Emerging pathogens:

A number of new diseases have emerged lately, disrupting normal life and tourism across the world. These comparatively unheard of diseases are a threat to humans and have resulted in a large number of deaths in some countries. Some are airborne while others are transferred through contaminated food or mosquitoes breeding in unclean environments. Their spread can definitely be curtailed using hygienic practices.

1. **Chikungunya:** this is a viral fever spread by the bite of the mosquito Aedes egypti, which is active during the daytime and bites during the day, unlike the common mosquitoes which bite at night. The symptoms of chikungunya are high fever, headache, body ache, joint pain and lethargy. The treatment is symptomatic. Antipyretics are used to bring down fever , analgesics are prescribed for body ache and antibiotics are administered as prophylactic to prevent secondary bacterial infection. In several cases, antiviral drugs are administered. Preventive measures include treating stagnant water by breeding guppy fish to eat the larvae of the mosquito. Use of full sleeve clothing, spraying insecticides and wire meshing of doors and windows to keep mosquitoes away, are advisable in mosquito infested areas.

2. **Bird Flu:** Avian influenza refers to the disease caused by infection with avian (bird) influenza (flu) Type A viruses. These viruses occur naturally among wild aquatic birds worldwide and can infect domestic poultry and other bird and animal species. Avian flu viruses do not normally infect humans. However, sporadic human infections with avian flu viruses have occurred.

Avian Influenza in Birds: Avian influenza refers to infection of birds with avian influenza Type A viruses. These viruses occur naturally among wild aquatic birds worldwide and can infect domestic poultry and other bird and animal species. Wild aquatic birds can be infected with avian influenza A viruses in their intestines and respiratory tract, but usually do not get sick. However, avian influenza A viruses are very contagious among birds and some of these viruses can sicken and even kill certain domesticated bird species including chickens, ducks, and turkeys. Infected birds can shed avian influenza A viruses in their saliva, nasal secretions, and faces. Susceptible birds become infected when they have contact with the virus as it is shed by infected birds. They can also become infected by coming in contact with surfaces that are contaminated with virus from infected birds. **Highly Pathogenic Avian Influenza A (H5N1) in People:**

H5N1 Virus Infection Can Cause Severe Illness in People

HPAI H5N1 virus can infect the respiratory tract of humans. When people develop illness from HPAI H5N1 virus infection, severe respiratory illness (e.g. pneumonia and respiratory failure) and death may occur.

The majority of HPAI H5N1 cases have occurred among children and adults younger than 40 years old. Mortality has been highest in people aged 10-19 years old and young adults. Most human HPAI H5N1 cases have presented late in their illness for medical care and have been hospitalized with severe respiratory

Symptoms include fever, cough, sore throat, nausea; symptoms often progress to severe breathing problems, pneumonia that can result in death. Avian influenza A viruses are classified into the following two categories: low pathogenic avian influenza (LPAI) A viruses, and highly pathogenic avian influenza (HPAI) A viruses.

Swine flu: ***Swine Influenza*** also known as **H1N1 flu, Swine flu, Pig and Hog flu** is a respiratory disease caused by virus commonly found in pigs throughout the world. Most commonly it is due to H1N1 influenza subtype but sometimes H1N2, H3N1, and H3N2 can also be responsible. The major difference is that the current virus has strains of bird and pig viruses in it, and humans have very low or negligible immunity to it. That is what has made it more likely to become a pandemic virus (that can cause a global outbreak) as it could easily spread from human to human. Swine flu can look like a normal fever as its symptoms are similar to normal human influenza like cold and cough, sore throat, body aches, headaches, chills and fatigue. If diagnosed eairler treatment can be done to avoide further complications.
For confirmed case of Swine flu Oseltamivir (Tamiflu) or zanamivir (Relenza) are administered for treatment of virus infection. Swine influenza virus is very common in pigs worldwide. Approximately 1%-4% of pigs get infected and die from it. The main mode of spread among pigs either direct or indirect contact. In many parts of the world pigs are vaccinated against it.

Types

The Influenza viruses causing sickness in humans are classified into three types - A, B and C. Type A is most common in pigs and C is rare. Influenza B has not been reported in pigs. Swine influenza is commonly of the H1N1 influenza subtype, but sometimes they can come from other types, such as H1N2, H3N1, and H3N2.The recent outbreak of swine flu in humans is of the H1N1 type which is not as dangerous as some other types. It is caused by a new virus that has changed in ways that allow it to spread from person to person and it's happening among people who haven't had any contact with pigs. Normaly swineflu virus do not transmit from pigs to human and do not cause swineflu, althuough if it happens, antibodies are produced in human blood. To distinguish from viruses that infects pigs and the seasonal influenza A H1N1 viruses that have been in circulation for many years, The World Health organization (WHO)calls it "pandemic (H1N1) 2009." The CDC calls H1N1 illness "H1N1 flu". Its official name or scientific name is H1N1 influenza A. The H means hemagglutinin and the N means neuraminidase and the 1s refer to their antibody type. Influenza A is a genus of the Orthomyxoviridae family of viruses, and refers to the fact that the virus is first identified in an animal, usually a pig or a bird. When put together, they describe the 2009-2010 swine flu virus.

Some important things to note:

* Generally Swine flu virus transmits through direct contact with respiratory secretions like coughing and sneezing of a infected person close or near to you.

* Swine flu is likely contagious from one day upto seven days if a person get sick with its symptoms.

* Surfaces such as a doorknob, drinking glass or kitchen counter can also be contaminated if droplets from cough or sneez fall on them. But these germs survive for only few hours.

* People who are in regular exposure to pigs have increased risk of getting swineflu.

* The swineflu vaccine developed by GlaxoSmithKline is called Pandemrix and the vaccine developed by Baxter is known as Celvapan.

Finally, transmission of the virus doesn't require you to come into contact with pigs. It can pass from one human to another. According to the CDC (Center for Disease Control), there is some evidence that people who do come into contact regularly with pigs may be immune to this virus

MAD COW DISEASE / BOVINE SPONGIFORM ENCEPHALOPATHY (BSE) / Creutzfeldt-Jakob disease (CJD) :-

Mad Cow Disease is the common term for Bovine Spongiform Encepholopathy (BSE), a progressive neurological disorder of cattle which can be transmitted to other species, including humans. In humans, it is called Creutzfeldt-Jakob Disease, after the two doctors who first described the symptoms of the disease. The disease in cattle is called Bovine Spongiform Encepholopathy because this form of the disease occurs in cows (therefore, the term bovine), it causes a sponge-like destruction of the brain (therefore, the term spongiform encepholopathy - *enceph* means brain and *pathy* means pathology - meaning an abnormality).

Symptoms

- Blurred vision (sometimes), Changes in gait (walking), Confusion, disorientation,, Dementia that occurs over a few weeks or months , Hallucinations, Lack of coordination (for example, stumbling and falling), Muscle stiffness, Muscle twitching, Myoclonic jerks or seizures, Nervous, jumpy feelings, Personality changes, Sleepiness, Speech impairment

Symptoms includes an excitable or nervous temperament to external stimuli such as touch to the skin, a progressive unsteadiness of gait resulting eventually in the inability to stand up. The disease is virtually 100% fatal.

The human equivalent of Mad Cow Disease, Cruetzfeldt-Jakob Disease, causes memory loss, emotional instability including inappropriate outbursts, an unsteady gait, progressing to marked weakness, severe rapidly progressive dementia and death, often within a year of the onset of symptoms.

Treatment

- There is no known cure for this condition. Interleukins and other medications may help slow the disease. The person may need care early in the disease. Medications may be needed to control aggressive behaviors.

- Providing a safe environment, controlling aggressive or agitated behavior, and meeting the person's needs may require monitoring and assistance in the home or in a care facility. Family counseling may help the family cope with the changes needed for home care.

- Visiting nurses or aides, volunteer services, homemakers, adult protective services, and other community resources may help care for the person with CJD.

- People with this condition may need help controlling unacceptable or dangerous behaviors. This involves rewarding positive behaviors and ignoring negative behaviors (when it is safe). They may also need help getting oriented to their surroundings.

- Getting legal help with advance directives, powers of attorney, and other legal actions early in the disorder can make it easier to make ethical decisions about the CJD patient's care.

GENETICALLY MODIFIED FOOD:

- **Genetically modified foods** (or **GM foods**) are foods produced from organisms that have had specific changes introduced into their DNA using the methods of genetic engineering. These techniques have allowed for the introduction of new crop traits as well as a far greater control over a food's genetic structure than previously afforded by methods such as selective breeding and mutation breeding.

- Commercial sale of genetically modified foods began in 1994, when Calgene first marketed its Flavr Savr delayed ripening tomato. To date most genetic modification of foods have primarily focused on cash crops in high demand by farmers such as soybean, corn, canola, and cotton seed oil. These have been engineered for resistance to pathogens and herbicides and better nutrient profiles. GM livestock have also been experimentally developed, although as of November 2013 none are currently on the market.

- There is broad scientific consensus that food on the market derived from GM crops poses no greater risk to human health than conventional food. However, opponents have objected to GM foods on several grounds, including safety issues, environmental concerns, and economic concerns raised by the fact that GM seeds (and potentially animals) that are food sources are subject to intellectual property. rights owned by multinational corporations .

- **Food Labeling:** The government of India has issued a notification on labeling requirements for food processors, making it mandatory for all prepackaged food to carry a label clearly visible and adhering to the container with all necessary information mentioned in the notification. Food Labelling serves as a primary link of communication between the manufacturer or packer of food on the one hand and distributor, seller, and user or consumer on the other hand. By way of labelling the manufacturer introduces his product to his distributor or seller and to the target consumer or user of his product by providing all the information regarding his product on the label. The manufacturer can impress the consumer or its target user that it is the product of his choice, which suits him/her according to his/her needs. Thereby, the correct and required labelling undoubtedly promotes the sale of his product. As per Food Laws every packaged food article has to be labelled and it has to be labelled in accordance to the law applicable in the country of the user. Every packaged food article for the domestic use has to be labelled in accordance to the related Indian Food Law i.e. Food Safety and Standards (Packaging and Labelling) Regulations, 2011, notified by Food Safety and Standards Authority of India (FSSAI).

- The packaged food for export has to be labelled in accordance to the food laws and regulations applicable to the importing country.

In order to safe guard the interest of the consumer, The Food Safety and Standards (Packaging and Labelling) Regulations, 2011, provides that every packaged food article has to be labelled and it shall provide the following information –

1. The name of Food

2. List of Ingredients,
3. Nutritional Information,
4. Declaration regarding Veg or non-veg,
5. Declaration regarding Food Additives,
6. Name and complete address of the manufacturer or packer
7. Net Quantity,
8. Code No,/Lot No./Batch No.,
9. Date of manufacture or packing,
10. Best Before and Use By Date,
11. Country of Origin for imported food and
12. Instructions for use

- **Trends in food packaging**

Active packaging

- Numerous reports industry associations agree that use of smart indicators will increase. There are a number of different indicators with different benefits for food producers, consumers and retailers.
- Temperature recorders are used to monitor products shipped in a cold chain and to help validate the cold chain. Digital temperature data loggers measure and record the temperature history of food shipments. They sometimes have temperatures displayed on the indicator or have other output (lights, etc.): The data from a shipment can be downloaded (cable, RFID, etc.) to a computer for further analysis. These help identify if there has been temperature abuse of products and can help determine the remaining shelf life. They can also help determine the time of temperature extremes during shipment so corrective measures can be taken.
- Time temperature indicators integrate the time and temperature experienced by the indicator and adjacent foods. Some use chemical reactions that result in a colour change while others use the migration of a dye through a filter media. To the degree that these physical changes in the indicator match the degradation rate of the food, the indicator can help indicate probable food degradation.
- Radio Frequency Identification is applied to food packages for supply chain control and has shown a significant benefit in allowing food producers and retailers create full real time visibility of their supply chain.
- Plastic packaging being used is usually non-biodegradable due to possible interactions with the food. Also, biodegradable polymers often require special composting conditions to properly degrade. Normal sealed landfill conditions do not promote biodegradation. Biodegradable plastics includes biodegradable films and coatings synthesized from organic materials and microbial polymers. Some package materials are edible. For example, pharmaceuticals are sometimes in capsules made of gelatin, starch, potato or other materials. Newer films and products are being developed.

Barcodes have been used for decades in packaging many products. 2D barcodes used in Auto coding are increasingly applied to food packaging to ensure products are correctly packaged and date coded.[1]