Chapter-1

Introduction and Statement of Problem
INTRODUCTION

The susceptibility of man to infectious diseases is a fact that cannot be ignored nor be eliminated. The infectious agents had existed, before human existence, and will be existing as long as man is living as hoards creature in nature. Microscopic organisms are ever lasting and are one of the major human history determinative in the world. The prevention and control of infectious diseases is essential to achieving a healthy population. One of the principal public health activities of this century has been a significant reduction in the incidence of selected infectious diseases. This success is graphically illustrated by the global eradication of smallpox and the virtual elimination of diphtheria and poliomyelitis in the U. S. Much of the progress has been as a result of improvement in living standards, basic hygiene, pasteurization, and water treatment. The development and widespread use of childhood vaccines have also had a significant impact on the reduction of infectious diseases.

Despite these successes, infectious diseases continue to pose an important public health problem. Today, the issue of emerging and re-emerging infectious diseases is at the forefront of public health concern. The very young, older adults and hospitalized and institutionalized patients are at an increased risk of attack from many infectious diseases. Changes in demographics, lifestyle, technology, land use practices, as well as increasing poverty, have each played a role in emerging infections. Many infectious diseases which threat the health of the general population are preventable and are controllable. Prevention and control of infectious diseases involve collection of accurate assessment data (such as surveillance data for specific conditions), outbreak detection and investigation, and
development of appropriate control strategies (both short and long term) based on specific epidemiologic data.

In spite of advances in controlling of the communicable diseases, a large number of communicable, diseases non-communicable diseases and health related events continue to remain a major public health problem world wide.

Communicable diseases are a major cause of mortality and morbidity in emergencies, and particularly in complex emergencies, where collapsing health services and diseases control programmes, poor access to health care, malnutrition, interrupted supplies and logistics and poor coordination among the various agencies providing health care often coexist. The main causes of morbidity and mortality in emergencies are diarrhoeal, acute respiratory infections, measles and, in areas where it is endemic, malaria. Other communicable diseases, such as epidemic meningococcal diseases, tuberculosis, relapsing fever and typhus, have also caused large epidemics among emergency affected populations. Malnutrition and trauma are the two main additional causes of illness and death. The prediction theories about the reduction of infections did not consider the factors such as: demographic changes, the ability of organisms in adapting the environmental conditions and resistance to drugs. More than 36 newly emerging infectious diseases were identified between 1973 and 2003, and new emerging infectious diseases continue to be identified. These are threatening human life. Further they can have a negative impact on tourism, trade, foreign investment etc. and have economic cost. Old and new and emerging infectious diseases persist in plaguing nations, particularly the developing ones, repeatedly threatening global health security and straining the economy. To cope with these threats through cost-effective, prompt and efficient public health responses, appropriate
information about priority diseases of public health importance is considered the most important element. Strengthening capacity of the member countries to generate timely and reliable information and to implement appropriate responses would contribute significantly to national, regional and global health security and economy\(^3\).

According to WHO, (on its strategic recommendation about prevention of infectious diseases), communicable diseases are still the major cause of both morbidity and mortality\(^7\). Increasingly, the World Health Organization is being requested to provide assistance to countries in strengthening their national surveillance, response and control activities\(^8\). WHO proposes to strengthen and support national disease surveillance systems using an integrated approach thus enlarging the scope and contents of the prevailing health information system. It aims at building a vibrant effective, efficient and dynamic national health surveillance network through: coordinating, streamlining, updating and modernizing all surveillance activities, proactive regular dialogue and feedback between all the key players in surveillance; use of new electronic tools for prompt alert and response and promotion of a national network of responsible people for disease prevention and control\(^3\).

According to the World Health Organization, one of the main causes of morbidity and mortality, in relation to the prevention of infectious diseases is communicable diseases. Reports issued by the WHO, pointed out that the globalization and the epidemiological expansion, enhancement of the electronical capabilities and communication networks, changes in the strength and resistability of communicable diseases, increasing of population density and immigration phenomena are some of the factors that have made an essential approach for paying more attention towards
the surveillance system, reviewing and the health system in all
the countries\textsuperscript{9}.

Considering this as an important issue, in the late 2000, many countries prepared a system and called "notifiable infectious disease surveillance system". This aims at systematic collection, collation and analysis of data to find out epidemiology of infectious diseases. Based on the national and international requirements, a list of the disease was prepared, named, notifiable disease and then is being managed\textsuperscript{10}.

For identification of the condition and health problem, improvement in decision making, financing and finally efficiency of executed programs, proper data are required\textsuperscript{11}. Therefore, through a well-planed surveillance system for notifiable infectious diseases, it is possible to have regular recording of the data through statistical analysis, diagnose pattern and processing of disease and attend them in the society\textsuperscript{12}. In 1977, India started implementation of the National Surveillance Programme for control of Communicable Disease (NSPCD) in selected districts, while in the same year, the National Apical Advisory Committee for National Diseases Surveillance and response system, established by the Ministry of Health and Family Welfare, prepared a concept plan for strengthening the disease surveillance system in India. The NSPCD and the associated specific activities were developed and approved by the government and implementation of these activities was initiated. The overall focus of the programme was to enhance and expand the existing activities of the National Institute of Communicable Diseases (NICD), India Council for Medical Research (ICMR) and the state governments to establish networks for communicable disease surveillance and response.
The NSPCD includes activities such as development of human resources through training of surveillance officers and laboratory personnel and upgrading and modernization of laboratories. It also includes strengthening of the links from peripheral to central levels, networking between state, regional and national institutions, and the development of standard formats, operation and training manuals, and improving monitoring and evaluation. The programme was first pilot tested in 101 districts of the country and has now been introduced into all the states.

Building on the lessons learnt from implementation of the NSPCD, India has embarked upon an IDSP. This programme aims to integrate existing surveillance information collected at the district level, and to use it for public health action. The IDSP will integrate surveillance and control programmes covering communicable diseases, accidents, water quality, outdoor air quality, surveillance of risk factors for non-communicable diseases, and state specific priority diseases. It will be implemented using a phased approach and all districts will be covered within a 5-years period. Because the system of administration and health care delivery in India is decentralized, the IDSP focuses on strengthening the implementation capacity at the state and district levels, as this is the best practical approach.

As part of the implementation of the IDSP, a central IDSP cell and a national coordination committee have been established. Resources to strengthen the national IDSP cell have also been identified. Additionally, state and district level surveillance committees have been established. An innovative approach being used in India is the participation of the private sector in public health surveillance. Currently this initiative is being piloted in the
state of Maharashtra which has established a functional district focused surveillance system. Lessons from this pilot project will contribute to the development of a model for involving the growing private sector in disease surveillance and response.

As a matter of fact, in spite of promotion of the statistical data in recent years, in relation to the reporting system on one hand and the surveillance qualities on the other hand, the approaching of the proper indicators of the said elements have yet to be improved. At the same time, it is obvious that more effective stages must strictly be taken into consideration for achievement of the ideal targets\textsuperscript{8}.

The outcomes of health care are based on the obtained data and by referring to it, the general image of ailment in a society can be obtained. Review of the relevant literature indicates that in many developing countries such data are not correct qualitatively and quantitatively\textsuperscript{12}.

Considering the importance of an efficient nationally notifiable infectious diseases surveillance system, organizations obtain data in small and large scale for improving the health level of society. Different countries are trying to have different models of data collection. Continued recording of the obtained data and their analysis for logical identification of the issue would help to improve the quality of the data and as a result to increase the confidence level in using the data. After studying health systems of different countries, and considering the socio-economic condition of India, a new model was developed for India.

**Magnitude:**

Magnitude of control and reduction of the diseases are one of the main aims in the world development. Each year, by determining health indices and daily observation of the changes
in such indexes, the condition of each country is assessed. On this basis, the short and long-term plans of the politicians and administrators of a society are determined. The main action in changing of these indices is diseases surveillance system. Surveillance is the systematic collection, analysis of data and the dissemination of information to those who need to know, particularly those who are in a position to take action for evaluation of the plans. According to the USA Centers for Diseases Control and Prevention, the aims of surveillance system are the following:

- Recognize cases or clusters of cases, to trigger interventions to prevent transmission reduce morbidity and mortality (includes the special case in which surveillance national level is required to recognize multi-state clusters).
- Identify new health problems and emerging diseases.
- Assess public health impact of health events or determine and measure trends;
- Demonstrate the need for intervention programs and resources, and allocate resources during health planning.
- Monitor effectiveness and evaluate the impact of prevention and control measures and intervention strategies, and health policy changes.
- Identify high-risk population groups or geographic areas to target interventions and guide analytic studies.
- Provide data for research and develop hypotheses that lead to analytic studies risk factors for disease causation, propagation or progression.
- Measure progress toward Millennium Development Goals.
- Measure causal factors in disease\textsuperscript{13}.
In fact, the surveillance system as a strategy is a key in prevention of infectious diseases and forms the basis for control and prevention of infectious diseases.

Since India is on the epidemiologic transition; therefore, episode of contagious diseases, have gradually declined and at the same time prevalence of non-contagious diseases are rising. Therefore prediction of financial resources and provision of the required facilities, particularly about contagious disease which impose medical cost to the system are necessary in the program designed for eradication of the diseases. Prevalence of newly emerged and re-emerged diseases such as tuberculosis, Malaria, HIV/AIDS, Hepatitis etc, also the situation of the neighboring countries doubles the attention to the process of epidemiology about these diseases.

Referring to the review of the relevant literature about epidemiology of reportable infectious diseases, the required time for decision making is several hours to several days. Therefore this problem doubles the significance of data, regarding time limit about the statistical analysis. Proper and on time information about the society based on the needs of the determined indexes in the prevention and control of this disease will be effective. One of the country's problems in the system rendering health care service is deficiency in the informatics system, recording and reporting. It points out that in case of continuing this defect process; it affects badly the health care success and the main indexes. Since the outcome of the process in notifiable infectious diseases surveillance system is information and the society faces the increasing rate of population, changes in life style, prevalence and episode of infectious and non-infectious diseases, the researcher is trying to do a descriptive study on notifiable disease surveillance system and based on the obtained data plan to
design a proper model. It is hoped that the findings of this study would help to improve the level of public health qualitatively and quantitatively.

**Main objective of the study:**

A study on national notifiable infectious diseases surveillance system in India. A managerial perspective.

**Specific aims**

1. Study the structure of the national notifiable infectious diseases system in India.
2. Study of data of the national notifiable infectious diseases system in India.
3. Study of admission criteria for recording of infectious diseases of the national notifiable diseases surveillance system in India.
4. Study on the processing of the data for national notifiable infectious diseases surveillance system in India.
5. Study of the methods of data analysis for national notifiable infectious diseases surveillance system in India.
6. Study of method of distribution of national notifiable infectious diseases surveillance system in India.
7. Study of the national surveillance system for classification of notifiable infectious disease in the India
8. Study on the drugs quality of control method of national for notifiable infectious diseases, surveillance system in the India.
9. Study of the instruction and strategy of giving confidentiality information related to national notifiable infectious disease surveillance system in the India.

**A- Planning of proper model for national infectious notifiable infectious surveillance system in India.**

**B- Testing of the presented model of Delphi method.**
Chapter-1

Research questions:

1- How is the national notifiable infectious disease surveillance system?
2- What are data of national notifiable infectious diseases surveillance system in the India?
3- What are the results of evaluating the presented model by Delphi methods?
4- What is the better model for the national notifiable infectious disease surveillance system in the India?
5- What are the criteria of admission for National Notifiable Diseases Surveillance System in India?
6- What is the process of data collection for National Notifiable Diseases Surveillance System in India?
7- What is the process of data analysis for National Notifiable Diseases Surveillance System in India?
8- What is the method of information dissemination for National Notifiable Diseases Surveillance System in India?
9- What is the case classification for National Notifiable Diseases Surveillance System in India?
10- What is the data quality controlling method for National Notifiable Diseases Surveillance System in India?
11- What is the guide line of confidentiality for National Notifiable Diseases Surveillance System in India?

Surveillance Definitions

Career:

A person or animal that harbours a specific infectious agent in the absence of discernible clinical disease and serves as a potential source of infection. The carrier state may occur in an individual with an infection that is apparent throughout its course (known as healthy or asymptomatic carrier) or during incubation period, convalescence, and post convalescence of an
individual with a clinically recognizable disease (known as incubatory carrier or convalescent carrier). The carrier state may be of short or long duration (temporary or transient carrier or chronic carrier)\textsuperscript{15}.

**CASE:**

A person who has the particular disease, health disorder, or condition which meets the case definitions for surveillance and outbreak investigation purpose. The definition of a case for surveillance and outbreak investigation purpose is not necessarily the same as the ordinary clinical definition\textsuperscript{16}.

**CASE CLASSIFICATION:**

Gradations in the likelihood of being a case (e.g., suspected/ probable/ confirmed). This is particularly useful where early reporting of cases is important (Ebola hemorrhagic fever) and where there are difficulties in making definite diagnoses (specialized laboratory tests required)\textsuperscript{16}.

**CASE DEFINITION:**

A set of diagnostic criteria that must be fulfilled for an individual to be regarded as a case of a particular disease for surveillance and outbreak investigation purpose. Case definition can be based on clinical criteria, laboratory criteria or a combination of the two with the elements of time place and person\textsuperscript{16}.

**COMMUNICABLE DISEASE (INFECTIONIOUS DISEASE):**

An illness due to a specific infectious agent or its toxic products that arise through transmission of that agent or its products from an infected person, animal, or reservoir to a susceptible host, either directly or indirectly through an intermediate plant or animal host, vector, or the inanimate environment\textsuperscript{17}.

**EMERGING INFECTIONS:**
In the final quarter of the twentieth century, more than 30 such conditions, many of them capable of causing dangerous epidemics, were recognized. They include human immune-deficiency virus (HIV) infection, Ebola virus disease, Hantavirus Pulmonary syndrome and other viral hemorrhagic fevers, campylobacter infection, transmissible spongiform Encephalopathies Legionnaires’ disease and Lyme disease. Some appear to be “new” disease of humans, others may have existed for many centuries and have been recognized only recently because ecological or other environmental changes have increased the risk of human infection, re-emerging infections are certain “old” diseases, such as tuberculosis and syphilis, that have experienced a resurgence because of changed host-agent-environment conditions.

**ENDEMIC:**

The constant presence of a disease or infectious agent within a given geographic area or population group; may also refer to the usual prevalence of a given disease within such area or group. The expression “endemic disease” has a similar meaning.

**EPIDEMIC:**

The occurrence in a community or region of cases of an illness, specific health-related behavior, or other health-related events clearly in excess of normal expectancy. The community or region and the period in which the cases occur are specified precisely. The number of cases indicating the presence of an epidemic varies according to the agent, size, and type of population exposed, previous experience or lack of exposure to the disease and time and place of occurrence.

**FEEDBACK:**

The regular process of sending analyses and reports about the surveillance data back through all levels of the surveillance
system so that all participants can be informed of trends and performance\textsuperscript{15}.

**HEATH EVENT:**

An event relates to the health of an individual. It refers to the occurrence of a case of a specific disease or syndrome, the administration of a vaccine or an admission to hospital\textsuperscript{15}.

**INCIDENCE:**

An incidence refers to the number of instances of illness commencing, or of persons falling ill, during a given period in a specified population\textsuperscript{18}.

**NOTIFIABLE DISEASE:**

Notifiable disease refers to a disease that, by statutory/legal requirements, must be reported to the public health or other authority in the pertinent jurisdiction when the diagnosis is made\textsuperscript{17}.

**NOTIFICATION:**

Notification refers to the processes by which cases of outbreaks are brought to the knowledge of the health authorities. In the context of the international health regulations; notification is the official communication of a disease/health event to the World Health Organization by the health administration of the Member State affected by the disease/health event \textsuperscript{17}.

**OUTBREAK:**

Outbreak refers to an epidemic limited to localized increase in the incidence of a disease, e. g., in a village, town or closed institution\textsuperscript{18}.

**PREVALENCE:**

The number of instances of illness or of persons ill, or of any other event such as accidents, in a specified population, without any distinction between new and old cases. Prevalence may be
recorded at a stated moment (Point prevalence) or during a given period of time^{19}.

**REPORTING SYSTEM:**

The specific process by which diseases or health events are reported. This will depend on the importance of the disease and the type of surveillance^{17}.

**REPORTING TIMELINESS:**

Proportion of all expected reports in a reporting system received by a given data (due date)^{17}.

**SENSITIVITY IN SURVEILLANCE:**

The ability of a surveillance or reporting system to detect true health events i.e. the ratio of the total number of health events as determined by an independent and more complete means of ascertainment^{17}.

**SURVEILLANCE:**

The process of systematic collection, orderly consolidation and evaluation of pertinent data with prompt dissemination of the results to those who need to know, particularly those who are in a position to take action^{19}.

**SURVEILLANCE ACTIVE:**

Surveillance where public health officers seek reports from participants in the surveillance system on a regular basis, rather than waiting for the reports (e.g. telephoning each participant monthly)^{17}.

**SURVEILLANCE, COMMUNITY**

Surveillance where the starting point for the notification is from community level, normally reported by a community worker. It can be active (looking for cases) or passive (reporting cases). This may be particularly useful during an outbreak and where syndrome case definitions can be used (the active identification of
community cases of Ebola virus infection in Kikwit was an example of active community surveillance\textsuperscript{17}.

**SURVEILLANCE PASSIVE:**

Surveillance where reports are awaited and no attempts are made to seek reports actively from the participants in the system\textsuperscript{15}.

**SURVEILLANCE ROUTINE:**

The regular systematic collection of specified data in order to monitor a disease or health event\textsuperscript{19}.

**SURVEILLANCE, REPORT:**

A regular publication with specific information on the disease under surveillance. It should contain updates of standard tables and graphs as well as information on outbreaks etc. In addition it may contain information on the performance of participants using agreed performance indicators\textsuperscript{19}.

**National Notifiable Disease Surveillance System (NNDSS)** is a database maintained by the CDC's Epidemiology Program Office. NNDSS is a mechanism for the collection and publication of surveillance data gathered by state health departments on specific diseases and conditions. The system is based on a list of notifiable diseases compiled annually by the Council of State and Territorial Epidemiologists (CSTE) in collaboration with the CDC\textsuperscript{20}. 

15