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Review Article

Swine flu outbreak of Pandemic Influenza and effect on pregnancy

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Abstract

Influenza a (H1N1) virus was identifying in specimens obtained from two epidemiologically unlinked patients in the United States. The ongoing outbreak of novel H1N1 2009influenza (swine influenza) has caused more than 3, 99,232 laboratory confirmed cases of pandemic influenza H1N1 and over 4735 deaths globally. This novel 2009 influenza virus designated as H1N1 A/swine/California/04/2009 virus is not zoonotic swine flu and is transmitted from person to person and has higher transmissibility then that of seasonal influenza viruses. In India the novel H1N1 virus infection has been reported from all over the country. A total of 68,919 samples from clinically suspected persons have been tested for influenza A H1N1 across the country and 13,330 (18.9%) of them have been found positive with 427 deaths. At the All India Institute of Medical Sciences, New Delhi India, we tested 1096 clinical samples for the presence of novel H1N1 influenza virus and seasonal influenza viruses. Of these 1096 samples, 194 samples (17.7%) were positive for novel H1N1 influenza virus and 197 samples (18%) were positive for seasonal Influenza viruses. the swine flu all so, effected on pregnancy, how to effected on omblicalcord and cross the placental barrier and caused to the death of baby.

Keywords: Influenza, Swine Flu, Pregnancy, Pandemic.

Introduction

This Type A viruses have a protein coating that surrounds them, called a capsid. The surface proteins making up the capsid in these virus strains are Hem agglutinin and Neuraminidase. These surface proteins are the parts of a virus that can be changed when viruses mutate into new forms. This is how they change to be able to attack the cells of new hosts or in new ways in the same hosts. They are no longer recognized as viruses that the immunological system of the host has fought before, and that allows them to mutate to forms that can evade the body's defenses again at first. In the naming convention of viruses, the protein classifications become part of the name as in H1N1[1]. **H** for the Hem agglutinin and **N** for the Neuraminidase. Hem agglutinin binds the virus to the cell it is infecting. Neuraminidase is an enzyme that lets the virus be released from the host carrier cell.

Swine influenza was first proposed to be a disease related to human flu during the 1918 flu pandemic, when pigs became ill at the same time as humans. The first identification of an influenza virus as a cause of disease in pigs occurred about ten years later, in 1930. For the following 60 years, swine influenza strains were almost exclusively H1N1. Then, between 1997 and 2002, new strains of three different subtypes and five different genotypes emerged as causes of influenza among pigs in North America. In 1997-1998, H3N2 strains emerged. These strains, which include genes derived by re-assortment from human, swine and avian viruses, have become a major cause of swine influenza in North America. Re-assortment between H1N1 and H3N2 produced H1N2. In 1999 in Canada, a strain of H4N6 crossed the species barrier from birds to pigs, but was contained on a single farm.

The H1N1 form of swine flu is one of the descendants of the strain that caused the 1918 flu pandemic[2]. As well as persisting in pigs, the descendants of the 1918 virus have also circulated in humans through the 20th century, contributing to the normal seasonal epidemics of influenza. However, direct transmission from pigs to humans is rare, with only 12 recorded cases in the U.S. since 2005. Nevertheless, the retention of influenza strains in pigs after these strains have disappeared from the human population might make pigs a reservoir where influenza viruses could persist, later emerging to reinvest humans once human immunity to these strains has waned.

Swine flu has been reported numerous times as a zoonosis in humans, usually with limited distribution, rarely with a widespread distribution. Outbreaks in swine are common and cause significant economic losses in industry, primarily by causing stunting and extended time to market. For example, this disease costs the British meat industry about £65 million every year.

The vaccination program was plagued by delays and public relations problems. On October 1, 1976, immunizations began, and three senior citizens died soon after receiving their injections. This resulted in a media outcry that linked these deaths to the immunizations; despite the lack of any proof the vaccine was the cause. According to science writer Patrick Di Justo, however, by the time the truth was known–that the deaths were not proven to be related to the vaccine–it was too late. "The government had long feared mass panic about swine flu–now they feared mass panic about the swine flu vaccinations." This became a strong setback to the program.

In 1998, swine flu was found in pigs in four U.S. states. Within a year, it had spread through pig populations across the United States. Scientists found this virus had originated in pigs as a recombinant form of flu strains from birds and humans. This outbreak confirmed that pigs can serve as a crucible where novel influenza viruses emerge as a result of the reassortment of genes from different strains[3]. Genetic components of these 1998 triple-hybrid stains would later form six out of the eight viral gene segments in the 2009 flu outbreak.

Life-cycle:

Follow a virus through the game of life, Maybe you have heard about the Spanish flu from your grandparents. It affected Europe during 1918, at the end of the WW2, making millions of victims. (Fig: 1)

Fig. 1

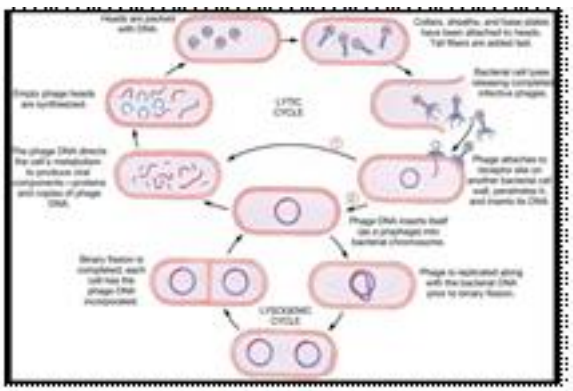
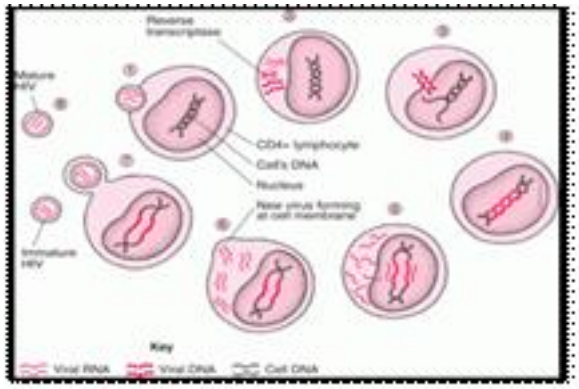


Fig. 2



The figures (1&2) were declared about the life cycle of influenza

It is believed that this virus was also based on the h1n1 strain, just like the swine flu, but as the medical methods used then were not as accurate as they are today, this information can't be confirmed [4]. The virus had nothing to do with Spain, as the pandemic virus had the same impact over all the Occidental countries of Europe. It was called the Spanish flu, as the Spanish newspapers were the only free media methods speaking about it, while the newspapers from other countries were censored by the war propaganda.

The Lifecycle of H1N1:

The swine flu, just like the Spanish or Avian virus, has about the same lifecycle. In fact, the lifecycle of a pandemic virus was first studied with the Spanish flu, and the results are about the same and valid even today. The h1n1 virus appears at animals, because improper conditions or because the food given to those animals. At first, the virus stays in a latency form, and it is harmless for the respective animals. The danger in this case is the fact that those animals can survive for months, and during this time, the viruses can easily develop strong stains that are immune to vaccines. For example, in the case of swine flu, the farmers believed that this was a simple virus; therefore they started to vaccine the animals with different solutions. Of course, those solutions were not effective. On the contrary, the virus developed immunity to those simple vaccines, giving the pandemic side of the disease. In the case of the Spanish flu, there are no sure details about the development of this disease, but in the case of the modern pandemic diseases, it is confirmed that this was the first and most important mistake made in the treatment of this disease.

The complications can appear to fragile persons, old or ill persons, but also to children and people with a weakened immune system[5]. The Spanish flu found a large number of people with a weakened system after the First

World War, and it had a great environment to develop. Even if the h1n1 is considered a more powerful virus, the modern vaccines allow people to protect themselves effectively. Unfortunately, the swine flu is known as a virus with a huge potential to adapt and to develop the necessary modifications needed to adapt to any kind of environment. In fact, this adaptability gives the pandemic character of the swine flu, just like in the case of the Spanish flu. (Fig: 2)

H1N1 develops in different ways once it is installed in humans. It can survive for one week or more, and the response of the human organism is different, considering the immune resistance of different people to the swine flu. If the organism is weakened, the flu affects all the weak organs, killing the host eventually [6]. If the organism is strong, it will manage to fight the virus, eliminating it. In any case, the virus dies one way or the other, and even if the bodies might be contagious for a while, the virus eventually dies.

Transmission:

Transmitting H1N1 from animals to humans: Just as the Spanish flu had nothing to do with Spain, the swine flu has nothing to do with pigs. It is true that this virus can be transmitted from pigs, but the chances are just about the same for this pandemic condition to be transmitted from other animals. Just like in the case of the Spanish flu, as soon as the h1n1 is transmitted to humans, it suffers modifications that make it stronger and more powerful.

Even if researchers developed some vaccines against the swine flu, this virus can be treated most effectively with rest and treating the symptoms[7]. The pandemic flue usually disappears by them, but in some rare cases, it could result in the decease of the diseased person. With the modern medical methods, the impact is smaller than the one of the Spanish flu, but people continue to die because of those diseases.

H1N1 finds a great environment to develop for humans. The organisms are less resistant than those of animals, allowing the swine flu not only to develop as a powerful virus, but also to suffer mutations and to be transmitted to other humans.

Transmission between pigs:

Influenza is quite common in pigs, with about half of breeding pigs having been exposed to the virus in the US. Antibodies to the virus are also common in pigs in other countries.

The main route of transmission is through direct contact between infected and uninfected animals. These close contacts are particularly common during animal transport. Intensive farming may also increase the risk of transmission, as the pigs are raised in very close proximity to each other. The direct transfer of the virus probably occurs either by pigs touching noses, or through dried mucus. Airborne transmission through the aerosols produced by pigs coughing or sneezing is also an important means of infection[8]. The virus usually spreads quickly through a herd, infecting all the pigs within just a few days. Transmission may also occur through wild animals, such as wild boar, which can spread the disease between farms.

Transmission to humans:

People who work with poultry and swin:-e, especially those with intense exposures, are at increased risk of zoon tic infection with influenza virus endemic in these animals, and constitute a population of human hosts in which zoon sis and reassortment can co-occur. Vaccination of these workers against influenza and surveillance for new influenza strains among this population may therefore be an important public health measure. Transmission of influenza from swine to humans who work with swine was documented in a small surveillance study performed in 2004 at the University of Iowa. This study, among others, forms the basis of a recommendation that people whose jobs involve handling poultry and swine be the focus of increased public health surveillance[9]. Other professions at particular risk of infection are veterinarians and meat processing workers, although the risk of infection for both of these groups is lower than that of farm workers.

Signs and Symptoms:

These H5N1 infections may be quite common; in a survey of 10 apparently healthy pigs housed near poultry farms in West Java, where avian flu had broken out, five of the pig samples contained the H5N1 virus. The Indonesian government has since found similar results in the same region. Additional tests of 150 pigs outside the area were negative.

Signs and symptoms:

In swine: In pigs, influenza infection produces fever, lethargy, sneezing, coughing, difficulty breathing and decreased appetite. In some cases the infection can cause abortion. Although mortality is usually low (around 1-4%), the virus can produce weight loss and poor growth, causing economic loss to farmers[10] infected pigs can lose up to 12 pounds of body weight over a three to four week period. (Fig: 3)

Main symptoms of swine flu in humans: Direct transmission of a swine flu virus from pigs to humans is occasionally possible (called zoon tic swine flu). In all, 50

cases are known to have occurred since the first report in medical literature in 1958, which have resulted in a total of six deaths. Of these six people, one was pregnant, one had leukemia, one had Hodgkin's lymphoma and two were known to be previously healthy. Despite these apparently low numbers of infections, the true rate of infection may be higher, since most cases only cause a very mild disease, and will probably never be reported or diagnosed.

According to the Centers for Disease Control and Prevention (CDC), in humans the symptoms of the 2009 "swine flu" H1N1 virus are similar to those of influenza and of influenza-like illness in general[11]. Symptoms include fever, cough, sore throat, body aches, headache, chills and fatigue. The 2009 outbreak has shown an increased percentage of patients reporting diarrhea and vomiting. The 2009 H1N1 virus is not zoonotic swine flu, as it is not transmitted from pigs to humans, but from person to person.

Because these symptoms are not specific to swine flu, a differential diagnosis of probable swine flu requires not only symptoms, but also a high likelihood of swine flu due to the person's recent history. For example, during the 2009 swine flu outbreak in the United States, the CDC advised physicians to "consider swine influenza infection in the differential diagnosis of patients with acute febrile respiratory illness who have either been in contact with persons with confirmed swine flu, or who were in one of the five U.S. states that have reported swine flu cases or in Mexico during the seven days preceding their illness onset. A diagnosis of confirmed swine flu requires laboratory testing of a respiratory sample (a simple nose and throat swab).

The most common cause of death is respiratory failure. Other causes of death are pneumonia (leading to sepsis), high fever (leading to neurological problems), dehydration (from excessive vomiting and diarrhea), electrolyte imbalance and kidney failure. Fatalities are more likely in young children and the elderly. (Fig: 4)

Diagnosis:

A number of different laboratory diagnostic tests can be used for detecting the presence of novel H1N1 influenza virus in respiratory specimens, including direct antigen detection tests, virus isolation in cell culture, or detection of influenza -specific c RNA by real-time reverse transcriptase polymerase chain reaction (Real-time RT-PCR). During outbreaks of emerging infectious diseases accurate and rapid diagnosis is critical for minimizing further spread through timely implementation of appropriate vaccines, antiviral treatment and prophylaxis where available and other public health-based no pharmaceutical measures [12]. Appropriate treatment of patients with respiratory illness depends on accurate and timely diagnosis and early diagnosis of influenza can reduce the inappropriate use of antibiotics and provide the option of using antiviral therapy. (GH: 1)

Specimen collection:

Preferred respiratory samples for influenza testing include nasopharyngeal or nasal swab, throat swab and nasal wash or aspirate, depending on which type of test is used. Samples should be collected within the first 4 days of illness. Routine serological testing for influenza requires paired acute and convalescent sera, does not provide results to help with clinical decision-making. Serological testing results for human influenza on a single serum specimen are not interpretable and are not recommended [13]. All respiratory specimens should be kept at 4°C for no longer than 72 hours before testing and ideally should be tested within 24 hours of collection. If storage longer than 72 hours is necessary, clinical specimens should be stored at -70°C (GH: 2)

Epidemiology:

An outbreak of influenza-like illness was first reported from Mexico on 18 March 2009. What alerted the authorities was an unusually high number of cases of influenza-like illness and pneumonia occurring in the month of March. Typically, in Mexico, seasonal influenza occurs mainly from October to March and causes more serious illness in the elderly [14]. This increase in cases in the month of March was unusual and cases were seen more among young adults. The WHO identified the H1N1 virus on 15 April 2009 and declared a public health emergency on the 25 April 2009. Its rapid spread led to a pandemic alert phase 4 on 27 April which was vbstepped up to pandemic alert phase 5 on 29 April and phase 6 on 11 June 2009. Till 17 October 2009, 414000 laboratories confirmed cases of H1N1 influenza with 5000 deaths had been reported to the WHO. The actual number must be much higher as many countries have stopped counting mild cases. As of 25 October 2009, India has reported 13,370 laboratory confirmed cases with 444 deaths.

Real-time RT-PCR:

RNA extraction: The efficiency and performance of nucleic acid amplification based assays depends on the amount and quality of sample template. For detection of novel H1N1 2009 influenza virus validated and qualified RNA extraction, procedures should be used to ensure efficient recovery and purity. Commercially available extraction procedures including QIAamp® Viral RNA Mini Kit, or RNeasy® Mini Kit (QIAGEN), Roche MagNA Pure

Compact RNA Isolation Kit, MagNA Pure LC RNA Isolation Kit II, and Roche MagNA Pure Total Nucleic Acid Kit have been shown to generate highly purified RNA following manufacturer's recommended procedures. Nucleic acid amplification assays, including reverse transcriptase RT-PCR (rat-PCR), and real-time RT-PCR are the most sensitive and specific influenza virus diagnostic assays[15]. Real-time RT-PCR remains the method of choice for clinical diagnosis of novel H1N1 2009 virus in respiratory specimens and for differentiating it from seasonal

Influenza viruses. Laboratory tests, such as real-time RT-PCR should be prioritized for hospitalized patients to diagnose 2009 H1N1 influenza and immunocompromised persons with suspected influenza where RIDT or DFA testing is negative or to determine influenza A virus subtype in patients who have died from suspected or confirmed influenza A virus infection.

Treatment:

Swine flu is treatment by three ways' they are

1. Chemotherapy
2. Homeopathy
3. nano-viraside technique

1. Chemotherapy

TAMIFLU: Tami flu (oseltamivir phosphate) is available as 30, 45 and 75 mg capsules and a 12 mg/mL oral suspension suitable for children and others who have trouble swallowing capsules[16]. In adults, the standard dose is 75 mg twice daily for 5 days for the treatment of swine flu and 75 mg once daily for 10 days for the prevention of swine flu[12]. In clinical studies conducted by Roche Laboratories, the most common side effects were nausea (10 percent) and vomiting (9 percent). Side effects usually occurred during the first 2 days of use and were reduced by taking the medication with food.

RELENZA: Relenza (zanamivir inhalation) is dispensed as a 5-mg "Rotadisk" (powder-filled blister) that is inhaled through the mouth. A plastic inhaler called a "Diskhaler" is supplied for this purpose [17]. Most patients require training on the proper use of the system. Relenza is FDA-approved for the treatment of swine flu in adults and children older than 7, as well as for swine flu prophylaxis in adults and children older than 5. Relenza sometimes causes airway spasms, so it should not be taken by people with a history of underlying heart or lung disease. In clinical studies, the most common side effects of Relenza included inflammation of the sinuses, dizziness, fever and/or chills and joint pain, reported by approximately 1.5 percent of patients.

2. Homeopathy & nano-vermicide technique:-

- Gelsemium.
- Baptisia Eupatorium
- perfoliatum. Sabadilla.
- iodide. Dulcamara
- Bryonia (fg:6)

Prevention:

Swine can be infected by both avian and human flu strains of influenza, and therefore are hosts where the antigenic shifts can occur that create new influenza strains.

The transmission from swine to humans is believed to occur mainly in swine farms, where farmers are in close contact with live pigs. Although strains of swine influenza are usually not able to infect humans, this may occasionally happen, so farmers and veterinarians are encouraged to use face masks when dealing with infected animals[18]. The use of vaccines on swine to prevent their infection is a major method of limiting swine-to-human transmission. Risk factors that may contribute to swine-to-human transmission include smoking and, especially, not wearing gloves when working with sick animals, thereby increasing the likelihood of subsequent hand-to-eye, hand-to-nose or hand-to-mouth transmission.

Prevention of human-to-human transmission:

Influenza spreads between humans when infected people cough or sneeze, then other people breathe in the virus or touch something with the virus on it and then touch their own face. "Avoid touching your eyes, nose or mouth. Germs spread this way." Swine flu cannot be spread by pork products, since the virus is not transmitted through food[19]. The swine flu in humans is most contagious during the first five days of the illness, although some people, most commonly children, can remain contagious for up to ten days. Diagnosis can be made by sending a specimen, collected during the first five days, for analysis.

Thermal imaging camera and screen, photographed in an airport terminal in Greece - thermal imaging can detect elevated body temperature, one of the signs of the virus H1N1 (swine influenza).

Recommendations to prevent spread of the virus among humans include using standard infection control, which includes frequent washing of hands with soap and water or with alcohol-based hand sanitizers, especially after being out in public[20]. Chance of transmission is also reduced by disinfecting household surfaces, which can be done effectively with a diluted chlorine bleach solution.

Experts agree hand-washing can help prevent viral infections, including ordinary and the swine flu infections[21]. Also, avoiding touching one's eyes, nose or mouth with one's hands helps to prevent the flu. Influenza can spread in coughs or sneezes, but an increasing body of evidence shows small droplets containing the virus can linger on tabletops, telephones and other surfaces and be transferred via the fingers to the eyes, nose or mouth. Alcohol-based gel or foam hand sanitizers work well to destroy viruses and bacteria. Anyone with flu-like symptoms, such as a sudden fever, cough or muscle aches, should stay away from work or public transportation, and should contact a doctor for advice.

Social distancing, another tactic, is staying away from other people who might be infected, and can include avoiding large gatherings, spreading out a little at work, or perhaps staying home and lying low if an infection is spreading in a community[22]. Public health and other responsible authorities have action plans which may request or require social distancing actions, depending on the severity of the outbreak.

Vaccination:

Vaccines are available for different kinds of swine flu. The U.S. Food and Drug Administration (FDA) approved the new swine flu vaccine for use in the United States on September 15, 2009. Studies by the National Institutes of Health show a single dose creates enough antibodies to protect against the virus within about 10 days.

In the aftermath of the 2009 pandemic, several studies were conducted to see who received influenza vaccines[23]. These studies show that whites are much more likely to be vaccinated for seasonal influenza and for the H1N1 strain than African Americans this could be due to several factors. Historically, there has been mistrust of vaccines and of the medical community from African Americans. Many African Americans do not believe vaccines or doctors to be effective[24]. This mistrust stems from the exploitation of the African American communities during studies like the Tuskegee study. Additionally, vaccines are typically administered in clinics, hospitals, or doctor's offices. Many people of lower socioeconomic status are less likely to receive vaccinations because they do not have health insurance. (FG: 7)

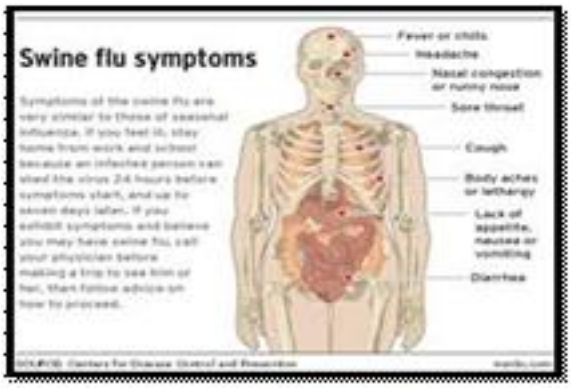


Fig. 3 : These were declared symptoms of swine flu

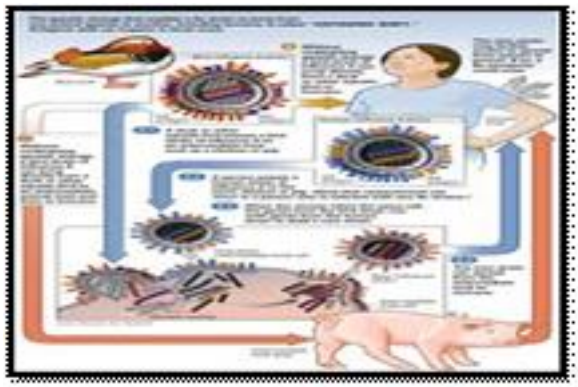


Fig. 4: These were declared symptoms of swine flu

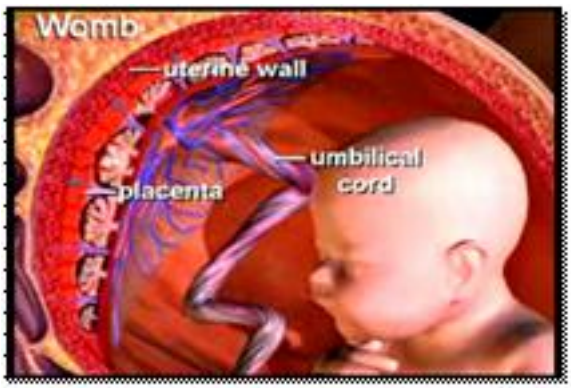


Fig.5: This is predicted Flu effect on pregnancy

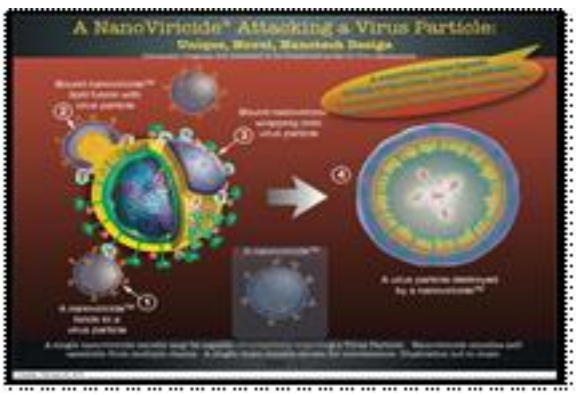
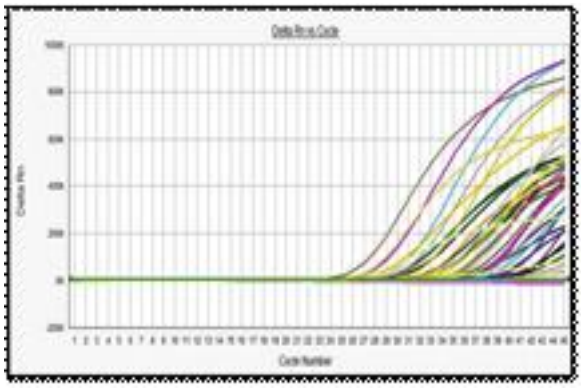
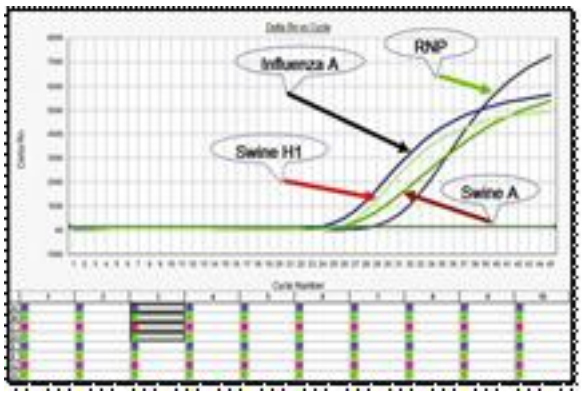


Fig.6: This is predicted Nano technical vaccination



Real-time PCR amplify cation curve for novel H1N1 influenza virus detection in a 96 well plate format.



Real-time PCR amplify action plot for novel H1N1 infl uenza virus detection. The grey highlighted area represents a sample in the 96 well reaction plates. Each sample is tested for seasonal Infl uenza A virus, novel H1N1 infl uenza virus A (Swine A), novel H1N1 infl uenza virus A subtype H1 (Swine H1) and internal control human RNaseP gene (RNP). The amplification plot for seasonal infl uenza virus A (black arrow), novel H1N1 infl uenza virus A (brown arrow), novel H1N1 infl uenza virus A subtype H1 (red arrow) and internal control RNP (green arrow) are shown in the figure.

Conclusion

Call the following numbers:-

Government of India on toll free number 1075 or 1800-11-4377. Outbreak monitoring cell of the national institute of communicable diseases at 011-23921401.

You may also like to check the following websites for more information:- http://www.babycenter.in

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