

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

VIROLOGY#5

In this lecture we will talk about SARS, and briefly about MERS, I hope that everything will be clear.

A) SARS:

Severe Acute Respiratory Syndrome (abbreviated as **SARS**): is **serious** form of **pneumonia**, it's the most important **immerging outbreak** in the 21st century, and still there is a fear from its revisiting.

SARS is caused by a virus; the 1st first time that the virus was discovered & detected was in **2003**, the virus belong to group of family of **Corona viruses** .

SARS is a **dramatic example of how quickly world travel can spread diseases**, nowadays epidemics are not limited by geographical boundaries, they can easily spread anywhere (like Ebola in these days), **airplanes & ships** are to blame for this. It's also **an example of how quickly a connected health system can respond to a new health threat**, controlling SARS spread was a huge success to WHO.

The 1st patient who had SARS was in November 2002 in china, however he wasn't diagnosed with SARS as it wasn't known that time , it was thought to be pneumonia and the number of people with pneumonia started **increasing** , unfortunately **Chinese health offices and institution haven't reached out with WHO**. But one day, an American businessman travelled from china to Vietnam , he was diseased with pneumonia then hospitalized, a doctor name **Carlo Urbani** (who is Italian) took care of the patient . This case, because it was across countries, was interesting & questionable. **Dr Urbani was the first one to discover the virus & describe it as SARS officially** .Sadly he died from it ☹ .

Then, SARS was diagnosed in **Canada, America, China & surrounding countries**. **Epidemiological link** is the most apparent sign in SARS.

Note: Epidemiological link: The possibility to Catch a virus after contacting with someone who Has the virus (or the disease).

Respiratory System

Airports , Schools were **closed** during the outbreak of SARS , as a consequence the **economical state** was affected in these countries, so It was considered as **global health threat** , there were a **enormous efforts** exerted by WHO , health organizations , & institutions to control this outbreak ,thanks to them **the outbreak was reduced** without the presence of treatment to the virus or vaccine **but by isolation and control** , this indicate the importance of **infection control measures** in controlling outbreaks.

There is **no specific treatment or vaccine till now**.

The virus that was discovered as **causative agent** for SARS belongs to **Corona virus** group (abbreviated as **SARS-CoV**). It is believed that epidemics started from small mammals in **China** in 2003,in a province called **Guangdong** (spelled as **:gwong-dung**) ,it was noticed that patient with the disease were frequently going to a market where it sells animals as food(**Animal markets**),**civets** (animals that were in that market)was found to have **the greatest concentration of that virus**, but in other civets the virus wasn't detected, so it **wasn't** considered as the main reservoir of the virus, they continued searching and found that **Bats** were reservoirs for corona viruses , and that they infect the civets, then people will eat civets , and get infected, also they will infect other people.

Note: to know **the source** of outbreaks you should be concerned with the **place** that the outbreak originated from, this can be indicated by **the number of people infected in that place**, for example; if in one area there was **100 patients** with a certain disease, and in another area it was **10 patients** with that disease, by logic the area with 100 patients having that disease is **more probable** to be the origin of outbreak.

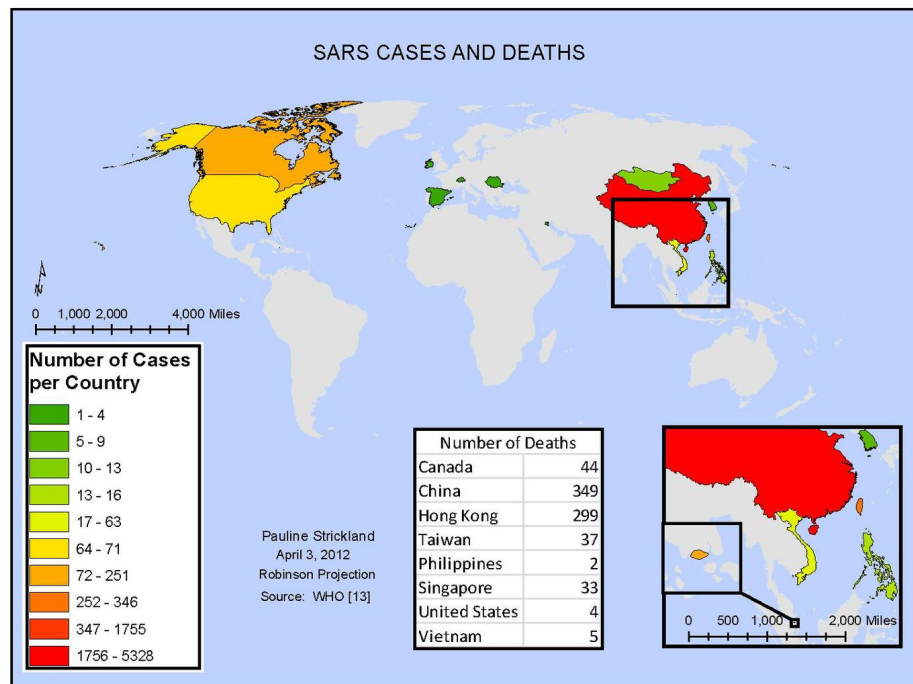
The outbreak extended from **November 2002- July 2003**, and It was panicking period to the whole world; **8000** cases of SARS were recorded (Frighteningly **20%** of them were **health workers**), **750** people **died** from it (**10% mortality**), most deaths were from **elderly** patients, within weeks SARS spread from **Hongkong** to **37** countries.

Like most respiratory viruses; this virus spread by **droplets**, it can enter tissues and stay in surfaces from **5-6 hours**, also it can be detected in stools of SARS patients –so it can be transmitted via feco-oral route- , even in **cold areas** (under 0 degrees) it can live for weeks, **2-10 days** is the **incubation period** of this virus, this is not an easy virus, it is really a survival hard one with **reinfection** being possible!

People with **active symptoms** of illness are **contagious**; they may be contagious **before** or **after** the appearance of symptoms.

Respiratory System

Here is an illustration of the countries that were affected with SARS:



Areas of SARS infection: china, Canada, Taiwan, etc.

Symptoms are **non specific** in SARS patients; fever, difficulty in breathing, any pulmonary symptoms that can indicate pneumonia. **Fever, chills, cough, muscle ache , & headaches** are the **most important** symptoms , however they are not specific to SARS only; **other** symptoms like diharrea, dissiness, vomiting, sore throat can be found but again they are not specific .**History taking** can help physicians in diagnosing SARS by asking the patients if he have contacted any **sick holder** of the disease.

Unfortunately, **no specific treatment is available**. **Antibiotics** can be given to prevent **bacterial superinfection**, also antipyretics, oxygen, mechanical ventilation, & **supportive treatment**.

No cure or vaccines are available.

Infected people might die from the severe pulmonary failure caused by the virus

Suspected cases with SARS must be isolated in **negative pressure rooms**, in which when the doors of theses rooms are opened, air will not go from inside to outside (the hospital corridor) but air will enter from outside the room

Respiratory System

(hospital corridor) then from the room it will leave out (to the environment) by an **exhaust** then it will be diluted by outside air, this is done to **prevent the spread of the infection**. Complete **barrier precautions** taken for any necessary contact must be worn by the health care provider.

Pulmonary fibrosis, Osteoporosis, Femoral necrosis, & Major depression disorders (due to inflammatory **cytokines**) are all complications of SARS, and they can occur even after recovery.

Prevention: There is **no vaccine** to date, **isolation** is the **most effective** mean, **hand washing**, **Universal precautions** (infection control measure), Disinfection of surfaces, Surgical masks, and avoiding contact with **bodily fluids**.

Note: Universal Precautions: gown, gloves, proper disposal of sharps, washing the hand before entering and after leaving the room, etc.

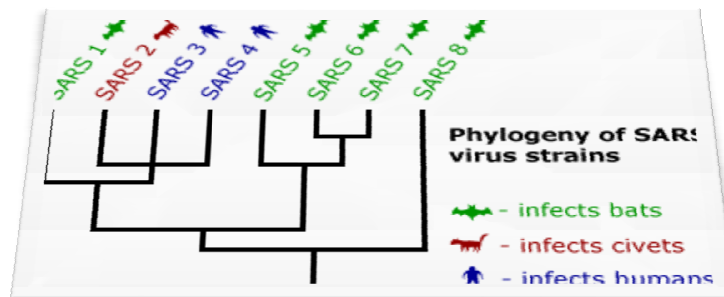
Keep children home from school if they develop a fever of respiratory syndrome **within 10 days** of being exposed to someone with SARS.

Influenza and pneumococcal vaccinations to prevent respiratory super-infections.

1st case was a **farmer** who died in china, later cases were not reported, and the government didn't report it, until it spread to Canada. China **later** apologized for not reporting SARS. "Too late china! -_-".

PCR is used to diagnose SARS by using nasal swab or bronchial swab or biopsy, then the PCR will detect the sequence of the viral genome and give us the results .

Phylogenetic tree of SARS:



"A phylogenetic tree or evolutionary tree is a branching diagram or "tree" showing the inferred evolutionary relationships among various biological species or other entities—their phylogeny—based upon similarities and differences in their physical or genetic characteristics". –Wikipedia

Respiratory System

They found that Human SARS (SARS4) is closer to Civets SARS (SARS2) and human SARS 3 which is closer to Bats SARS (SARS1). The numbers are **not** expressing subtypes, they use it to make the phylogenic tree easier to read and analyze.

There is some **variation** in the virus that causes SARS in different creatures, but they are too similar to each other and of the same viral family.

B) MERS:

Middle East Respiratory Syndrome (abbreviated as **MERS**): Appeared in **2012**, the 1st cases were in **Jordan**, then an outbreak was in al **Zarqa'a** in **Al-Zarqa'a Hospital**, then the outbreak went off and everything went back to normal ^_^! But then in less than a month new cases were reported in **KSA** (the bulk of the cases was in KSA), and it wasn't diagnosed until an **Egyptian virologist** cultured the virus but he couldn't figure it out, so he have sent the specimens to **Netherlands** and they succeeded to detect the virus and it was announced as a new virus that belong to the corona virus.

MERS made the world panicking like SARS, with its high mortality rate (**30%**), they suspected **camels & bats** as reservoirs for the virus, they thought that bats will infect animals (camels) and the these animal will infect **Humans** :\$.

Note: **the speed of spread of SARS around the world was faster than MERS although MR of MERS is higher (30% in MERS compared to 10% in SARS)**

I have incorporated some notes that were written by **Sally Al Khateeb** in this sheet,

so Thank You Sally ☺

Written By: **Aladdin Dahbour**

☺GoodLuck☺
