

## SICK CITIES: WHY URBAN LIFE IS BREEDING NEW ILLNESS FEARS

"The whole history of urban life, in a sense," says Richard Barnett, "is of living with parasites and trying to get rid of them." We are at the end of a rainlashed walk through London, one of a series of health and disease tours run by Barnett, a historian of science and a Wellcome engagement fellow. He has told us of mummification and mass graves; the heads once displayed on spikes at the entrance to London Bridge; and the bodies that washed up in dead man's hole in the Thames, before being taken to a mortuary. The history of cities worldwide, he says, is one of filth and disease, of docks humming with people, rats and mysterious cargoes, of overcrowded slums, poor diet and pollution.

One of our last stops is St Olave's church, where Samuel Pepys is buried, and the site of a plague pit – the body of Mary Ramsey, the woman said to have brought plague to London from France in the 1660s is among those buried here. Barnett thinks Ramsey's alleged role in the plague was probably just anti-French propaganda, but it illustrates an ongoing fear – the sense of cities as pregnable entities, susceptible to bacterial invaders, to infections that enter through a port and spread quickly through a population that is living at perilously close quarters.

Over the last decades, these fears have flared with the Sars virus, avian flu and swine flu, each outbreak prompting new concerns about our ability to prevent and treat disease, at a time of greatly increased drug resistance.

While travel hubs in most cities are themselves more hygienic than in Ramsey's day, Dr Ronald Cutler, an expert in infection control at Queen Mary University of London, says the frequency – and speed – of travel has had huge ramifications for the potential for diseases to spread.

"In the past," he says, "if you were going on a boat to the Americas it might take six or seven weeks to get there, and if you had a really serious infection, there was a good chance you'd die in transit. Nowadays, you can pick up a horrible lergy, fly to the other side of the world, and not realise you've got it. It doesn't matter how many good infection control measures you have in place, nobody can tell, unless someone's visibly ill, whether or not they're actually carrying anything."

Once an infection has arrived in a city, proximity enables its spread. The city is a playground for parasites. "There are a lot more exciting human beings they can jump on to," says Barnett, "lots more opportunities for vectoring and transmission. It's all about movement. Parasites love movement. So in that sense the city is an absolutely fantastic place for them."

The opportunities for infection are often strong in areas of high population within a city – schools, for instance. In January 2010, at the height of a swine-flu outbreak, researchers at Stanford University in the US used wireless sensors to monitor the movements of 788 students, teachers and staff at a high school. They were particularly interested in how many times people came within 10ft of one another, the distance at which it's possible for infections to spread through coughs and sneezes. In the course of a day, the researchers were astonished to discover 762,868 encounters in all.

Human proximity in cities has been rising as a result of increases in world population, and rapid urbanisation – the World Health Organisation has said that, while 4 in 10 people were living in cities in 1970, by 2050 this proportion will be 7 in 10; during that 70-year period, the world population is projected to  
5 have grown from 3.7 billion to 9.3 billion.

The human population is also growing older than ever. This is a significant factor in the spread of disease, says Cutler, because, "the older you get, the more susceptible you get. The very young and very old are the two major groups that are prone to infections."

10 Infections can be passed from person to person partly through bad respiratory etiquette. Dr Arpana Verma, senior lecturer in public health at the University of Manchester, says she was recently involved in a project where a group of researchers covertly observed people's coughs and sneezes: "We were amazed by how many people spit."

15 During the group's survey around the city of Manchester, they observed 154 people coughing, sneezing, or blowing their noses, and classified this behaviour according to the Centres for Disease Control and Prevention (CDC) guidelines. Only one person – 0.7% of their sample – had good respiratory etiquette, coughing in to their upper arm, in line with CDC recommendations. Four (2.6%)  
20 had acceptable etiquette, and 149 (96.8%) had bad respiratory etiquette. None reached the bar set for excellent etiquette. "People were sneezing, just out into the open," says Verma, "and I'm sure you've seen that photograph of how far the droplets from a sneeze go ..."

Another classic route for the spread of germs is poor hygiene, especially poor  
25 handwashing. Recent UK research found that 99% of people interviewed at service stations claimed to have washed their hands after using the toilet – but recording devices revealed only 64% of women and 32% of men actually had. In 2012, Cutler published research which found faecal bacteria on 26% of hands in the UK; 11% of hands had as many germs as a dirty toilet bowl.

30 This bacteria is passed to everything we touch. Cutler screened banknotes and credit cards and found 26% of the notes and 47% of the cards had high levels of bacteria, including E coli. Analysis of mobile phones has shown one in six are contaminated with faecal bacteria. (Experts have suggested, as a guideline, that washing your hands properly should take as long as singing Happy Birthday  
35 twice.)

In environmental terms, public toilets are obviously breeding grounds for germs in cities, and Cutler says he'd like to see "ways of improving environments so they become easier to clean, easier to manage – novel surfaces and structures, so there aren't so many nooks and crannies in public areas. There's now a plethora  
40 of different toilet designs, none of which have been realistically tested but which nevertheless show promise. What people forget is that when you flush a toilet, there's a thing called a spray that goes something like two metres in the air and can contain faeces, which means you could breathe in E coli and the rest."

Other potential environmental hazards include air-conditioning systems – it's  
45 vital that the reservoir of water used for cooling a room is kept free of bacteria,

says Verma. In 1976, following a meeting of the American Legion at a hotel in Philadelphia, 182 legionnaires were taken ill, and 29 died. They had contracted a form of pneumonia from bacteria in the hotel's cooling tower, a potentially fatal sickness which became known as legionnaires' disease.

- 5 There is other evidence that air conditioning in city offices can be hazardous. A 2004 study in France found that women who worked in air-conditioned offices were almost twice as likely to take sick days – and more than twice as likely to visit the doctor for ear, nose and throat problems.

10 And yet, city life isn't all bad. Some elements which are perceived as hazardous may actually help us build immunity – public transport, for instance. Last year, a survey by the London School of Hygiene and Tropical Medicine found that people who use public transport to commute are actually *less* likely to be infected with flu than those who use other modes of travel. While cities "have often, through history, been filthy, overcrowded, diseased", says Barnett, "they have also been  
15 the places where you find doctors, hospitals, sanitation. And very often, cities are quite well fed." So although infection might spread more freely than in rural areas, there are also more tools on hand to combat it.

Cities haven't only been threatened by disease; they have also been shaped by it. "In some ways," says Barnett, "we owe the creation of the modern city first to  
20 plague, and then to cholera in the 19th century." There were four main outbreaks of cholera in London over four decades, starting in the 1830s, and although it wasn't the most deadly disease – tuberculosis killed many more people – its brutality forced city authorities to become serious about sanitation.

"If you got cholera in the 19th century," says Barnett, "you had about a one in  
25 two chance of fitting yourself to death in your own watery shit within about 48 hours."

The 1830s was a time of economic depression, and various political revolutions were under way in Europe. As a result, says Barnett, "it wasn't surprising that  
30 governments feared cholera, because it had the potential to make the sick, poor working-classes become revolutionary."

The early Victorians had their own theory about what caused cholera, that it was "spread by miasmas," he says, "which are basically bad smells. So you have rotting stuff – sewage, horse shit, industrial waste – the idea was that it decayed, gave off poisonous vapours, which blew about in the air and were breathed in."

35 The actual culprit was sewage in drinking water (as the Soho doctor John Snow deduced in the 1850s), yet the miasma theory was nonetheless useful in developing city infrastructure, as it encouraged the authorities to clean up.

"A disease like cholera helped create the modern city," says Barnett, "in the sense  
40 that it helped create most of the institutions we think of as modern. So public health, sanitation, sewerage, fresh water. I think cholera really forced the city to abandon an older way of thinking about health that is almost every man for himself, and acknowledge that a population lives and dies together, and we all have to take care of one another."

In a 2007 poll by the British Medical Journal, sanitation was voted the greatest medical milestone since 1840. Verma compares the infrastructure built in Victorian England to that being created in the developing world today, where rapid urbanisation is taking place, often without enough time and resources. "So  
5 you've got open sewers, and shared toilets out in the open. I think we forget how absolutely fundamental access to clean water and safe and effective sanitation is."

The rapid growth of cities is a serious concern for the planet's health – as is the growing number of infections which are resistant to all available drugs. In the  
10 US last September, the CDC warned that the country faces "potentially catastrophic consequences" if it doesn't combat drug resistance, echoing a statement from Sally Davies, the UK's chief medical Officer, who said that the British health system could slip back 200 years, if the "catastrophic threat" of antibiotic resistance isn't properly tackled.

15 "Antimicrobial resistance is a ticking timebomb not only for the UK but also for the world," Davies wrote in her first annual report, last March.

There were times, in the last century, when experts believed we might see the end of infectious disease. That seems much less likely now. The death toll remains horrifying: the US Department of Health and Human Services estimates  
20 infectious diseases account for about 1 in 4 deaths worldwide, including around two-thirds of all deaths of children under five.

Given their particular vulnerabilities, cities would be well advised to prepare for the worst through good hygiene control, infection control, and urban infrastructure and design. But, says Cutler, "you still won't be able to stop  
25 somebody carrying a drug-resistant organism in their body coming into a country, not even knowing they've got it – and when they find out, it's too late, they've already spread it. Not to be scaremongering, but it will happen.

"The bottom line is that if you combine the lack of development of new antimicrobials with international travel; with the fact that the world has more  
30 people now, every year, than it ever had before; and that they're ageing, the result is very concerning." At the very least, we can all wash our hands.

urban life	městský život
to get rid of sth	zbavit se něčeho
rainlashed	ošlehaný deštěm
engagement	povinnost, zapojení se
spike	hrot
mortuary	márnice
humming	hemžící se
cargo	náklad (lodi, letadla)
plague	mor
alleged	údajný
pregnable	otevřený
entity	entita, subjekt
susceptible	snadno podléhající, náchylný
perilously	nebezpečně

to flare	vypuknout, vzplanout
outbreak	propuknutí, epidemie
to prompt	být podnětem
ramification	následky
lergy	(nedefinovaná) nemoc
proximity	blízkost
to vector	přenášet (patogen)
to be prone to sth	mající sklony, náchylný
respiratory etiquette	respirační pravidla, etiketa
covertly	tajně, potají
spit	plivat, prskat
droplets	kapičky
germs	bakterie
toilet bowl	záchodová mísa
to suggest	naznačovat
guideline	směrnice, zásady
breeding grounds	živná půda
nooks and crannies	zákoutí a škvíry
plethora	nadbytek
legionnaire	legionář
to contract	nakazit se, onemocnět
air-conditioning (AC)	klimatizace
survey	průzkum
filthy	špinavý
sanitation	hygienická opatření
to combat	bojovat, zápasit
threatened	ohrožený
to decay	hnít, rozkládat se, upadat, chátrat
poisonous vapours	jedovatý výpary
culprit	viník, pachatel
sewage,	splašky
to abandon	opustit, zanechat
sewers	stoka, kanál
scaremongering	šíření paniky, poplašných zpráv
sewerage	kanalizace