Super Bugs And Resistant Diseases: Is There A Global Solution?

Health Committee! My name is Chris Trew and I’ll be one of the chairs for the Watson’s conference this year. To all new delegates, don’t worry, you’ll be fine. Really. If it helps it’s my first time chairing, so we’re all in the same boat really. If you want to be in the running for a Committee Award, I would like to remind you to e-mail your completed position papers (50 words or so outlining your country’s view of this topic) to me by 18 February. So without further ado, let’s introduce the topic which will be debated: super resistant diseases, is there a global solution?

Super resistant diseases (superbugs such as MRSA or XDR-TB [Extensively Drug Resistant Tuberculosis] ) are diseases which have developed a resistance to certain antibiotics. They are referred to as Multi Drug Resistant (MDR) if they are resistant to most first line drugs and Extensively Drug Resistant (XDR) if they are resistant to all the first line drugs and at least two of the second line ones. The problem with these sorts of resistances is obvious: people die because they can’t be treated. In fact, in the last year 60,000 people died in the USA alone due to drug resistant infections, more than breast and prostrate cancer put together.

How The Diseases Arise…

Drug resistance is developed by bacterial strains which are not properly treated. When a patient is admitted to a hospital with a disease caused by a bacterial strain, the standard course of action is to proscribe antibiotics. The antibiotics kill the bacteria and the patient gets better, where’s the problem? The problem is that when antibiotics do not kill all of the bacteria, the bacteria exposed can develop what is effectively an immunity, so that particular antibiotic will no longer kill the disease. Due to Darwinian Evolution (the concept of survival of the fittest) these bacteria which have the resistance then breed and suddenly we find ourselves with a whole new strain of bacteria, which we can not treat with the drugs available. This selection effect means that the problem is always continuing, with new drugs always being needed as some bacteria inevitably will survive, be it down to luck or simply a missed prescription.

How the Antibiotics Are Prescribed Now…

Roughly 100 countries of the 192 member states of the UN have public health care, as shown by Appendix 1. In a public health system, antibiotics are only prescribed by trained physicians and can not be bought over the counter. The antibiotics are free to everybody and readily available to all. However, even in such health care systems drug resistance can develop as some patients can miss a prescription or not take the antibiotics regularly. There also tends to be a lack of disease control, so the health system can lose track of the people infected, and allow them to spread the infection further. This deficiency tends to be due to cost, but is also down to the bureaucracy that would be involved in implementing such a system. One of the main problems with this system is that doctors prescribe antibiotics too readily. In many cases, antibiotics are not necessary and should not be prescribed, but the patient expects to have something given to them, so the GP does. In the USA where the health care is private, the poor struggle to afford their treatments. But in the USA the antibiotics still have to be prescribed; therefore the problem is not so bad as in the third world. In third world countries the problem is very different. In this situation there is no governmentally funded health care, so antibiotics are often simply bought over the counter. The problems of having no centralised system means that very few people ever complete their course of antibiotics due to the disappearance of their symptoms or they simply can not afford it. This allows the emergence of even more drug resistant strains.
Reasons For The Spread…

Diseases are spread by contact with the bacteria. This could be anything from touching something which has recently been sneezed or coughed on, or simply eating some bad food. This may seem simple, but when it comes to regulating drug resistant diseases this is a major problem. For instance, 1 person with active TB will infect 30 others. If that person has XDR-TB, then so will the 30 others. This rapid spread is very difficult to control, and is obviously catastrophic. This means that drug resistance spreads very quickly. Another reason for the global worry about such diseases is the amount of international travel, which allows the diseases to spread worldwide very quickly. The main problem is immigration, although tourism plays a similar albeit smaller role. Immigrants are not always subjected to the sufficient tests to determine their health, and this allows the spread of the diseases and the resistance. The thought of testing all immigrants is not as ridiculous as it sounds as in many countries all diabetics and HIV positive people are required to be subjected to regular tests and the results pooled and submitted to the WHO (World Health Organisation). Also, in many countries, quarantine laws are remarkably lax. A person who is diagnosed with a drug resistant disease can still leave and interact with non-infected people; they can even leave the country. This is an aspect of the spread that can be controlled but is not.

Problems With Determining The Extent Of Drug Resistance…

At the moment, the WHO carries out surveys to try and determine the extent of drug resistance in certain strains of bacteria. However, the task is not easy. In the third world, the number of people not reporting to a physician is enormous, so the percentage of people infected is unknown and remains under estimated. Also, many countries which do administer tests of a large percentage do not release the information. For instance, South Korea runs a lot of research into XDR-TB, and test a very large percentage of their cases for drug resistance, however, they only released the results of their research once: in 2004. This causes a lot of discrepancies in the figures the WHO generates, which makes it very difficult to monitor the spread of such diseases. The WHO needs to know how these diseases are spreading so they know if they need to declare an epidemic, which encourages governments to give extra funding to control the disease, but if the figures are lower than they are, when the real extent of the problem is revealed, the response will be slow and inadequate.

What is Being Done Now…

There are some laboratories across the world researching how to combat drug resistance and stop diseases developing resistance in the first place. This is very expensive and slow work, and only a few laboratories have the equipment necessary. At the moment, most of the funding to combat resistance goes into the production and creation of new antibiotics. This is an ongoing process as every antibiotic they create is eventually made obsolete so the search for the next temporary fix begins. This is obviously time consuming and expensive, but the cycle has begun so it must be continued. In Norway, they have a health system which has managed to control the rise of MDRDs in its own country but immigration still poses a problem. There are also specialist wards which are built to treat people with such diseases. The problem with such clinics is that they are incredibly expensive due to the cost of the drugs and the timescale involved (18 months of treatment are required to cure someone of XDR-TB)

Further Complications…

- It came to the attention of the WHO and the CDC (Centre for Disease Control) that patients infected with HIV (a disease with its own resistances and problems) develop more different drug resistant diseases.
- Second line drugs (drugs which are more obscure and more likely to be effective against drug resistant diseases) are very expensive.
• To combat the problem of over prescription would require every GP and physician to be re-educated, many of whom are stuck in their ways.
• Medicine is an industry, so drugs are priced high for profit’s sake, as the companies have no government funding. Countries are very reluctant to spend their money funding disease control clinics and funding research unless the disease has been declared critical, so the disease spread rate constantly increases as the diseases are not properly regulated.
• In LEDCs (Less Economically Developed Countries), the populations are often centred in villages, which does not allow for easy monitoring.
• In LEDCs, many members of the population live subsistent lifestyles, so do not have the time to go for regular check ups.
• People often refuse treatment for diseases such as HIV due to the social stigma, so the strain is not controlled.

Useful Links

For further information on the health systems in your country visit [http://www.who.int/countires](http://www.who.int/countires) or type "Health Systems in Transition" followed by your country's name into Google.

For more information on the cases studies looked at visit:

- [http://findarticles.com/p/articles/mi_m0GVK/is_12_9/ai_111933581/](http://findarticles.com/p/articles/mi_m0GVK/is_12_9/ai_111933581/)

There are also podcasts on iTunes which look at these studies as well, search for Emerging Infectious Diseases in the podcast directory. These are run by the CDC, so are valid studies.

For further information on what is happening at the moment to stop the spread of resistant diseases visit:

- [http://www.cdc.gov/](http://www.cdc.gov/)
- [http://www.who.int/en/](http://www.who.int/en/)

which are the sites of the two major international bodies involved at the moment in this problem.

Find your Country Profiles here:

- [http://news.bbc.co.uk/2/hi/country_profiles/default.stm](http://news.bbc.co.uk/2/hi/country_profiles/default.stm)
- [http://www.nationsonline.org/oneworld](http://www.nationsonline.org/oneworld)

For issues of general international debate:

- [http://www.newint.org/](http://www.newint.org/)
- [http://www.idebate.org/](http://www.idebate.org/)
- [http://news.bbc.co.uk/](http://news.bbc.co.uk/)