**International Journal of Research Studies in Medical and Health Sciences**
**Volume 4, Issue 1, 2019, PP 11-16**
**ISSN : 2456-6373**

# Briefly About the Influenza

**Siniša Franjić**

*Faculty of Law, International University of Brcko District, Brcko, Bosnia and Herzegovina*

***Corresponding Author:** Sinisa Franjic, Faculty of Law, International University of Brcko District, Brcko, Bosnia and Herzegovina.*

## ABSTRACT

*Influenza is an infectious respiratory acute illness which is a major health threat to the human population. The virus of influenza affects individuals regardless of age and is transmitted from man to man. The virus of influenza affects a large number of people around the world, and can cause some serious illnesses where the recovery is long-lasting. Vaccination is the most effective method of prevention.*

**Keywords**: *influenza, virus, vaccine, health*

## INTRODUCTION

Multiple viral agents are known to cause acute respiratory infections [1]. Most of those agents belong to the families orthomyxoviridae, paramyxoviridae, picornaviridae, coronaviridae, adenoviridae, and so on. Among them, the orthomyxoviruses and paramyxoviruses share a common nature, that is, they have negative - strand RNA and have viral envelopes with a plasma membrane structure, and they are similar in several steps of viral replication.

Most human viral respiratory infections are highly contagious and sometimes epidemic. Clinical symptoms of the acute respiratory infections vary and are diagnosed as the common cold, rhinitis, pharingitis, croup, bronchitis, bronchiolitis, pneumonia, influenza and so on. However, etiological diagnosis of respiratory infection from clinical manifestations alone is very difficult for general practioner physicians. At times, metapneumovirus and even rhinovirus have caused influenza-like disease. Although there are several laboratory diagnostic procedures for FLUV and RSV, the reagents are expensive, it takes time to perform the diagnosis, and the patients have to be treated as soon as possible, usually at home.

Microbial agents causing infectious diseases in humans often originate from processes and events occurring in the natural environment [2]. Most of the so-called emerging diseases are caused by infectious agents of wildlife that have either recently adapted to infect humans or are preadapted and have recently come into opportunistic contact with humans. These include some of the most important pathogenic agents that have caused major epidemics in humans, such as HIV/AIDS, influenza A, Ebola, West Nile virus, and Lyme disease.

## IMMUNITY

Evolution has fostered the development of defenses against infection [3]. The skin is an effective, if passive, barrier against most bacteria and viral infections. Surface responses that help resist infection include sweating and desquamation, cilia movement in the respiratory tract, and production of mucus along interior epithelial surfaces. Mucous membranes have antibacterial properties; stomach acid, saliva, and tears help to resist infection. In the gut, entrenched but friendly bacteria compete with pathogens, limiting opportunities for the pathogens to establish themselves. For pathogens that manage to penetrate skin or mucous membranes, the immune system provides two more levels of defense. The first comes from the innate immune system. Injury to cells triggers a nonspecific infl ammatory reaction, which is a cascade of events involving chemical and cellular responses to the local injury. The inflammatory reaction recruits a variety of blood cells, including mast cells, phagocytes, neutrophils, and others that play various roles in the host response. The innate immune system also activates the adaptive immune system, which allows a specific response to infectious agents. This system produces antibodies that are designed to attach to specific sites on the pathogen or its toxins,

neutralizing the threat. Specialized B-cell lymphocytes work in conjunction withhelper T cells to produce antibodies. These cells also record the antigenic pattern that stimulated their response, enabling a faster and more effective response if the antigen is encountered again. This antigenic memory is what is commonly referred to as immunity to an infectious agent. Immunity occurs naturally after an infection, but it can also be stimulated by vaccination, which is intended to provoke an immunogenic reaction without causing an initial pathogenic infection. Immunity can vary in duration from a relatively short period to lifetime protection.

The sophistication of host defenses implies that humans have always had to reckon with infectious disease. The balance between host and pathogen, however, is readily tipped by changing social conditions. For example, human invasions or migrations sometimes brought immunologically naïve populations into contact with diseases to which they had not previously been exposed. Urbanization during the Middle Ages brought on the conditions that fostered spread of the plague. Europeans brought with them to the New World a host of infections, such as smallpox, measles, typhus, and cholera, which had catastrophic consequences for natives of the Western Hemisphere. Europeans had adapted to these agents, but the newly exposed natives of the Americas had no natural defenses.

## VIRUS

Viruses are the smallest of the infectious agents, with the exception of prions, the agents of spongiform encephalopathies, such as scrapie and Creutzfeldt-Jakob disease [4]. Viruses range in size from 20 to 200 nm and, as such, are not readily visible by light microscopy. They contain a single form or type of nucleic acid, either DNA or RNA, which functions as their genome. In addition to a single form of nucleic acid, viruses compositionally may contain proteins, lipids, and glycoproteins as structural components, depending on their level of complexity. Viruses are obligate intracellular parasites, and their replication is hostcell dependent, directed by their DNA or RNA. Viral subversion of the host's cellular machinery favors the synthesis of viral nucleic acid and structural proteins.

Viral infection is host-cell specific and depends on the presence of specific surface receptors (attachment molecules) for successful entry. Viruses specific for almost every organism have been identified. Even bacteria may be infected by phage viruses—an interaction that has proved useful in the laboratory for introducing genes into bacteria. The outcome for cells infected by a virus can vary and is often virus specific. For instance, some viruses cause rapid cell death (e.g., influenza), whereas others induce continued cellular growth with concomitant release of new virus particles (e.g., adenoviruses). Some viruses are capable of integrating their nucleic acid into the host cell's genome, thereby estab lishing a latent or quiescent state (e.g., herpesviruses). Latency can continue for long periods of time before reactivation followed by initiation of viral replication and subsequent lysis of the host cell (herpesviruses). Other viruses carry specific oncogenes capable of promoting cellular growth that can lead to transformation and immortalization of the cells. Such changes have been associated with human papillomavirus, the cause of cervical cancer.

Viruses are intracellular parasites that use the resources of the host cell to make more viruses [5]. Finding or developing drugs that will destroy or inactivate the viruses without harming the host is a major challenge. Some new antiviral drugs have been developed; however, current research and development for new antivirals is agonizingly slow. Just when scientists think they have finally figured out this latest viral wrinkle, the virus mutates.

## THE FLU VIRUS

The flu virus is one of the most extraordinary of all viruses [6]. Like a master criminal, it comes in countless different guises. In fact, recent research in southern Asia showed that there may be more than 500 different varieties of flu, and new ones are emerging all the time.

Flu viruses are classified into three broad kinds: A, B and C. B and C have both been human flus for centuries. Type C is the mildest, causing cold-like symptoms. Type B is the one that's to blame for the classic winter flu. Type A is the bigdanger. It remains essentially a bird virus, but every now and then it acquires the ability to cross into humans, either via pigs or directly. When it does this, people may have so little resistance that a pandemic is a real possibility.

Although it remains fundamentally the same kind of virus, the flu virus is an RNA virus, which means that it's very unstable and changing all the time. When DNA is copied, it's copied pretty near perfectly. RNA, however, is much less reliable and is copied with a host of misprints. When flu viruses multiply, each

individual particle has its own set of misprints. This can create a real problem for immune systems trying to guard against it. The immune system identifies the flu virus by its coat, the antigens that match up with particular antibodies. If the misprint in RNA changes the coat enough, it may become unrecognisable.

Flu A viruses are divided into subtypes based on two proteins on the surface of the virus, that is, hemagglutinin (H; 15 subtypes: H1–H15) and neuraminidase (N; 9 subtypes: N1–N9). Wild birds are the primary natural reservoir for all subtypes of flu A viruses, and while shedding the viruses they mostly remain healthy hosts [7]. When domesticated birds (ie, chickens, ducks, turkeys, etc) become infected, the infection spreads quickly and widely and leads to a bird flu outbreak in poultry. If the virus is of a highly pathogenic type, the epidemic is highly lethal. Viruses can be transmitted from farm to farm by contaminated equipment, vehicles, feed, cages, or clothing. Thus, the standard control measures in poultry are quarantine and depopulation (or culling) and surveillance around affected flocks. Although the risk of infection to humans from bird flu is generally low, people should avoid contact with infected birds or contaminated surfaces and should be careful when handling and cooking poultry.

Annual epidemics usually appear in the fall or winter in temperate climates [8]. Influenza seasons are longer in tropical climates. Up to 5 million cases of severe influenza are estimated by the WHO to occur annually, with up to 0.5 million annual deaths. Influenza epidemics affect 10–20% of the global population on average each year and are typically the result of minor antigenic variations of the virus, or antigenic drift, which occur often in influenza A virus. On the other hand, pandemics—associated with higher mortality—appear at longer and varying intervals (decades) as a consequence of major genetic reassortment of the virus (antigenic shift) or adaptation of an avian or swine virus to humans.

The flu starts suddenly [9]. One minute you feel fine, the next you have a headache. Within a few hours you feel acutely ill with fever, body aches, and exhaustion. A harsh dry cough begins within twenty-four hours. Eyes can be sensitive to light and nausea is not uncommon. To add insult to injury, you can also have coldlike congestion and sneezing. Severe body aches and exhaustion are key markers of this infection. You may feel too weak to get out of bed and find it painful even to turn over.

## EPIDEMIOLOGY

Influenza or flu is an acute respiratory disease caused by influenza viruses [10]. Influenza viruses are continuously changing, and antigen changes of influenza A virus are responsible for epidemics occurring each winter and for pandemics occurring every several decades. The clinical features of influenza primarily include general symptoms, i.e. high temperature and headache, muscle pain and fatigue. Respiratory symptoms, primarily dry cough and sore throat, usually occur after a day or two. Generally, influenza is a serious disease due to a number of complications that may be caused by either influenza virus itself or secondary bacterial infections. The most frequent complications are respiratory complications, especially pneumonias, but other organ systems may be also affected.

Epidemiology is "the study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to control health problems" [11]. The term epidemiology is derived from Greek words that can be translated into the phrase "the study of that which is upon the people." The goal of epidemiology is to limit undesirable health events in a community. For example, illness can be limited by identifying the food that is making people sick or determining modifiable risk factors for heart disease. This is accomplished by describing the distribution and determinants of health events to validate new approaches to prevention, control, and treatment. Through these practices, epidemiologists contribute to our knowledge of how diseases begin and spread through populations, and how they can be prevented, controlled, and treated.

The question might be asked, how many cases are required before a disease outbreak is considered an epidemic—10 cases? 100 cases? 1,000cases? The answer is that it depends on the disease and the population, but any unexpectedly large number of cases of an illness, specific health-related behavior, or other health-related event in a particular population at a particular time and place can be considered an epidemic.

Epidemiology is an academic discipline that determines the distribution of disease onsets and the causes of the development of diseases [12]. However, when causal relations between

individual victims' diseases and exposures are presumed based on prevalence rates among populations, a point of connection between epidemiology and jurisprudence is created. Epidemiology carefully examines whether observational associations among particular events are genuinely causal relations.

Consequently, epidemiology involves the collection of data through various experimental and observational studies to classify causal relations. For example, most chronic diseases develop not due to single factors alone but due to the negative effects of many factors on the human body over a long period of time. In addition, because epidemiological research examines populations, it makes use of figures concerning relative risk, odds ratios, and attributable risk levels as indices expressing associations between instances of exposure to harmful factors and the development of diseases through a range of data. For example, when the relative risk is 4.0, the danger of the development of a disease is four times as high for exposure groups as it is for non-exposure groups. Consequently, when used appropriately, such indices can serve as evidence for presuming a causal relation in court as well.

In its infancy, epidemiology focused on a single pathogen, a single cause of disease, with the challenge of isolating the causal agent in order to prevent and stop the spread of disease [13]. As improvements have been made in supplying safe water, appropriate disposal of waste, clean housing, and regulation of food handling, morbidity and mortality levels from infectious agents have been greatly reduced in many developed parts of the world. Antibiotics and immunization programs have further reduced the threat of infectious disease. As these public health efforts have taken hold, life expectancy has increased.

## VACCINE

Recently, the public has frequently asked whether the vaccine is harmful or not [14]. There are those who claim that the vaccine is harmful and this proves the negative side effects that appear as a result of vaccination. Evidence-based medicine acknowledge that there are rare side effects, but that does not mean that the vaccine will harm every organism who receives it. Although the vaccines eradicated some illnesses, it is difficult to convince someone whose family member has been ill with a disease as a result of the vaccine. Unfortunately, such negative side effects are occurring in the practice.

Vaccination is a method of introducing living modified or artificially obtained viral or bacterial agents into the body with a goal to imitate a natural infection and intentionally creation an immune reaction - by creating an antibody. When they meet the cause, such antibodies protect the body and prevent diseases from severe illness. Vaccination is applied by taking it as a solution in the mouth or by injection into the muscle. Vaccination is considered like one of the greatest health achievements in the twentieth century in the field of medicine as a scientific discipline and the most successful applied public health method for suppression diseases.

A vaccine is a formulation that is injected into healthy people in the expectation that they will develop immunity towards a specific disease [15]. Flu vaccines are made from the virus that causes that particular disease. Unlike homeopathy, which uses the cause of a particular disease in virtually infinite dilution in the hope of curing it, the viruses used in flu vaccine are inactivated or segmented so that they cannot make you ill, but instead your body will develop an immunity by its antibodies against it for when the real thing comes along. Once the vaccine triggers the formation of antibodies that will stop the virus, and your body is able to maintain that at a high-enough level, you can be infected with that virus but it won't make you ill.

The influenza virus, existing laboratory diagnostic abilities, and disease epidemiology have several peculiarities that impact on the timing and processes for the annual production of influenza vaccines [16]. They are the reason for an "annual circle race" beginning with global influenza surveillance during the influenza season in a given year to the eventual supply of vaccines 12 months later in time before the next seasonal outbreak and so on. As influenza vaccines are needed for the Northern and Southern Hemisphere outbreaks in fall and spring, respectively, global surveillance and vaccine production has become a year round business. Its highlights are the WHO recommendations on vaccine strains in February and September and the eventual delivery of vaccine doses in time before the coming influenza season. In between continues vaccine strain and epidemiological surveillance, preparation of new high growth reassortments, vaccine seed strain preparation and development of standardizing reagents, vaccine bulk production, fill–finishing and vaccine release,

and in some regions, clinical trials for regulatory approval.

The availability of licensed influenza vaccine products is dependent on the age and health status of the individual [17]. For children younger than 6 months of age, there are no currently approved influenza vaccines anywhere in the world. For children younger than 2 years of age, nonadjuvanted inactivated vaccines are the only approved vaccines in most places, although Canada has approved an adjuvanted inactivated vaccine for children from 6 through 23 months of age. For children 2 years of age and over, both nonadjuvanted, inactivated and liveattenuated vaccines are approved and available. The options increase for adults, as intradermal and recombinant vaccines are licensed beginning at 18 years of age. For adults 65 years and over, a high dose inactivated vaccine is available in the United States, while Europe, Canada, and the United States have approved an MF-59 adjuvanted vaccine for this group.

## INFLUENZA CONTROL

Influenza control is principally achieved through the use of vaccination to prevent the development and transmission of illness [18]. However, influenza vaccination is not universally available on a global level; 90% of the world's influenza vaccine production capacity is centered in North American and European countries, which represent only 10% of the world's population. Nor is influenza vaccine optimally utilized in developed countries: The United States has not met national objectives for vaccination rates to eligible individuals, including those involved in the provision of health care to the population in general. Significant health disparities also exist for vaccine receipt among different racial and socioeconomic groups.

As with other infectious diseases, education of local populations and health-care providers regarding basic personal hygiene, such as hand washing, avoidance of mucus contamination, and control of coughs and sneezes, can contribute to improved influenza control. Maintenance of adequate barrier protections and supplies to maintain adequate hygiene during periods of increased clinic or hospital use associated with influenza outbreaks may serve to dampen nosocomial transmission as well. In hospitals, where patients may be at increased risk for severe complications of influenza, restricting visitors with respiratory illness or elective procedures has been proposed in the literature. Isolation of cases is difficult because of delays in presentation that may coincide with the period of communicability and because of delays in diagnosis, evenwhererapid laboratory testingexists. Rapiddiagnostic testing for influenza A and B can now take as little as 30min with commercially available kits processed by trained laboratory personnel. In general, these tests are 90–95% specific and 70–75% sensitive when compared with routine influenza culture as a gold standard.

## PUBLIC HEALTH

Public health is not limited to what governmental public health agencies do, although this is a widely held misperception [19]. Still, particular aspects of public health rely on government. For example, the enforcement of laws remains one of those governmental responsibilities important to the public's health and public health practice. Yet, law and the legal system are important for public health purposes above and beyond the enforcement of laws and regulations. Laws at all levels of government bestow the basic powers of government and distribute these powers among various agencies, including public health agencies. Law represents governmental decisions and their underlying collective social values, providing the basis for actions that influence the health of the public.

Decisions and actions that take place outside the sphere of government also influence the health of the public, sometimes even more than those made by ourelected officials and administrative agencies. Private sector and voluntary organizations play key roles in identifying factors important for health and advancing actions to promote and protect health for individuals and groups. Public health involves collective decisions and actions; it is often governmental forums that raise issues, make decisions, and establish priorities for action. Many governmental actions reflect the dual roles of government often portrayed on official governmental seals and vehicles of local public safety agencies—to protect and to serve. As they relate to health, the genesis of these two roles lies in separate, often conflicting, philosophies and duties of government.

## CONCLUSION

Influenza is an infectious respiratory acute illness which represent a major health threat to the human population. The virus of influenza

affects individuals regardless of age and is transmitted from man to man. The virus of influenza affects a large number of people around the world, and can cause some serious illnesses where the recovery is long-lasting. It takes about a ten days, and in patients with chronic illness, it may take longer. Influenza is a seasonal disease that can cause serious health complications in older people and in chronic patients. Vaccination is the most effective protection and it is recommended for anyone who has an increased risk from appearances of complications.

## REFERENCES


[1] Shigeta, Shiro (2007.): „Broadly Effective Anti-Respiratory Virus Agents“ in Torrence, Paul F. (ed): „Combating the Threat of Pandemic Influenza - Drug Discovery Approaches“, John Wiley & Sons, Inc., Hoboken, pp. 98. – 99.

[2] Institute of Medicine and National Research Council(2007):„Earth Materials and Health: Research Priorities for Earth Science and Public Health“, Washington, DC, The National Academies Press, pp. 105., https://doi.org/10.17226/11809.

[3] Rothman, Kenneth J. (2012.): „Epidemiology - An Introduction, Second Edition“,Oxford University Press, Inc, Oxford, pp. 110. – 111.

[4] Parrish, Nicole M.; Riedel, Stefan (2014.): „Microbiology Tools for the Epidemiologist“ in Nelson, Kenrad E.; Masters Williams, Carolyn (eds): „Infectious Disease Epidemiology - Theory and Practice, Third Edition“, Jones & Bartlett Learning, Burlington, pp. 189.

[5] Emmeluth, Donald (2003.): „Influenza - Deadly Diseases and Epidemics“, Chelsea House, Infobase Publishing, New York, pp. 96.

[6] Farndon, John (2005.): „Everything You Need To Know – Bird Flu“, Icon Books, Cambridge, pp.55.- 56.

[7] Durrani, Timur S.; Harrison, Robert J. (2014.): „Occupational Infections“ in LaDou, Joseph; Harrison, Robert J. (eds): „CURRENT Occupational and Environmental Medicine, Fifth Edition“, McGraw-Hill Education, New York, pp. 311.

[8] Dailey Garnes, Natalie J. M.; Shandera, Wayne X. (2018.): „Viral & Rickettsial Infections" in Papadakis, Maxine A.; McPhee, Stephen J.; Rabow, Michael W. (eds): „CURRENT Medical Diagnosis and Treatment 2018, Fifty Seventh Edition", McGraw-Hill Education, New York, pp. 1427.

[9] Schachter, Neil (2005.): „The Good Doctor's Guide to Colds and Flu“, PerfectBound, New York, pp. 156.

[10] Kuzman, Ilija (2011.): „Influenca: klinička slika bolesti i komplikacije“ (Influenza: Clinical Presentation and Complications), MEDICUS, Vol. 20, No. 1, pp. 25.– 32.

[11] McKenzie, James F.; Pinger, Robert R.; Seabert, Denise M. (2018.): „An Introduction to Community & Public Health, Ninth Edition“, Jones & Bartlett Learning, Burlington, pp. 59.

[12] Jung, Minsoo (2018.): „An Investigation of the Causal Inference Between Epidemiology and Jurisprudence“, Springer Nature Singapore, Singapore, pp. 45.

[13] Merrill, Ray M. (2017.): „Introduction to Epidemiology, Seventh Edition“,Jones & Bartlett Learning, Burlington, pp. 212.

[14] Franjic S (2018) Vaccination–Yes or No. J Gen Pract (Los Angel) 6: e122. doi:10.4172/2329-9126.1000e122

[15] Avlicino, A. A. (2006.): „Beat the Flu - How to Stay Healthy Through the Coming Bird Flu Pandemic“, Fusion Press, Lodon, pp. 136.

[16] Stöhr, Klaus; Bucher, Doris; Colgate, Tony; Wood, John (2012.): „Influenza Virus Surveillance, Vaccine Strain Selection, and Manufacture“ in Kawaoka, Yoshihiro; Neumann, Gabriele (eds): „Influenza Virus - Methods and Protocols“, Humana Press, Springer Science+Business Media, New York, pp. 147.

[17] Maletic Neuzil, Kathleen; Ortiz, Justin R. (2016.): „Influenza Vaccines and Vaccination Strategies“ in Bloom, Barry R.; Lambert, Paul-Henri (eds): „The Vaccine Book, Second Edition“, Academic Press, Elsevier, London, pp. 428.

[18] Targonski, P. V.; Poland, G. A. (2008.): „Influenza“ in Heggenhoughen, Harald Kristian (editor-in-chief); Quah, Stella R. (associate editor-in-chief): „International Encyclopedia of Public Health“, Elsevier, New York, pp. 593.

[19] Turnock, Bernard J. (2016.): „Public Health - What It Is and How It Works“, Jones & Bartlett Learning, Burlington,pp. 97. – 98.


**Citation:** *Siniša Franjić, "Briefly About the Influenza", International Journal of Research Studies in Medical and Health Sciences. 2019; 4(1): 11-16.*