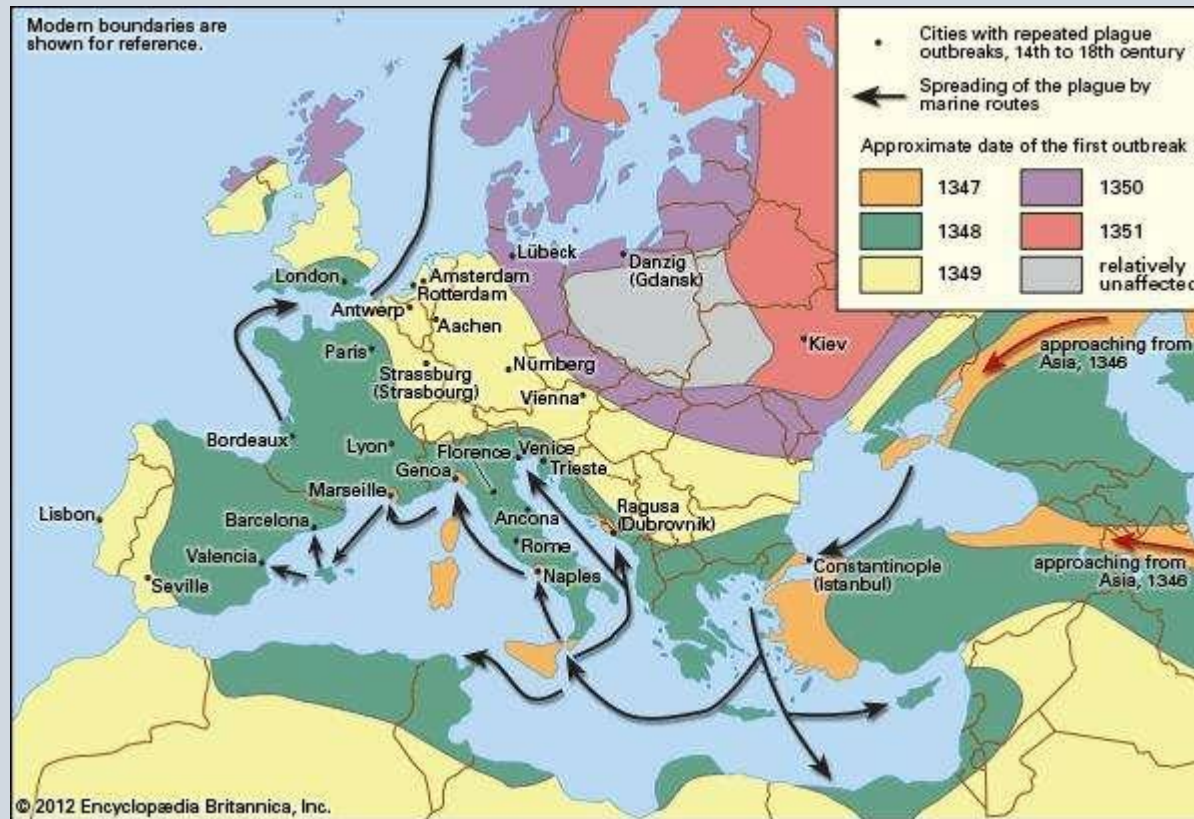
Genoese merchants abandoned Kaffa and spread plague across Europe, but also other trade routes of entry

Sicily and Italy by 1348



Giovanni Boccaccio : The Decameron

“The symptoms were not the same as in the East, where a gush of blood from the nose was the plain sign of inevitable death: but began in men and women with swellings in the groin and armpit. These grew to the size of a small apple. In time these tumours spread all over the body. Soon after black and purple spots appeared all over the body. These spots were a certain sign of death.....”





Black Death

A massive outbreak of bubonic plague that ravaged Europe throughout the 14th Century

Estimated to have killed between 75 to 200 million people in the 14th century alone

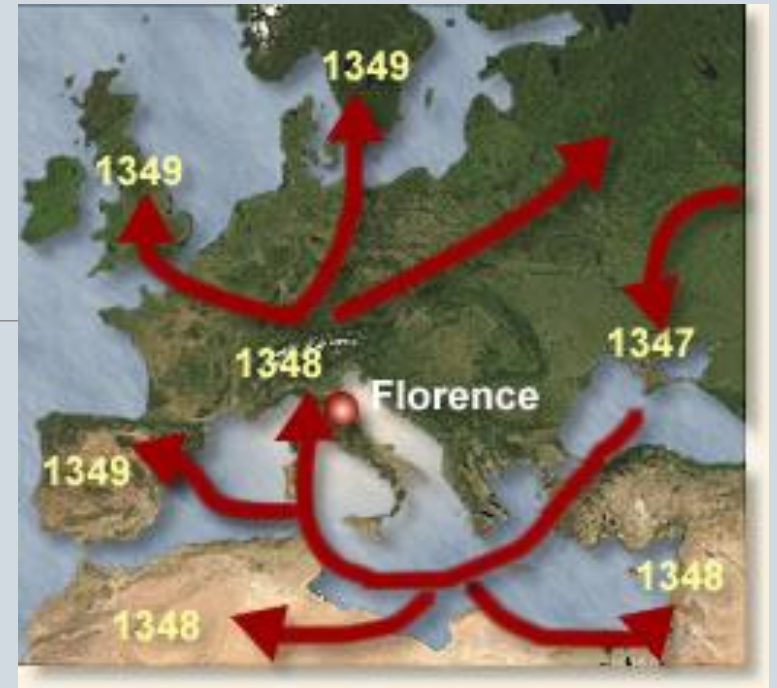
45 - 60% of the entire population of Europe was wiped out

Reduced the world's population from an estimated 450 million to between 350 and 375 million by 1400

It took 150 years for Europe's population to recover

Periodically resurfaced

The last major outbreak was in London in 1665.



Chronicle of Symptoms: Black Death

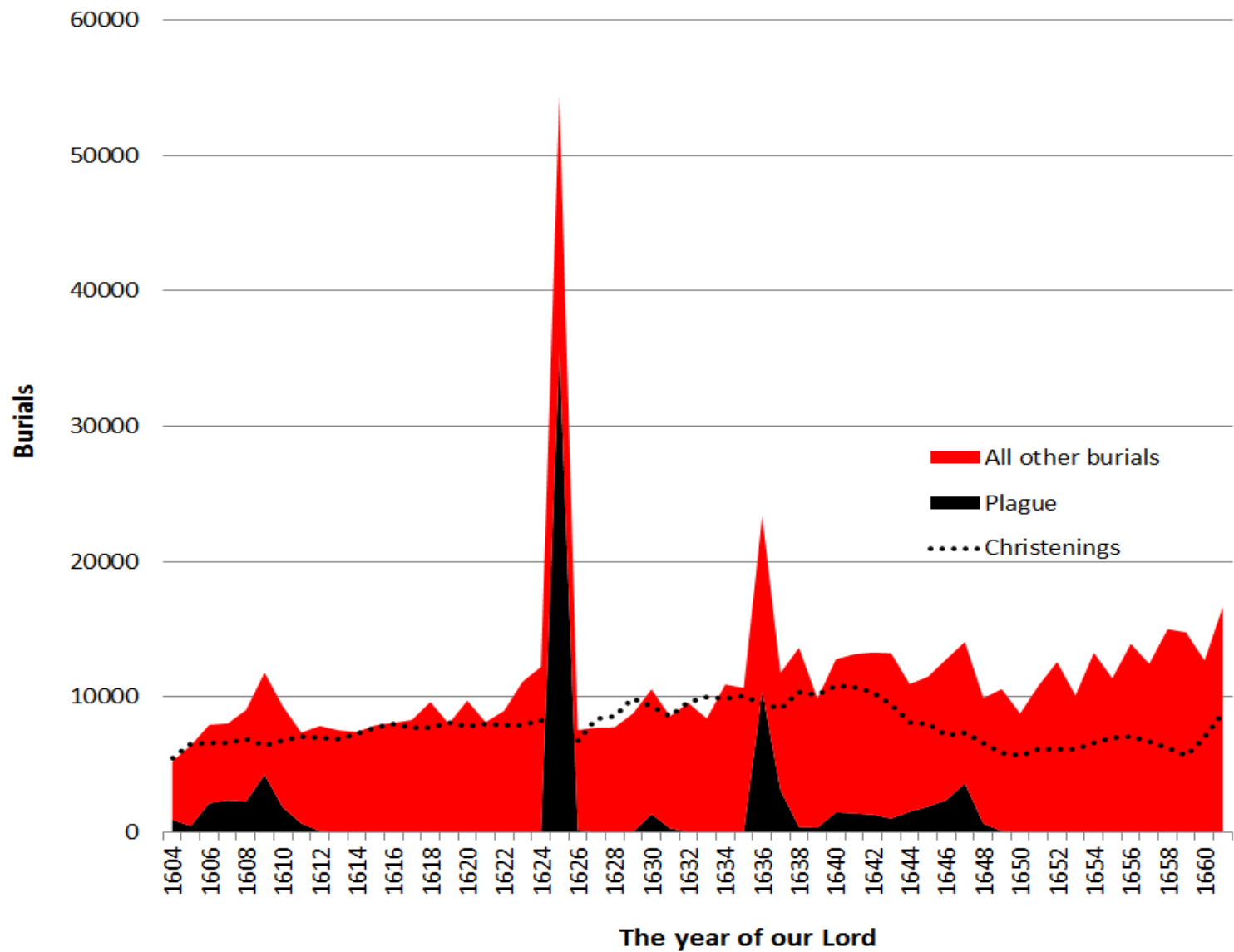
Bubonic plague –death within 4-5 days of onset

Pneumonic plague – 3 days

“The horrifying nature of symptoms as victims wasted away in excreted, putrid body fluids.”

“Destruction of societal norms as victims were abandoned by fearful family and friend, the legitimacy of civil and religious authority eroded”

Some historians believe labour shortages led to the end of feudalism



Great Plague of London 1665

Started in St Giles-in-the-field

Authorities quarantined all infected household; a red cross and “Lord Have Mercy on Us” painted on doors.

At night dead collected and buried in large communal pits; eg Aldgate and Finsbury Fields

Mayor of London – Cats and Dogs

Worsening of Black Rat population




Late 20thC medical historians- anthrax also involved?

Iceland in 14thC had plague but no black rats until 17thC

3282

MEMENTO MORI

LONDON'S Dreadful Visitation:
 Or, A COLLECTION of All the
Bills of Mortality
 For this Present Year:
 Beginning the 27th of *December* 1664. and
 ending the 19th. of *December* following:
 As also, The *GENERAL* or *whole years* *BILL*:
 According to the Report made to the
 KING'S Most Excellent Majesty,
 By the Company of Parish-Clerks of London. &c

LONDON:
 Printed and are to be sold by *E. Cotes* living in *Aldersgate-street*.
 Printer to the said Company 1665.

1665

From February death toll could not be concealed

Official death toll 68,596

Underestimate as Quakers, Anabaptists and Jews not recorded

False under-reporting to avoid compulsory segregation of families

Most authorities 100,000 out of 500k in London - 20%

Peak in June, declined from September

Influx of refugees from August but no rise in mortality

Famine a greater problem than plague from October

Severe frosts from November seems to have halted spread

Severe outbreaks in Colchester, Winchester, Deptford, Greenwich and Portsmouth...

Treatment of Plague in 17thC

Doctrine of 4 humours

Blood letting and purging

Mithridantium

Up to 41 herbal ingredients from Galen 2ndC

Theriac

Up to 64 ingredients

THE
WHOLE WORKS

Of that Excellent
Practical Physician,
Dr. Thomas Sydenham:

WHEREIN

Not only the HISTORY and CURES
of Acute Diseases are treated of, after a
New and Accurate Method; but also the
Shortest and Safest Way of Curing most
Chronical Diseases.

The Seventh Edition:
Corrected from the Original *Latin*,
By JOHN PECHAY M. D.

and is now living, so that any one may be satisfied that doubts the Truth of it.

I will mention what I have observed worth Note, concerning this Thing, when I come to treat of those few Remarks I have made by my own Experience, while the late *London Plague* raged.

But tho in my Judgment, I approve of this Practice, and have experimentally found the Usefulness of it long ago, yet the dissipation of the Pestilential Ferment by Sweat pleases me better, upon many accounts, than the Evacuation of it by Bleeding, because it does not weaken the Patient so much, nor hazard the Physician's Reputation: But this has also its Inconveniencies; for first many, especially young Men of a hot Constitution, sweat difficultly; and in such, the more you endeavour to force Sweat by strong Diaphoreticks, and by heaping on a great many Clothes, so much the more are they in danger of falling into a Phrensy; or which is yet worse, after having been entertain'd a while with vain Hopes, the *Tokens* are drawn out instead of it: for the chief Venom residing in the most spirituous part of the Blood (the motion of the grosser Particles being on this account somewhat more weak than is usual in other Inflammations) that tender Portion becomes very furious by the accession of this new Heat, and at length breaks in pieces all the Fibres of the Blood distended beyond the bounds of their Texture; which dissolution of the sanguineous Fibres, I suppose, is the cause of the *Pestilential Tokens*, for they are first intensely red and soon after livid or black, like Stripes inflicted by violent Blow on some fleshy Part of the Body.

Take of white Arsenick two ounces, white Dittany and *English Saffron*, of each two drams, of Camphire and *Euphorbium* of each one dram, beat them into Powder, and with *Gum Arabick* dissolv'd in Rose-water, make them into little Cakes about the breadth of a Shilling, and the thicknes of two half Crowns, and dry them in the Sun, or in an Oven after the Bread is taken out.

Skenkius commends this: Take white Arsenick two ounces, yellow Arsenick one ounce, powder them, and with the white of an Egge, or Gum Dragon dissolv'd in water, make them into Cakes, as aforesaid.

Some there be, that would have onely a piece of Arsenick sewed in Silk, and worn in the bosome, and have little or nothing mixt with it, least it should hinder its vertue and efficacy of operation; others put in many things, that some of them might meet with and resist the pestilential venom, which oftentimes is not of the same, but of a different and various Nature.

Sennertus directs this: Take of white Arsenick two ounces, Zedoary two drams, Saffron one scruple, Camphire half a dram; beat all into powder and with *Gum Arabick* dissolv'd in Rose-water, as

Speciall Command, containing certaine necessary Directions, as well for the cure of the Plague, as for preuenting the Infection; with many easie Medicines and of small charge, the vse wherof may be very profitable to his
MAIESTIES Subjects.

Doctors, Apothecaries and Chirurgions.

The Church orders for prayers being first obserued as in former times, it is thought necessary that by the gouernment of the City there be appointed sixe or fowre Doctors at least, who may apply themselves to the cure of the Infected: and that these Doctors bee stipendiaries to the City for their liues: and that to each Doctor there be assigned

B 3

two

Treatment of Plague in 17thC

“The Great Plague increased the popularity of apothecaries because most of them stayed in London and treated plague victims, whereas most of the physicians followed their wealthy patients out of the City”

A W Sloan: English Medicine in the 17th Century

Lord have Mercy upon us.



Death triumphant c'loth'd in Ermine
About whose bones do crawl the Vermine
Death denote that each condition
To his power must yeeld submission

55410

THE
Christians Refuge:

OR
HEAVENLY ANTIDOTES

against the

PLAGUE

In this time of Generall Contagion

To which is added the

CHARITABLE PHYSICIAN

Prescribing

Cheap and Absolute Remedies

For

PREVENTION and CURE

thereof

Published for the Benifit of all
FAMILIES

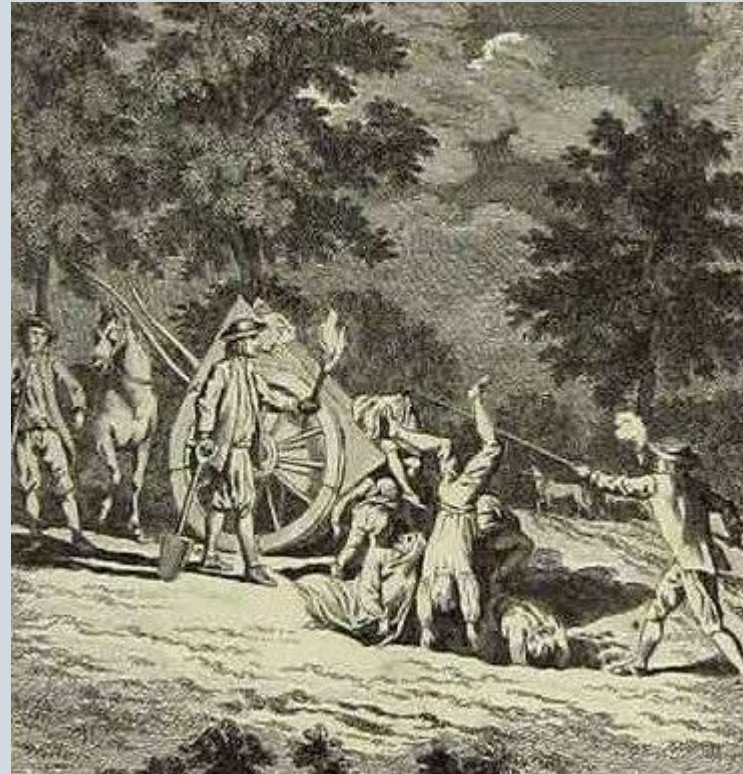
Sold by H. Maff at the Princes, Armes
in Chancery-Lane: Price. 8 d. 1665.

- Hans Holbein the Younger (1497/98-1543) is remembered as a brilliant portrait painter, especially in the court of Henry VIII, and as the designer of a series of remarkable woodcuts, *The Dance of Death*. *The Death and the Knight* is one of forty-one woodcuts in 1538. The other images show Death escorting people from all walks of life to their final destiny.

Der Ritter.



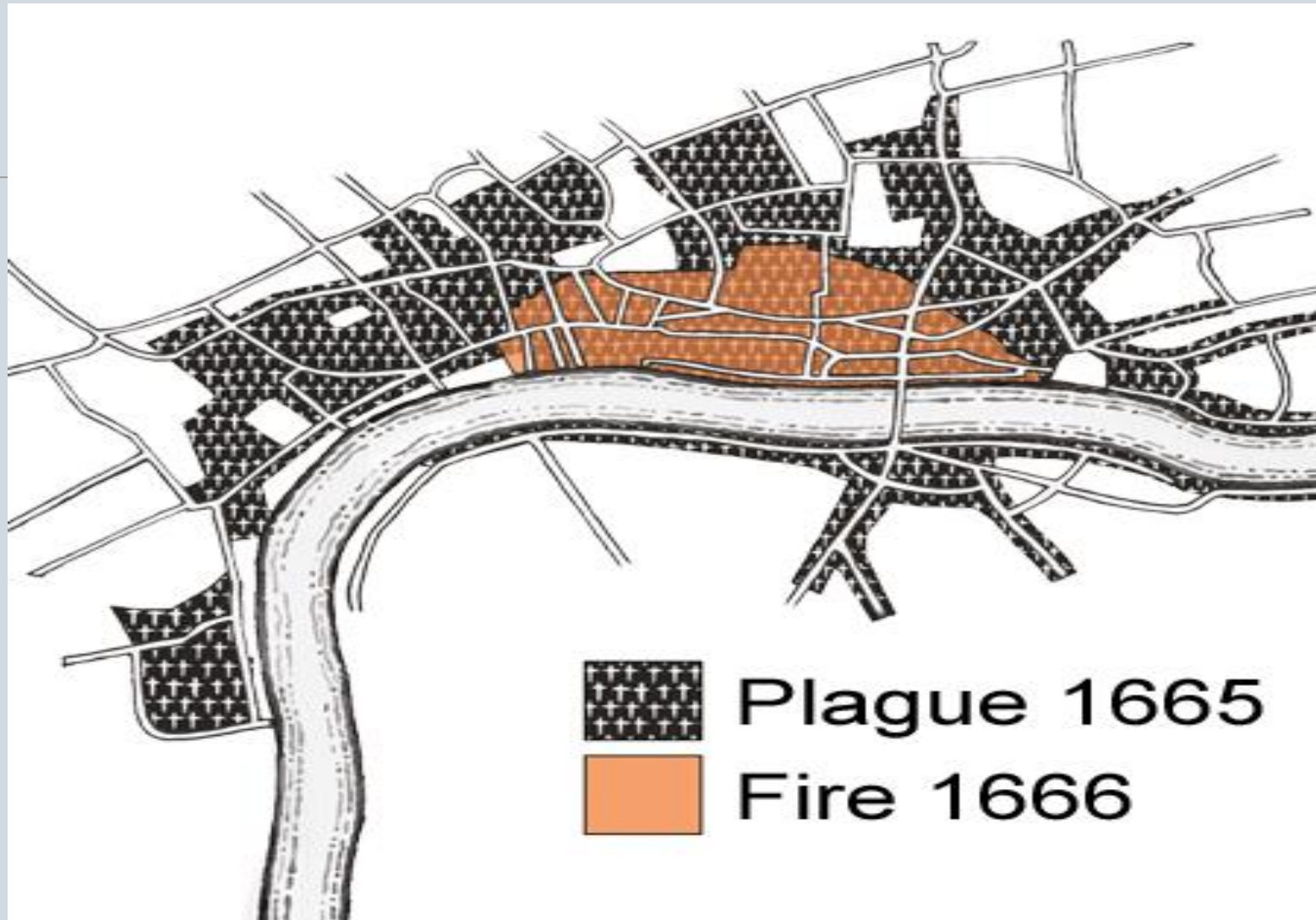




As described by Daniel Defoe in his book, A Journal of the Plague Year.

'A terrible pit it was, and I could not resist my curiosity to go and see it. As near as I may judge, it was about forty feet in length, and about fifteen or sixteen feet broad, and at the time I first looked at it, about nine feet deep; but it was said they dug it near twenty feet deep afterwards in one part of it, till they could go no deeper for the water; for they had, it seems, dug several large pits before this. For though the plague was long a-coming to our parish, yet, when it did come, there was no parish in or about London where it raged with such violence as in the two parishes of Aldgate and Whitechapel.'





Plague



Bubonic plague, usually results from the bite of an infected flea *Xenopsylla cheopis* (the rat flea)

The bacteria form aggregates in the gut of an infected flea blocking it and, when trying to feed, the hungry flea regurgitates ingested blood into the bite site of a rodent or human host

FACTS ABOUT plague

Plague is an infectious disease that can become severe if left untreated. If diagnosed early, plague can be cured with antibiotics and supportive care.

Plague is caused by a bacterium usually found in small mammals and their fleas

People infected with plague usually have "flu-like" symptoms within 1-7 days of contact

Early diagnosis and treatment are essential - the fatality rate is 30-100% if left untreated

Bubonic

The most common type of plague affects the lymph nodes. It can be severe, but there is no human to human transmission.

Pneumonic

The deadliest and most rapid form of plague occurs when it reaches the lungs. It can be transmitted person to person via droplets in the air.


Middle ages ▶▶▶▶


Plague, known as the "Black Death" in 1400s, caused an estimated... **50 million deaths in Europe**

Modern era ▶▶▶▶

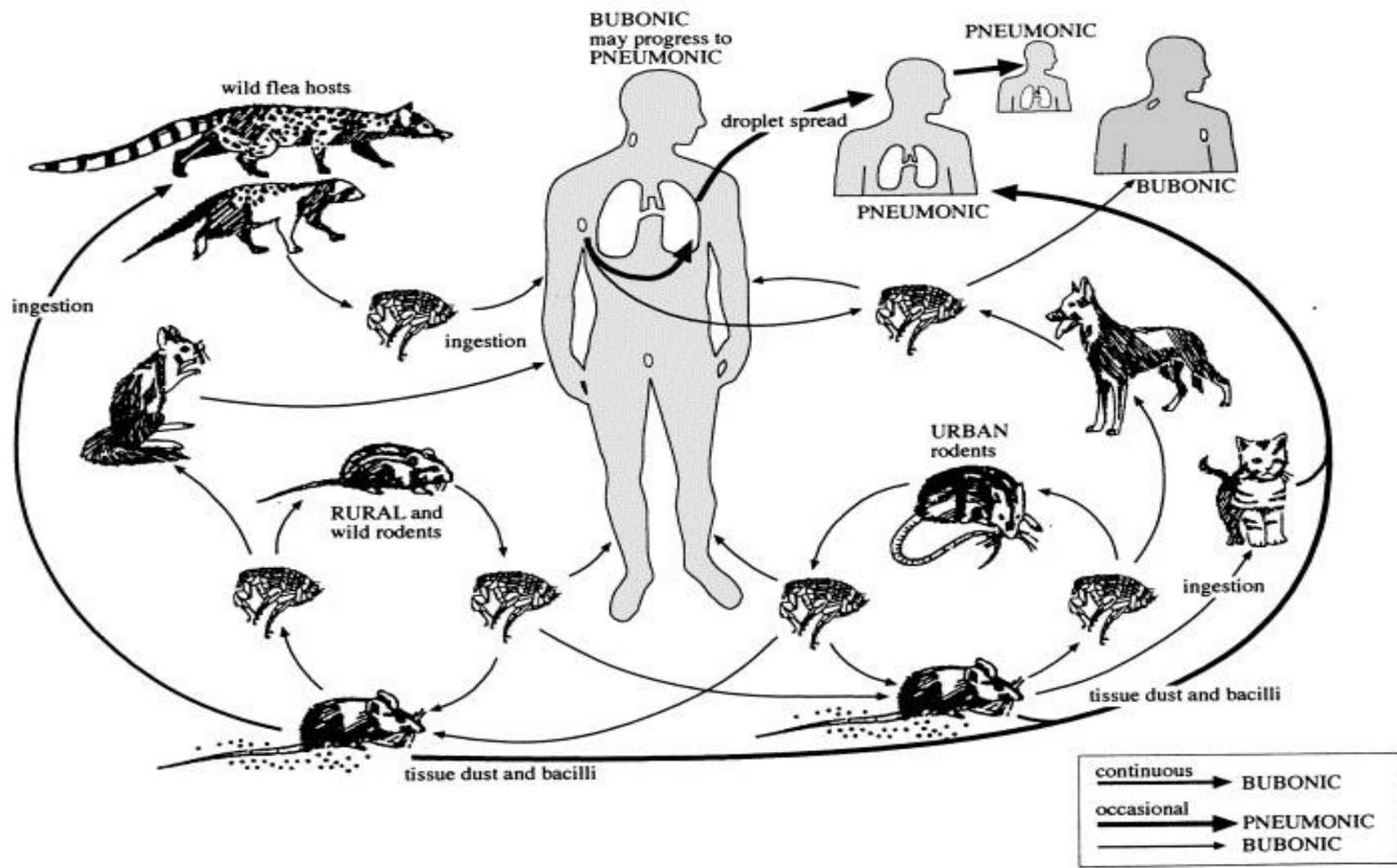
Between 2010 - 2015, 3248 people were infected with plague worldwide... **584 died**

Plague is most common in Madagascar, Democratic Republic of the Congo and Peru. However, the potential plague natural foci are distributed worldwide.



 **World Health Organization**
October 2017

Plague Pathways



Where is plague found?

Found in animals in all continents except Oceania

Human plague can occur wherever it occurs in animals

Epidemics have occurred in Africa, Asia, & South America

Since 1990s, most human cases have occurred in Africa

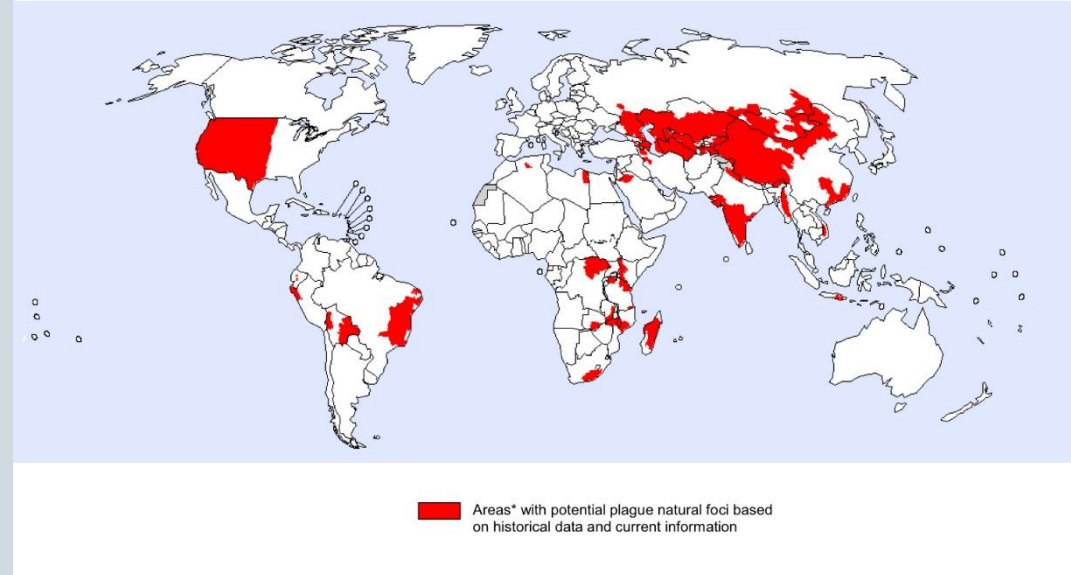
The 3 most endemic countries are DRC, Madagascar & Peru

In Madagascar cases of bubonic plague are reported nearly every year, during the epidemic season (September - April)

2010 – 2015:

- 3248 cases of plague reported worldwide, including 584 deaths

Global distribution of natural plague foci
as of March 2016



[WHO Plague Fact Sheet]

Signs, symptoms and types

Incubation 1-7 days

Acute febrile disease - non-specific systemic symptoms (fever, chills, head & body aches, & weakness, vomiting & nausea).

2 main forms, depending on the route of infection

Bubonic

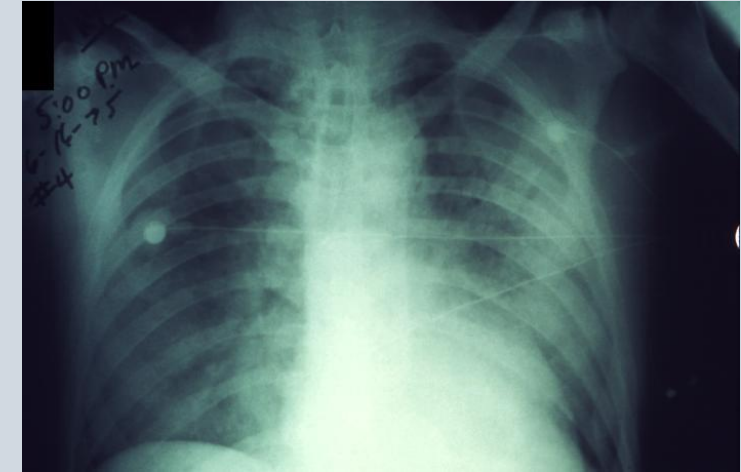
- most common form
- caused by the bite of an infected flea.
- the bacillus enters at the bite & travels through the lymphatic system to the nearest lymph node
- the lymph node becomes inflamed, tense and painful, and is called a 'bubo'.
- At advanced stages the inflamed lymph nodes can turn into open pus filled sores
- Can spread to the lungs
- Human to human transmission of this form is rare.



Signs, symptoms and types

Pneumonic plague

- the most virulent form of plague
- incubation can be as short as 24 hours
- Anyone with pneumonic plague may transmit the disease via droplets to other humans
- Untreated pneumonic plague, if not diagnosed and treated early, can be fatal. Recovery rates are high if detected and treated in time (within 24 hours of symptom onset)



Septicaemic plague

- Rare but highly lethal form of plague
- Patients can develop an overwhelming septicaemia with DIC



Diagnosis

Clinical

Microscopy of Gram stained aspirates

Fluorescent antibody, ELISA or PCR

Culture of bubo aspirates, blood, CSF, sputum

Dipstick test



Plague in Madagascar

WHO Sitrep: 22nd Nov 2017

2348 confirmed, probable & suspected cases

202 deaths (CFR: 8.6%)

1791 (76%) cases & 72 deaths clinically classified as pneumonic plague

- [394(22%) confirmed, 609 (34%) probable & 788 (44%) suspected cases]

Also:

- 341 cases of bubonic plague
- 1 case of septicaemic plague
- 215 type unspecified
- 81 healthcare workers ill (no deaths)

Figure 1: Number of confirmed, probable and suspected plague cases in Madagascar reported by date of illness onset from 1 August through 22 November 2017

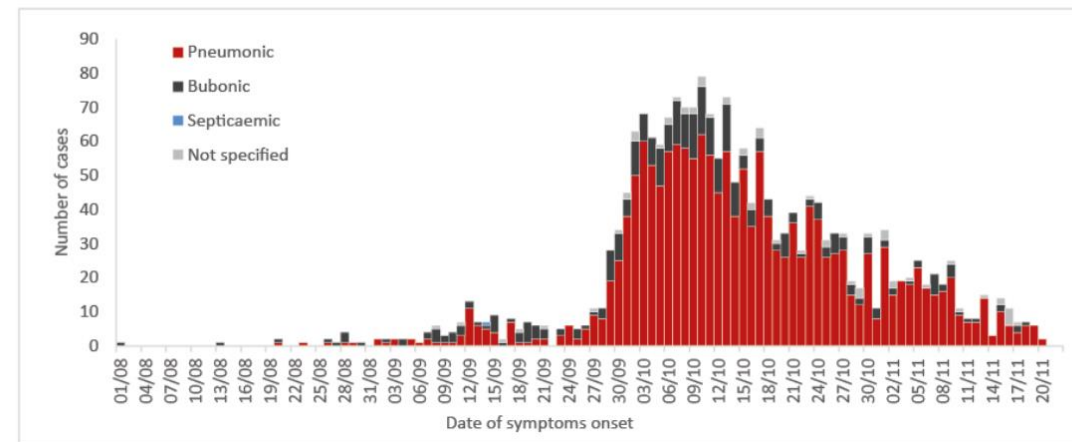
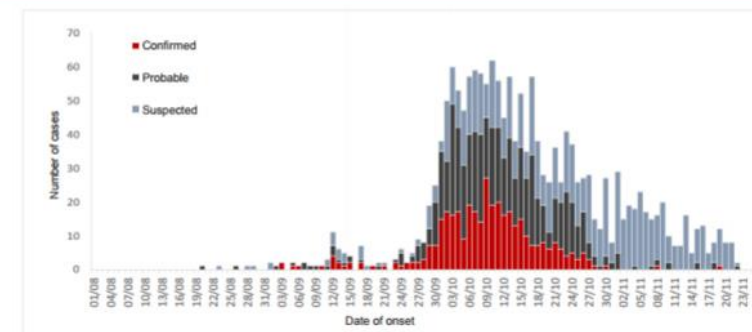


Figure 2. Distribution of pneumonic plague cases reported in Madagascar, 1 August – 24 November 2017



Treatment of plague- 21stC

Antibiotics & supportive therapy are effective if patients are diagnosed in time

CFR:

- bubonic plague: 1–15% in treated vs 30 - 60% in untreated cases
- septicaemic plague: 4–15% in treated vs 40 - 100% in untreated cases
- pneumonic plague: 1-10% in treated vs ca. 100% in untreated cases
 - pneumonic plague can be fatal within 18 - 24 hours of onset if untreated

Several classes of antibiotics are effective

- aminoglycosides (streptomycin & gentamicin)
- tetracyclines (especially doxycycline)
- fluoroquinolone (ciprofloxacin)

Supportive treatment includes oxygen and intravenous fluids

Madagascar

Contacts: follow-up

22/11/2017

7289 contacts have been identified, all of whom completed a 7-day follow up & a course of prophylactic antibiotics

Only 11 contacts developed symptoms and became suspected cases

Decline of the outbreak

20 - 24/11/2017

- 58 cases of plague (1 confirmed, 8 probable and 49 suspect) were reported to WHO
- The last two confirmed bubonic cases were reported on 8/11/2017
- The last confirmed case of secondary pneumonic plague (primary bubonic form) was reported on 21/11/2017

Figure 1. Geographical distribution of cases of plague in Madagascar as of 24 November 2017



NB: The figures in the External Situation Report are subject to change due to continuous data consolidation, cleaning and reclassification, and ongoing laboratory investigations. The data reported are based on available information reported by the Ministry of Public Health.

Public health response measures include:

Investigation of new cases

Isolation and treatment of all pneumonic cases

Enhanced case finding

Active finding, tracing and monitoring of contacts and provision of free prophylactic antibiotics

Strengthened epidemiological surveillance

Disinsection, including rodent and vector control

Raising public awareness on prevention

Raising awareness among health care workers and providing information to improve case detection, infection control measures and protection from infection

Providing information about infection control measures during burial practices

Plague as a Bio Weapon?

WW2 Japan developed “Flea-bomb” Uji-50

Plague fleas and flour

Flour attracted rats

Used on Manchurian villages -dead rats and bubonic plague spread

? Kamikaze bombers plan for San Diego “Operation Cherry Blossoms at Night”

1995 White supremacist in Ohio acquired Y.Pestis

1970 report WHO – 50kg Y Pestis bacteria sprayed over a city of 5m could cause 150k cases and 36k deaths

BRING OUT
YER DEAD!
BRING OUT
YER DEAD!

THE GREEN
RECYCLING
COLLECTION
MUST BE NEXT
WEEK.



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