Highs and Lows of Environmental Health

30 million sc Fossils of mosquitoes, found in Africa, illustrate that the vector for malaria was present well before Homo sapiens.

3000–1500 sc Stone water closets are built in the Palace of Knossos, Crete – the oldest example of flushing technology.

2000 sc Ancient Hindi source advises people to heat foul water by boiling and exposing it to sunlight.

476 av Lead acetate is added as a sweetener to wine and food. This, along with lead leaching into drinking water from lead pipes and vessels, hastens the decline of the Roman Empire.

11th century The Persian physician Ibn Sina (Avicenna) advises travellers to boil or strain drinking water.

13th century Holy Roman Emperor Frederick II (1194–1280) installs pour-flush toilets in his Castel del Monte, inspired by Arab technology.

1589 In England, Sir John Harrington invents the water closet, but the invention is ignored until 1778, when Joseph Bramah begins marketing a patented closet.

1690s Paris is the first European city to build an extensive sewerage system.

1775 Percival Pott notes an elevated incidence of scrotal cancer in small English boys assisting chimney sweeps, identifying the link between work and cancer.

1789 Frederic II (1194–1280) installs pour-flush toilets in his Castel del Monte, inspired by Arab technology.

1809 The British Royal Commission on Employment of Children in the Mines establishes the link between the work environment and cancer.

1842 The Swedish chemist Svante Arrhenius argues that the greenhouse effect from coal and petroleum use is warming the globe.

1908 The British Royal Commission on Employment of Children in the Mines reports “ouzel slaving revolting to humanity,” on finding children chained to carts and working 15-hour days.

1943 In the USA, Dr. Wendell Holmes proclaims the importance of hand washing to control the spread of disease.

1954 Louis Pasteur discovers that heat removes undesirable organisms. Today, pasteurization is used to prevent the spoilage of milk and milk products.

1850 John Snow publishes On the Mode of Communication of Cholera, identifying dirty water supplies as the cause of cholera outbreaks in London.

1900s In Europe, mercury used in the finishing process poisons hat workers, giving rise to the expression “mad as a hatter”.

1908 The Swedish chemist Svante Arrhenius argues that the greenhouse effect from coal and petroleum use is warming the globe.

1940s Shortly after the Second World War, chloroquine is introduced as an effective prophylactic and treatment against all forms of malaria.

1950 Pozzi Rica killer smog, caused by gas fumes from an oil refinery, leaves 23 dead and hundreds hospitalized in Mexico.

1959 Volvo introduces the three-point (“lap-and-shoulder”) seat belt, invented by the Swede Nils Bohlin.

1962 Rachel Carson’s book Silent Spring, which issues grave warnings about pesticide use and predicts massive destruction of the planet’s ecosystems, launches the environmental movement in the USA.

1970 The USA introduces the first protective child car seat.

1970 Singapore bans smoking in buses, cinemas, theatres and other public places.

1978 Rice oil contaminated with polychlorinated biphenyls (PCBs) causes Yusheng (“oil-disease”) in Taiwan, China. Children of affected women suffer developmental delays and behaviour problems.

1982–98 China’s National Improved Stoves Programme provides more than half of rural households with more efficient, cleaner cooking technologies. 185 million improved stoves help prevent pneumonia and other respiratory infections – the biggest killer of Chinese children.

1984 Methyl isocyonate gas leaks from a Union Carbide pesticide plant in Bhopal, India, killing 8000 people and maiming many more. Most of the victims lived in squatter settlements near the plant.

1986 The Chernobyl nuclear reactor explodes. Radiotoxic materials severely contaminate large areas of Belarus and Ukraine and are spread by wind and rain all over Europe.


1990s In Europe, mercury used in the finishing process poisons hat workers, giving rise to the expression "mad as a hatter".

1990s The installation of wells helps reduce child mortality in Bangladesh but exposes children to high levels of arsenic.


1997 The Kyoto Protocol sets targets for developed countries to reduce their emissions of greenhouse gases to combat global warming.

WHO Sub-Regions

The 192 Member States of the World Health Organization have been classified into five mortality strata according to their level of mortality in children under five years, and in males aged 15–59 years.

Mortality strata Child mortality Adult male mortality
A very low very low
B low high
c high very high
D high high
e very high

These strata have been applied to countries within the six WHO regions, producing 14 sub-regions.

Africa Af-0 Africa with high child and high adult mortality
African, Angola, Benin, Burundi, Cameroon, Cape Verde, Chad, Comoros, Equatorial Guinea, Gabon, Gambia, Guinea, Guinea-Bissau, Liberia, Madagascar, Malawi, Mauritania, Mauritius, Niger, Nigeria, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Togo

Afr-1 Africa with high child and very high adult mortality
Botswana, Burundi, Central African Republic, Congo, Côte d’Ivoire, Democratic Republic of the Congo, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe

Americas Amr-0 Americas with very low child and very low adult mortality
Canada, Cuba, United States of America

Amr-1 Americas with low child mortality and very low adult mortality
Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Bolivia, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guatemala, Honduras, Jamaica, Mexico, Panama, Paraguay, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela (Bolivarian Republic of)

Amr-2 Americas with high child and low adult mortality
Bolivia, Ecuador, Guatemala, Haiti, Nicaragua, Peru

South-East Asia Sear-0 South-East Asia with low child and low adult mortality
Indonesia, Sri Lanka, Thailand

Sear-1 South-East Asia with high child and low adult mortality
Bangladesh, Bhutan, Democratic People’s Republic of Korea, India, Maldives, Myanmar, Nepal, Timor-Leste

Europe Eur-0 Europe with very low child and very low adult mortality
Andorra, Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom

Eur-1 Europe with low child and low adult mortality
Albania, Armenia, Austria, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Hungary, Iceland, Ireland, Italy, Latvia, Montenegro, Poland, Romania, Slovakia, Switzerland, The former Yugoslav Republic of Macedonia, Serbia and Montenegro, Turkey, Ukraine

Eur-2 Europe with low child and high adult mortality
Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine

Eurasia Emr-0 Eastern Mediterranean with low child and low adult mortality
Bahrain, Iran (Islamic Republic of), Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Turkey, United Arab Emirates

Emr-1 Eastern Mediterranean with high child and high adult mortality
Afghanistan, Djibouti, Egypt, Iraq, Iran, Lebanon, Pakistan, Somalia, Sudan, Yemen

Western Pacific Wpr-0 Western Pacific with very low child and very low adult mortality
Australia, Brunei Darussalam, Japan, New Zealand, Singapore

Wpr-1 Western Pacific with low child and low adult mortality
Cambodia, China, Cook Islands, Fiji, Kiribati, Lao People’s Democratic Republic**, Malaysia, Marshall Islands, Micronesia (Federated States of), Mongolia, Nauru, Niue, Palau, Papua New Guinea**, Philippines, Republic of Korea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Viet Nam

Wpr-2 Western Pacific with high child and high adult mortality

* Following improvements in child mortality over recent years, Egypt meets criteria for inclusion in sub-region Emr-0 with low child and low adult mortality. Egypt has been included in Emr-0 for the presentation of sub-regional totals for mortality and burden to ensure comparability with previous editions of The World Health Report and other WHO publications.

** Although Cambodia, the Lao People’s Democratic Republic, and Papua New Guinea meet criteria for high child mortality, they have been included in the Wpr-2 sub-region with other developing countries of the Western Pacific Region for reporting purposes.