This talk will cover an important change in epidemiology, known as the epidemiologic transition. As we saw in the history of epidemiology, and especially for London in the 1800s, most causes of mortality were due to infectious disease.

An important historical trend that I wanted to point out is called the epidemiologic transition, in which diseases changed over time from a predominately infectious to chronic causes. This slide shows the number of deaths per 100,000 people in the US in 1900 and 2010. As you can see, the first three causes of deaths in 1900 were due to infectious causes while the top 5 causes of death in 2010 are all due to chronic diseases. This transition is due to a number of factors: improved sanitation, vaccinations, the use of antibiotics, lifestyle changes, and an aging population.
This graph illustrates this change over the same period. Note the spike in 1918 from the influenza epidemic. In general you see a decrease in infectious causes and an increase in chronic disease over time. In the 1930s-1960s, there was a dramatic increase in heart disease deaths which decreased starting in the 1970s. Cancer mortality also increased over time into the 1990s and then decreased a bit. Some of these changes are likely due to the increase and subsequent decrease in cigarette smoking. Also keep in mind that we do all die from something so if infectious diseases decrease there is a greater opportunity for people to die from chronic diseases.

The major causes of death worldwide have also undergone a transition, but there are differences in countries dependent upon income levels. This graph by the World Health Organization (WHO) shows the overall cause of mortality worldwide. Note that the top three causes are from chronic disease but the next 5 are due to infectious diseases. So worldwide infectious diseases remain a concern.

The next four graphs show the main cause of death by the income level of different countries.

- For very low income countries, the top 3 causes of mortality are due to infectious disease but the next two are chronic conditions (stroke and heart disease).
- In lower-middle income, that pattern starts to change and heart disease and stroke become the major causes of death, with a mix of chronic and infectious diseases following.
- As countries move into higher income levels, deaths are more commonly due to chronic disease, as seen in these graphs of upper-middle and high income countries.

The link to the full article from which these slides were taken is included in your readings.
Let's stop and think about infectious disease for a minute. This famous quote by the US surgeon general in 1967 says, “The time has come to close the book on infectious diseases. We have basically wiped out infection in the United States.” This was a very optimistic time. We had improved sanitations, vaccinations, and antibiotics. There was a great belief that we had solved the issue of infectious disease, at least in the United States.

So where are we with infectious diseases today? The picture is not as optimistic. A strong concern has been with emerging diseases. More than 20 Million people worldwide and approximately half a million people in the US have died from AIDS since it was first identified in 1981, less than 20 years after that prediction. From 1940 to 2004 several hundred new infectious diseases emerged, many of which are zoonotic and bacterial. More than half of these new diseases have emerged since the 1970s, with the 1980s being the decade with the most new infections. There is also increasing rates of antibiotic resistant diseases. Clearly, infectious diseases are still an open book.

This youtube video shows a 24 hour time lapse photograph of international air travel. It clearly demonstrates that many diseases are now only hours away by plane. The 2014 ebola epidemic which spread into urban areas in Africa demonstrates the increased rate of travel in developing countries as well. Prior epidemics had been more contained to small areas.
There are many areas of current concern within the world and epidemiology will address these and new health risks. We will increase our concern with chronic diseases but know that we also need to keep an eye on infectious disease as well.

This slide provides an overview of several disease categories, exposures, and populations that are of great interest right now.

This slide presents anticipated challenges for epidemiology in the 21st century. Environmental changes are of great concern as is social issues, including not only poverty but also the impact of civil unrest and violence. For example, polio vaccination programs have been hampered by violence in Pakistan.
It is important to realize that epidemiology is a component of public health and we cannot fully understand epidemiology without understanding public health. Our ultimate goal in epidemiology is to improve the health of all populations. It is an important goal.

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