

Management of IDER (Infectious Disease Emergency Response) Plan of San Francisco

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Research Article

Santosh Kumar Mishra

Ph.D., Technical Assistant, Population Education Resource Centre, Department of Lifelong Learning and Extension, S.N.D.T. Women's University, Mumbai-400020, Maharashtra, India (Retired).

*Correspondence authors

Dr. Santosh Kumar Mishra(Ph.D)

Independent Researcher

Post-retirement from the Population Education Resource Centre,

Department of Lifelong Learning and Extension

[Previously known as Department of Continuing and Adult Education and Extension Work],

S. N. D. T. Women's University, Mumbai, India, <https://sndt.ac.in>

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Abstract

The infectious diseases (IDs), that are defined as “disorders caused by organisms” (such as bacteria, viruses, and fungi); spread, directly or indirectly, from one person to another; are one of the major public health concerns for many societies and communities. In order to prevent mortality and other health-related complication among children, men and women, it is essential to put in place effective public health strategies at all levels. In the broader perspective of this realization, several initiatives have been taken, both at macro and micro levels, for effective management of the IDs. Multi-stakeholders have come forward to address the issue in several countries, including in the United States of America (USA). According to some estimates, the IDs are the third leading cause of death in the US (which has public health law in order to minimize the transmission of this disease). In addition, several stakeholders in the country, both in governmental and non-governmental sectors, have joined hands to prevent spread of the IDs. The Infectious Disease Emergency Response (IDER) Plan of San Francisco in the USA is an initiative the purpose of which is to (a) contain an outbreak of IDs caused by an infectious agent or biological toxin, and (b) respond to other ID emergencies. The author, in this review research paper, primarily aims to study the management of San Francisco's IDER Plan. Data used in the work are ‘qualitative’ (collected from secondary sources) & method of data analysis is descriptive.

Keywords: Infectious Disease (ID), Management, Infectious Disease Emergency Response (IDER), Outbreak, Mortality, San Francisco, & Surveillance

Introduction

Infectious diseases (IDs) are considered one of the most serious health issues, across the regions of the globe. Almost all nations, irrespective of their status of economic growth, are confronted with IDs. Notably, it has been found that during the beginning of the 20th century, chronic degenerative diseases began to emerge even in developed countries. It was during this time that IDs like plagues and cholera devastated health of significant proportions of the populations in many parts of the European region (Barreto et al., 2006).

Most importantly, coronavirus disease (COVID-19) is also an ID. It is caused by a newly discovered coronavirus. It is in this context that the author of this research argues that in today's world, there is increasing need to address emerging infectious diseases (EIDs). The EIDs (defined as “those diseases whose incidence in humans has increased in the past two decades, or threaten to increase in the near future”) are perceived as serious public health threats globally. It is in this context that au-

thor of this work is of the considered view that the COVID-19 is an EID. It is pertinent to note that the year 2018 marked the 100th anniversary of the Spanish flu. Health professionals consider the Spanish flu as the deadliest outbreak, prior to emergence of COVID-19 health emergency, in recorded history (National Academies of Sciences, Engineering, and Medicine et al., 2005). According to estimates by the National Archives and Records Administration, there were up to 50 million fatalities (which is more than the death toll resulting from the First World War) (National Archives and Records Administration, 1918).

The World Health Organization (WHO), in its document “A brief guide to emerging infectious diseases and zoonoses” (published in the year 2014) states that an EID is one that has already appeared and affected a population for the first time. Further, the WHO study also makes a point that an EID might

have (has) existed previously, but is expanding its base rapidly. Furthermore, another important dimension of EIDs is that they spread rapidly in two spheres: they spread (a) in terms of the number of people getting infected, and/or (b) to new locations and geographical areas (either within the country or among countries) (World Health Organization [WHO], 2014). The author does not wish to further elaborate on IDs and EIDs, as it is not within the scope and objectives of the present paper.

Efficient management of IDs is, thus, one of the areas of concern for health care providers and other stakeholders. Managing the epidemics has been on the developmental agenda of many national governments (World Health Organization [WHO], 2017). The ID management essentially consists of (a) identifying the microbial cause(s) of an infection; (b) initiating, if necessary, antimicrobial therapy against microbes; and (c) controlling host reactions to infection. In view of growing need for adequately addressing the IDs, several initiatives have been undertaken in both developing and developed countries. The USA administration has also taken meaningful measures to address the IDs. Some of the implementing agencies in the country have adopted community outreach model in management of the IDs. The San Francisco Infectious Disease Emergency Response (IDER) Plan in the USA is one project that aims to address the IDs through appropriate management strategies. Discussion on management of IDER is the focal point of this research. The author presents below description on research methods used in the work.

Research Methods

Rationale and Context: As outlined in the introductory section of this paper, prevention of the IDs is essential in order to ensure better health status of all citizens in the USA. According to published research report authored by Hansen, Victoria, et al. (published in November, 2016), mortality resulting from the IDs, during 1900 through 1996, in the USA declined, except for the year 1918. The prime cause of this spike in the year 1918 was the Spanish flu pandemic. The IDs, from 1980 through 2014, comprised 5.4% of overall mortality in the country. Again, mortality rate (per 100 000 population) resulting from the IDs increased from 42.0 in the year 1980 to 63.5 in 1995. Notably, this trend in mortality pattern during these years was equal to mortality occurring from HIV/AIDS (Hansen et al., 2016).

Further, it has been discovered by development planners, policy makers and health experts that the epidemics of the IDs are occurring more often, and spreading faster and further than ever, in many different regions of the world, including the USA. Some provincial locations in the USA have witnessed surge in the IDs over the years. It is pertinent to note that the contributing factors responsible for the ID threat include

- biological,
- environmental, and
- changing lifestyle patterns (among others) (Hansen et al., 2016).

The author of this review research paper makes a specific

point at this juncture that recently witnessed trend in fatalities (mortality) resulting from two prominent factors demand urgent responses to adequately and efficiently address relevant dimensions pertaining to the IDs in the USA. Importantly, two contributing factors (that may be attributed for surge in mortality) are combination of (a) newly-discovered diseases, as well as (b) re-emergence of many long-established IDs. It is because of these trends that the policy planners in the USA realized the significance of taking meaningful initiatives in order to better manage the health threats resulting from the IDs. The relevant offices and government departments (ministries) of the US administration made a call for management of the IDs in a way that meets health needs of all citizens (of all age groups, irrespective of their origin, nationality, and ethnic and cultural backgrounds). It was realized by the concerned US authorities that planning and preparation for epidemic prevention and control are essential. It is in the response of this call that the initiative termed as “IDER (Infectious Disease Emergency Response) Plan of San Francisco” was implemented.

The description presented above gives rationale for and context for the present research work (which is “desk review” in nature). Presented below is description on objectives of the work.

Objectives: In this section, objectives of this research paper have been looked into. The author has divided the objectives into two categories:

- general objectives, and
- specific objectives.

Description on these two objectives is presented below.

General Objectives: In terms of general objectives, brief description on conceptual framework of the IDs has been presented by the author. Further, the author has attempted to give answer to the question “why management of epidemics & the IDs is important”.

Specific Objectives: With regards to specific objectives, the aim of this review research paper is to give an insight into the management of the IDER Plan. Management aspect of the IDER Plan, that attempts to address the IDs, has been researched into by the author. In more scientific terms, the management aspects of the Plan studied by the author are:

- objectives,
- mission,
- assumptions,
- scope & vision,
- nature of supporting activities,
- roles and responsibilities, and
- plan for activation and deactivation of initiatives (responses).

Lessons learnt and challenges associated with the IDER Plan have also been researched into.

Type and Sources of Data: Secondary data have been used in this research work. Required data have been collected from secondary sources, such as journal articles, books, government

publications, as well as publication of the inter-governmental organizations. All reasonable precautions have been taken by the author to verify the information contained in this research paper. Data sources are quoted in the reference section. Concerning nature of data, that have been used here, data are largely 'qualitative' in nature. The author, in this section, makes a specific point that plagiarism, to some extent, may be detected in this research. Although as per academic and research ethics and practices, plagiarism is discouraged, the author argues that plagiarism in this work is reasonable and justifiable in view of the fact that while presenting some facts (including terminology, and names of organizations and initiatives) that are technical in nature, not much changes can be made, as there is likelihood that inherent (intended) meaning may be lost. This, in turn, will defeat the objectives of the research.

Method of Data Analysis: Method of data analysis is descriptive, involving "desk-based research". In view of the objective, as outlined in the previous section, the author has made systemic review of management of IDER Plan of San Francisco. Again, the research approach used is "case study method", as the author has studied response plan (initiative named "IDER Plan of San Francisco") to address the IDs in the USA.

Scope, Significance and Limitations: In view of growing significance of appropriately designed policies and responses in order to prevent the IDs in the USA (and elsewhere), this research work gains increased significance. In terms of limitations, conclusions from data analysis in this paper cannot be generalized, only actions (initiatives) undertaken as a part of the IDER Plan of San Francisco have been studied. However, some inferences drawn can be looked at in broader perspective in view of the fact (a) that the ID is a one of the major health concerns in many countries and regions of the globe, and (b) efficient management of initiatives aimed at addressing issues pertaining to the IDs is on the developmental agenda of many national governments, and the international inter-governmental organizations [like the World Health Organizations, (WHO) and the International Planned Parenthood Federation (IPPF)]. Health care providers and multi-sectoral stakeholders involved with addressing the IDs can learn lessons from the inferences derived from analysis of data in this paper.

Review of Literature: Review of literature forms an integral part in research studies, especially in the field of social science research. It is for this reason that description on review of literature related to objectives of the research paper (and work done previously in the subject area, under study) needs to be presented. However, the author of this work did not find, despite several academic and research efforts (including consultation with experts in the field, located both in India and abroad), any relevant and meaningful research work that can be presented here as part of review of literature (Mishra, 2021). This may be because of the fact that not much scientific work (that is available either in online or offline modes) has been done on the chosen subject of this research: Management of IDER (Infectious Disease Emergency Response) Plan of San Francisco. The author, thus, decided to not present any infor-

mation under this section (review of literature) of this research work.

Why Management of Epidemics & IDs is Important?

In this section of the work, the author attempts to give an insight into the significance of managing and addressing the IDs more effectively. As outlined above, the IDs are considered as a major health challenge for the health care providers from across the regions of the globe. According to the study "Managing epidemics: Key facts about major deadly diseases" (published by the WHO in the year 2018), epidemics of the IDs are occurring more often. The fact, today, remains is that they are spreading faster and further than ever (World Health Organization [WHO], 2021). This trend in health threat has been witnessed in many different regions of the world. The contributing and background factors behind health risks associated with the IDs are several, biological, environmental and lifestyle changes being prominent. Notably, re-emergence of many of the IDs calls for urgent and more meaningful responses from health care providers in all countries (World Health Organization [WHO], 2018). This background information justifies the need for efficient management of the IDs, at all times and everywhere.

From management point of view, it is recommended that adequate planning and preparation for the purpose of prevention and control of the IDs are essential. Health experts argue that management of the IDs, including the EIDs, should ideally examine (a) different IDs; and (b) responses required in order to address each and every one of them (the IDs). The WHO is of the view that the greatest threat in the IDs is influenza pandemic (IP). It (i.e., IP) is both 'unpredictable' and 'inevitable'. The WHO argues that the IP has the potential to result in a worst-case scenario wherein there will be no protective vaccine against this epidemic for six months (or longer) after the virus is detected. As a result of this scenario, there is likelihood that there may be a global shortage of doses. The early years of the 21st century have already been deeply scarred by so many major epidemics and the IDs. Another important consideration in management of the IDs is that old diseases (like cholera, plague, and yellow fever) often return, and new ones invariably arrive to join them. The Ebola epidemic witnessed in three West African countries [(a) Guinea, (b) Liberia, and (c) Sierra Leone)] in the year 2014 was unlike the previous 24 localized outbreaks that were observed since 1976. What is of serious concern is that this health crisis spread to six other countries in three continents. The outbreak sparked alarm worldwide. Again, the Zika virus transmitted in the year 2015. It triggered a wave of microcephaly in Brazil (World Health Organization [WHO], 2018).

Discussion

ID-Meaning and Causes: Before looking into management of the IDER Plan of San Francisco, it would be relevant to understand the conceptual framework of the ID. In this section, the author presents meaning (including causes) of the IDs. As indicated in the introductory part of this paper, the IDs are (a) caused by microorganisms such as viruses, bacteria, fungi

or parasites; and (b) can spread between individuals. Microorganisms that cause disease are collectively called 'pathogens'. Pathogens cause disease either by disrupting the body's normal processes and/or stimulating the immune system to produce a defensive response, resulting in (a) high fever, (b) inflammation, and (c) other symptoms (World Health Organization [WHO] & International Federation of Red Cross and Red Crescent Societies, 2001). The IDs can be spread from one person to another, for example through contact with bodily fluids, by aerosols (through coughing and sneezing), or via a vector, for example a mosquito (American Animal Hospital Association [AAHA], 2021).

In terms of causes, the IDs are caused mainly by four agents:

- viruses,
- bacteria,
- fungi and
- parasites.

Viruses (which are tiny infectious agents that replicate only in the living cells of other organisms) can be spread in many ways:

- from plant to plant;
- from animal to animal (by blood-sucking insects (e. g., dengue virus which is spread by mosquitos) ;
- Spread by aerosols (through coughing and sneezing modes (e. g., influenza virus or the novel coronavirus SARS-CoV-2) ;
- Spread by not washing hands after going to the toilet;
- Spread by sexual contact (e. g., HIV); and
- Spread by exposure to infected blood (e.g., Hepatitis B) (Government of South Australia, 2021).

Importantly, viruses can often be prevented through vaccines. With regard to bacteria, as a cause of the IDs, it is established fact that most bacteria are not harmful, rather some are beneficial. According to some estimates, less than 1% of bacteria make people sick or ill. However, it is pertinent to note that there are infectious bacteria that can grow and spread in the body, leading to the IDs. In terms of mode of transmission, bacteria are spread in following ways:

- Spread by aerosols;
- Spread by surface and skin contact; and
- Spread through body fluids, such as blood and saliva (Ministry of Health, 2021).

Antibiotics are usually administered in order to treat "severe bacterial infections". However, antibiotic resistance in bacteria is a major health challenges. Further, fungi (which are one of the contributing factors for spread of the IDs) are microorganisms that are characterized by cell walls made from a substance termed as 'chitin' (World Health Organization [WHO], 2020). The author of this paper makes a point that most fungi are harmless to humans, some are rather edible. However, some fungi are considered to be infectious. Most importantly, infectious fungi may result in life-threatening diseases. Fungal infections often affect the lungs, skin or nails, as has been reported among people infected with newly emerged COVID-19

virus. Some reflections of fungal infections are: (a) athletes' foot (with symptoms like itching, and/or cracking of the skin); and (b) ringworm (with symptoms like reddish and scaly rash on the skin and scalp). Furthermore, parasites are organisms that live in or on another organism. They benefit by getting nutrients at the expense of their host. They can be found in many different body sites, for instance in the blood, liver, digestive system, brain, and eyes (Family Health Diary, 2021)). The author does not wish to further elaborate on causes of the IDs and sources of their transmission, as it beyond scope and objectives of this research.

Quick Look at Need for Prioritizing IDs on Health Agenda:

The IDs are one of the leading causes of death worldwide. Initiatives aimed at prevention and control of the IDs involve dealing and adequately addressing with numerous pathogens. In the context of need for prioritizing the IDs on health agenda, the author of this paper makes a point that each of pathogens poses a specific threat from public health perspective. It is, therefore, necessary to place the IDs on priority development agenda of all national governments, and actors in the NGO-sector. The COVID-19 pandemic (that emerged in the beginning of 2020 globally) is also an ID. How to effectively manage the ID control programs is the dilemma and challenge for the public-health experts and lawmakers (Krause & and the Working Group on Prioritization at the Robert Koch Institute, 2008).

It has been found that many IDs become difficult to control in situations where the infectious agents evolve resistance to commonly used drugs. Bacteria can, for instance, accumulate mutations in their DNA or acquire new genes that allow them to survive contact with antibiotic drugs that would normally kill them. In this very context, the author of this research points out that prevention and control of the IDs become more challenging for managers of health programs (at the macro level) and health care workers in communities (at the micro level) to deal with situations where it is found that common viral infections (like coughs or a cold) can, sometimes, become complicated. This situation arises because of the fact that common viral infections can foster bacterial infection to develop. Health experts, however, discourage treating viral infections with antibiotics in order to prevent bacterial infections. Such practices are not recommended because of the risk of causing bacterial resistance. Notably, antibiotics do not work against viral colds and the flu. Findings of some past research studies are indicative of the fact that "unnecessary antibiotics can be harmful" (Johns Hopkins University, 2021).

In terms of challenges associated with management of the IDs, health experts are researching into new approaches that can be used to treat the IDs. These renewed research efforts focus on finding answer to the question: "how the pathogens change and drug resistance evolves". It is because of these considerations that addressing the IDs has always been on the health agenda of the US administration, as well as of other national governments. Notably, the author of this paper argues that rationally and adequately allocating required resources and infrastructure

for research, surveillance and other activities is another area of concern.

While addressing issues connected with prevention and control of the IDs, it is essential to remember that devising and strengthening communicable disease (CD) surveillance and response (at national and sub-national levels) needs dedicated commitment. Such a commitment should:

- Be substantial in nature, and
- Ensure desired health outcomes in the long-term (World Health Organization [WHO], 2006).

Such initiatives (as indicated above) will require availability of human, financial, and other infrastructural resources which can be mobilized through well-established mechanism of “networking and collaboration” (at all levels). The author further states that in a broader perspective, this initiative should be considered as investment in health matters that will yield desired results in the long-term, which is needed for ensuring “better health of all”, at all times, and in all countries. Notably, this plan of action should begin (ideally) with management strategy that ensures “systematic review of the national priorities for surveillance” [both at macro (national), and micro (sub-national/regional/provincial) levels]. In this context, what is of utmost importance is that each chosen region (or location of the proposed action area) should necessarily assess (periodically) overall surveillance system. Such a program mechanism will ensure that initiatives undertaken (or proposed to be undertaken): (a) continue to reflect national disease control priorities, (b) improve efficiency, and (c) take advantages of new emerging methods and techniques needed to strengthen surveillance (World Health Organization [WHO], 2006). After elaborating on need for prioritizing the IDs on health agenda, the author presents below discussion on management of the IDER Plan of San Francisco (which is focal point of this review paper).

Management of IDER Plan of San Francisco: The author has divided discussion on management of the IDER Plan of San Francisco (also sometimes written in this paper as San Francisco’s IDER Plan in order to make the presentation more meaningful) into three sections. They are

- Introduction to the IDER Plan; and
- Few Words about PHD, SFDPH.

Management Structure of the IDER Plan. Section-3 (Management Structure of the IDER Plan) has been further divided into six sub-sections. This has been done to present the data in logical order (in accordance with objectives of the paper). Discussion follows below.

Introduction to the IDER Plan: San Francisco’s IDER Plan is implemented by the Population Health Division, San Francisco Department of Public Health (referred to as PHD, SFDPH in remaining sections of this research), the USA. The IDER (referred to as Plan in the remaining sections of this research) is identified as a national promising practice. The ID emergencies, according to the vision of the PHD, SFDPH, are

circumstances that are caused by “biological agents”, including organisms such as:

- Bacteria,
- Viruses, or
- Toxins [19].

The three organisms, as outlined above, are considered as potential risk factors for severe illness or death in the population. The Plan is considered by the PHD, SFDPH as a mechanism that may be used in situations that include naturally occurring outbreaks. Such outbreaks include:

- Measles;
- Mumps;
- Meningococcal disease;
- EIDs (e.g., SARS, and pandemic influenza); and
- Bioterrorism (Population Health Division & San Francisco Department of Public Health, 2021).

Few Words about PHD, SFDPH: Before discussing the management aspect of the Plan (which forms prime objective of this research paper), the author presents here brief description on PHD, SFDPH. The initiative the “Disease Prevention and Control Branch” (DPC) is part of the PHD of the SFDPH. As per the mandates of the PHD, SFDPH, the DPC protects the health and well-being of residents and visitors of San Francisco region. This is done through three institutional mechanisms, as outlined below:

- Public health clinics,
- Public health laboratory, and
- Chronic disease prevention physician team (Population Health Division & San Francisco Department of Public Health, 2021).

It is pertinent to note that the public health clinics are comprised of three different types of clinics, namely, (a) Tuberculosis Clinic, (b) City Clinic, and (c) the AITC Immunization and Travel Clinic [20]. It should be noted that the AITC, a non-profit clinic, is part of the SFDPH. Further, as public health provider, the mission of the AITC is to prevent disease and protect the health of all (Population Health Division & San Francisco Department of Public Health, 2021).

Furthermore, the AITC Immunization and Travel Clinic came into existence in the year 1999. The author of this work makes a specific point herewith that this was the time (1999) when the SFDPH recognized that many adults in the San Francisco region had trouble getting access to vaccination facilities [21]. Notably, the AITC, within span of one year, had expanded to become a full-service travel medicine provider. In this role, the AITC offered:

- Vaccinations,
- Anti-malaria medications, and
- Health advice for international travellers (Population Health Division & San Francisco Department of Public Health, 2021).

According to the VolunteerMatch (an US-based agency, considered as leader in volunteerism, with a responsibility to unite broader community), the AITC is committed to provide immu-

nization and travel medicine services that are:

- Convenient,
- Knowledgeable,
- Personalized, and
- Cost-effective (VolunteerMatch, 2021).

The AITC is open to the public at large. In particular, the AITC strives to serve (among others) following categories of beneficiaries:

- International vacationers,
- International business travellers,
- Volunteers providing relief work,
- Travellers on international pilgrimages, and
- Adults seeking vaccinations for international travel (VolunteerMatch, 2021).

Importantly, the DPC also houses the Disease Intervention Specialists (DISs) in SFDPH. The DISs work directly with the public in order to improve health for individuals and for entire communities. This is done by ensuring that best possible treatment is provided to all members of the community. This initiative helps prevent the spread of many types of CDs (Population Health Division & San Francisco Department of Public Health, 2021).

Management Structure of the IDER Plan: In terms of management strategies, it is pertinent to note the Plan is compliant with two institutional mechanisms. They are:

- The State Emergency Management System (SEMS), and
- The National Incident Management System (NIMS) (Population Health Division & San Francisco Department of Public Health, 2021).

The Plan is based on the Incident Command System (ICS). The Plan gains increased significance in view of the growing realization in the USA that public health measures to prevent the IDs and virus outbreaks are especially important for ensuring better health outcomes for all in the community in the long-term (Population Health Division & San Francisco Department of Public Health, 2021). More particularly, there is need to contain diseases (i.e., the IDs) with:

- High morbidity and/or mortality, and
- Limited medical treatment (Population Health Division & San Francisco Department of Public Health, 2021).

Limited or inadequate health infrastructure needed to address the IDs that are severe in nature (like the COVID-19) is another area of concern for health officials and other stakeholders. The Plan addresses health concerns pertaining to both the IDs and the EIDs. Chart-1 depicts flow of organizational structure of the Plan. It is in the form of infectious disease emergency response structure, as envisaged in the Plan. In accordance with specific objectives of this paper, the author presents below description on management aspects of the Plan. Following six management aspects of the Plan (that are relevant in accordance with laid down scope and objectives) have been studied:

- Purpose and Mission,
- Scope,
- Assumptions,
- Structure of Plan Activation and Deactivation,
- Roles and Responsibilities, and
- Supporting Activities



Chart-1: Organizational Structure of the IDER Plan

Source: Accessed on August 7, 2021 from: <https://www.sfdcp.org/wp-content/uploads/2018/01/Visio-9.13.2010-Color-Org-Chart.IDERandDOC-id101.pdf>

Purpose and Mission: In the previous section of this research, the author has outlined the background in the context of which the Plan came into existence. In terms of objectives, the purpose of the Plan is to contain an outbreak of the IDs resulting from diseases caused by:

- An infectious agent, or
- Biological toxin (Population Health Division & San Francisco Department of Public Health, 2011).

In more specific terms, the purpose also includes responding to other ID emergencies. The Plan defines the ID emergencies as “circumstances caused by biological agents with the potential for significant illness or death in the population” (Population Health Division & San Francisco Department of Public Health, 2011). From this perspective, the ID emergencies may include:

- Naturally occurring outbreaks,
- EIDs, and
- Bioterrorism (Population Health Division & San Francisco Department of Public Health, 2011).

The author makes a specific point in this section of the research that the objective of the Plan, as outlined above, are in consistent with the mission of the San Francisco Department of Public Health (DPH). Mission of the DPH is to protect the public from (a) illness, and/or (b) death (Population Health Division & San Francisco Department of Public Health, 2011). A description on activities that may be implemented during an IDER is presented below:

- Coordination with federal agencies in responding to public health emergency,
- Development and dissemination of information,
- Public health disease containment measures,
- Co-ordination of medical care systems,
- Management of alternate care and/or shelter sites,
- Epidemiological surveillance and investigation activities, and
- Collection and analysis of data (Population Health Division & San Francisco Department of Public Health, 2011).

Scope: It has been found that in situations where an ID emergency (IDE) occurs, urgent and extensive public health and medical interventions are needed. In particular, such actions are needed in order to respond to and contain an ID outbreak (or biological threat) that has the potential for causing significant morbidity and mortality in San Francisco region. In this context, it is pertinent to note that the Communicable Disease Control and Prevention (CDCP) Section of the DPH monitors the responses and actions that are underway for the purpose of adequately and efficiently addressing the IDs (including EIDs). Importantly, it (i. e., the CDCP) routinely:

- Receives reports of cases of the IDs (with the exception of tuberculosis, HIV/AIDS, and sexually transmitted diseases);
- Conducts investigations; and
- Implements disease containment measures (Population Health Division & San Francisco Department of Public Health, 2011).

In terms of scope, the Plan is intended to be used for addressing

any IDE that requires a response that exceeds the control capacity of addressing normal diseases of the Section. It has been reported that some of the ID outbreaks and resulting health crisis situations require limited response activities. As against this, other situations may need large-scale response efforts, needing additional efforts from other agencies and stakeholders, including the IDE. The Plan includes a Core Plan (CP), which provides overall guidance for IDE. Parts of the CP can be activated and deactivated, depending on the ground situation (Population Health Division & San Francisco Department of Public Health, 2011). Activation and deactivation aspects of the Plan have been discussed in subsequent sections.

It is important to note that the Plan is not applied to address public health emergencies (PHE) that are not outcome of an infectious or biological agent. The Plan is designed to be used in accordance with the City and County of San Francisco’s Operational Area Emergency Operations Plan (EOP). Further, it is significant to note that the Plan is applied in situations where (a) DPH resources are exhausted, and/or (b) multiple city departments or agencies are involved in the required response (Population Health Division & San Francisco Department of Public Health, 2011). Furthermore, additional plans outline and define the roles and responsibilities of the DPH and other local stakeholders in responding to an IDE. The DPH is assigned with the task of supplying staff in order to (a) fill leadership roles within the response, and (b) represent the Health Department at the City and County Emergency Operations Center (EOC) (Population Health Division & San Francisco Department of Public Health, 2011).

Assumptions: From program management point of view, it would be relevant to investigate into assumptions of the Plan. Discussion on assumptions (of the Plan) forms part of the specific objectives of this research. The author states that the Plan integrates the key elements of CD control and prevention measures with emergency management concepts. A NIMS compliant ICS organizational structure is utilized to scale the response in order to effectively manage and meet the objectives of the IDER. California also requires use of the Standardized Emergency Management System (SEMS) by Government Code for the purpose of managing response to multi-agency and multi-jurisdiction emergencies in California jurisdiction. The Plan assumes that SEMS is (a) NIMS compliant, and (b) conforms to SEMS guidelines. Also, the Plan acknowledges that there are a limited number of personnel with required knowledge and training in management of the IDs (including plan for emergency preparedness) within the San Francisco DPH (Population Health Division & San Francisco Department of Public Health, 2011). Further, the Plan assumes that:

- Each incident will require tailored activation, and utilization of initiatives and responses;
- All confidential data regarding individual cases will not be shared outside; and
- Responses can be adjusted to address scenarios varying by the ID agent (Population Health Division & San Francisco Department of Public Health, 2011).

Structure of Plan Activation and Deactivation: In terms of nature of plan of activation and deactivation, it is pertinent to note that only authorized personnel are entrusted with the responsibility of directing the activation and deactivation of the of the initiatives under the Plan. Considerations envisaged in deciding matters pertaining to activation and deactivation include the followings:

- Large outbreak requiring more than routine resources;
- Possible or confirmed bioterrorism;
- Positive signal from an acknowledged environmental detector;
- First or initial case(s) of the EIDs with potential for significant illness or death,
- High profile situation involving the ID, and
- Waterborne outbreak or threat (Population Health Division & San Francisco Department of Public Health, 2011).

Activation mechanism triggers implementation of the Plan. The authorized DPH personnel take decisions to initiate activation/deactivation on the basis of parameters outlined above (Population Health Division & San Francisco Department of Public Health, 2011).

Roles and Responsibilities: With regards to roles and responsibilities, it should be noted that the DPH is the lead agency for any health or medical emergency response in the City and County of San Francisco. Within the DPH, the Communicable Disease Control and Prevention Section is the lead section for an IDER. The IDER Incident Commander has the final authority on all matters and decisions pertaining to the response for addressing the IDs. Further, there is a mechanism in place wherein the San Francisco EOC provides required support to other partnering agencies, including (a) city departments; and (b) regional, state and federal disaster response partners (Population Health Division & San Francisco Department of Public Health, 2011). Also, the EOC maintains contact and establishes networking and coordination with:

- Other local government EOCs,
- The Governor's Office of Emergency Services, and
- Homeland Security Coastal Regional Emergency Operations Center (REOC) (Population Health Division & San Francisco Department of Public Health, 2011).

Supporting Activities: The Plan also undertakes supporting activities. With regard to supporting activities, following two initiatives may be undertaken/activated (depending on the scale, nature, and scope of the disease and type of responses needed to address them):

- **Continuity of City Services:** Supporting activities may be undertaken in situations where there is reduced workforce (a) either due to an emergency requiring large numbers of responders, (b) or because of widespread illness. In such emergency situations, the Health Department and/or EOC is entrusted with the task of activating continuity of plans in order to ensure that critical city health services continue to be provided unhindered and in timely manner (Population Health Division & San Francisco Department of Public Health, 2011).

- **Health Care Surge:** In situations witnessing high prevalence of morbidity and mortality, supporting activities may be undertaken. This is because of the fact that such emergency health crisis situation may lead to an increase in public demand for health services [e.g., hospitals, clinics, and intensive care unit (ICU) beds]. It is pertinent to note that there is mechanism in place wherein hospitals anticipating (or experiencing) increased health care demands (that exceed their daily operating capabilities) are empowered to (a) activate hospital surge plans, utilizing their emergency standard operating procedures (SOPs); and (b) request assistance via the hospital incident command system (HICS) (Population Health Division & San Francisco Department of Public Health, 2011).

Lessons Learnt and Associated Challenges

The SFDPH operationalized, in the year 2006, its IDER Plan. The Plan has outlined the modality of integrating local emergency management and disease control functions during the ID emergency situations. Also, it has laid out plans for roles and responsibilities of local staff under the ICS. In terms of lessons learnt, the author of this research argues that despite several initiatives (including supporting activities) and resulting positive health outcomes, there are specific issues that the Plan need to look into, while addressing the ID emergencies. The Center for Infectious Disease Research and Policy (CIDRAP), University of Minnesota has outlined following management issues (and challenges) that the Plan should look into, while designing future plan of action (in its efforts to foster strategies for management of the IDs):

- **Variation in LHD structure:** The Plan was intended to apply to San Francisco's particular response logistics. However, other LHDs may have difficulty adapting the framework. This is because of differences in (1) surveillance, (2) laboratory, or (c) other functions (Center for Infectious Disease Research and Policy [CIDRAP] & University of Minnesota, 2021).
- **Staff hesitation and/or discomfort with ICS:** Staff may be resistant to embrace emergency response framework because of the ICS reshuffling a local health department's hierarchy or altering job responsibilities, (Center for Infectious Disease Research and Policy [CIDRAP] & University of Minnesota, 2021).
- **Overlap between disease control and emergency preparedness branch functions:** The two branches do not adequately coordinate activities on a normal basis. In this context, it is significant to note that during the ID emergency situations, expertise from both areas will be crucial and key to a response (Center for Infectious Disease Research and Policy [CIDRAP] & University of Minnesota, 2021).
- **Limited LHD staff and resources:** It has been found that there is inadequate (limited) LHD staff. Also, required infrastructure and resources, that are required during an emergency situation, are not available. Additionally, many of the local health agencies (especially those located in small and/or rural areas) have limited staff to dedicate exclusively to an emergency response situation connected with the IDs (Center for Infectious Disease Research and

Policy [CIDRAP] & University of Minnesota, 2021).



Chart-2: Suggested Model of Emergency Response Plan

Conclusions

Addressing IDs, in general, and EIDs, in particular is major challenge before health care providers. Especially, the IDs which cause high levels of mortality and morbidity place heavy burden on health care providers and health administrators, especially those located in countries and regions with inadequate health infrastructure. Some of the IDs, because of rapid and unexpected nature of their spread, can have serious global repercussions. Public health officials and organizations around the world, today, remain on high alert owing to increasing concerns about the prospect of an influenza pandemic (World Health Organization [WHO] et al., 2018). Recently detected COVID-19 outbreak is one example of how the global economy well-being of countless number of people on the earth is devastated by the IDs. It is in this very context that the initiative named the “IDER Plan of San Francisco” was implemented in the USA.

The author of this research argues that the initiatives, as per objectives and mission of the Plan, have been undertaken to prevent an outbreak of EIDs in the defined jurisdiction. The Plan has responded to pandemic and/or suspected bioterrorism incidents that threaten the public health, at large. Adequately addressing the ID emergency situations requires timely and meaningful use of public health and medical resources. The need for resources may exceed routine operations and overwhelm resources available at the local, provincial, and regional levels (Massachusetts Department of Public Health, 2020). As a part of the Plan, in San Francisco, there are several programs and activities that are dedicated to emergency preparedness. The Bioterrorism and Infectious Disease Emergencies (BIDE) Unit of the Plan is working closely with infection control professionals in San Francisco and other interested parties to address areas of common concern, including infection control and hospital preparedness for potential ID emergencies (Population Health Division & San Francisco Department of Public Health, 2011).

It is significant to note that as a part of actions needed to address the ID emergency situations, the Plan establishes the framework for incident recognition, activation (response), and coordination of the Massachusetts Department of Public Health (MDPH) and partner agency actions. This is done in response to the ID incidents having public health implications. The plan also describes the activities to ensure effective com-

munication, and ongoing planning (Massachusetts Department of Public Health, 2020). However, there are some areas in which the Plan need to strengthen its management strategies. Two key areas, identified by the author, needing improvement include:

- Co-ordination, and
- Resource availability (including human resources).

More meaningful co-ordination between participating agencies (working at different levels) and availability of resources needed to address the ID emergency preparedness are required in order to ensure better health outcomes (Dieleman & Harnmeijer, 2006). The author of this research argues that the administrators and all stakeholders involved with the Plan need to adequately address these considerations (while designing future plan of action). In addition, community mitigation should form an integral part of management strategies of the Plan that can be designed and implemented to reduce the ID transmission in the community in and around San Francisco. The author makes a specific point herewith that the ID transmission levels in the community may vary from minimal to substantial. Different mitigation activities and responses, thus, will be appropriate for different scenarios, depending on locally prevailing ground situations in the community. Importantly, as a part of emergency preparedness response, it is recommended that even during periods of minimal transmission of the IDs (including EIDs), communities should prepare for increased transmission. In addition, community mitigation activities should be tailored to match both (a) the transmission scenario, and (b) the specific community and setting (Centers for Disease Control and Prevention [CDC], 2021)). The Plan can ideally adopt the model of emergency response plan as depicted in Chart-2 (depicted in previous section this paper). Past experiences suggest that rapid case detection and timely response are two important and crucial factors in ‘preventing’ and ‘ending’ the ID outbreaks. Efficient surveillance and laboratory work, effective coordination, and strong workforce are other key considerations.

Abbreviations used (arranged alphabetically)

1. BIDE : Bioterrorism and Infectious Disease Emergencies
2. CDs : Communicable diseases
3. CDCP : Communicable Disease Control and Prevention
4. CIDRAP: Center for Infectious Disease Research and Policy
5. COVID: Coronavirus disease
6. CP: Core Plan
7. DISs: Disease Intervention Specialists
8. DPC: Disease Prevention and Control Branch
9. DPH: Department of Public Health
10. EIDs: Emerging infectious diseases
11. EOC: Emergency Operations Center
12. EOP: Emergency Operations Plan
13. HICS: Hospital incident command system
14. HIV: Human immunodeficiency virus
15. ICS: Incident Command System
16. ICU: Intensive care unit
17. ID emergencies: Infectious disease emergencies
18. IDs: Infectious diseases

19. IDE: Infectious disease emergency
20. IDER: Infectious Disease Emergency Response
21. IP: Influenza pandemic
22. IPPF: International Planned Parenthood Federation
23. IP: Influenza pandemic
24. LHD: Local health department
25. MDPH: Massachusetts Department of Public Health
26. NIMS: National Incident Management System
27. PHD, SFDPH: Population Health Division, San Francisco Department of Public Health
28. PHE: Public health emergencies
29. Plan: IDER Plan
30. REOC: Regional Emergency Operations Center
31. SARS: Severe acute respiratory syndrome
32. SEMS: State Emergency Management System
33. SOPs: Standard operating procedures
34. SEMS: Standardized Emergency Management System
35. WHO: World Health Organization

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Originality of Work

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Conflicts of Interest

The author states that there is no conflict of interest.

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