# Analysis of Stakeholder Concerns in Pandemic

Wenchang Liu [1, a], Yongchao Gao [2, b]

[1]Shanghai Qibaodwight High School, Shanghai, 20000, China;

[2] Shandong Computer Science Center, Qilu University of Technology, China.

[a] wcliu_alicia@qibaodwight.org, [b] gaoych@sdas.org

**Abstract.** Public health emergencies are not the norm in cities and have significant specificity, but they impact nearly all systems in a city. This paper analyzes the stakeholders concerns during a pandemic based on their activities and the citizens' needs during Covid-19 pandemic in a city that has the population of around 8 million people. These data are classified by real city service hotline calls. The analysis of concerns and needs of stakeholders can support city governance and help citizens live as normal a life as possible with city services in a pandemic.

**Keywords:** Public health emergency; stakeholder; city service.

## 1. Introduction

Emergency means sudden, urgent, usually unexpected occurrence or event requiring immediate action [1]. An emergency is usually a disruption or condition that can often be anticipated or prepared for, but seldom exactly foreseen. Major infectious disease is a main kind of Public Health Emergencies (PHE) that causes serious damage to public health. The International Health Regulations came into force in 2007 to manage global health emergency measures. The purpose and scope of the "Regulations" is to prevent, resist and control the international spread of diseases. Furthermore, to provide public health response measures in an appropriate way to address public health risks while avoiding unnecessary interference with international traffic and trade. At 8:30 pm on January 30th, Geneva time, 2020, World Health Organization (WHO) Director-General Tan Desai announced in Geneva that new Corona-virus pneumonia epidemic has constituted a "PHEIC" (Public Health Emergency of International Concern). This PHEIC impacts all aspect of cities and people's life around the world. Managers and citizens are responsible for the protection lives and health by changing their life and work style. To prevent and control a pandemic, city managers need to manage the concerns of the stakeholders of the city, especially the needs of the citizens.

## 2. Guiding Principles

To analyze the stakeholders' concerns in a pandemic, the following two principles are considered in which one is derived from consideration of time-dimension as emergency evolution and another is concerned to the stakeholders in a pandemic [2, 3].

— Principle 1: Covering life cycle of pandemic and individual infection

As a class of emergencies, a pandemic follows the life cycle of events from occurrence, development to recovery. Responding to and handling events can also be divided into prevention, preparation, response, and recovery stages accordingly. Individual infection also has an evolutionary life cycle, if one has been exposed to the virus, it will go through various stages from infection to recovery. The core of the life cycle would be prevention. Therefore, when developing PHE standards, the time principle of the life cycle needs to be considered. It is necessary to consider not only the occurrence, development, and recovery cycle of pandemic, but also the cycle from individual infection to recovery.

— Principle 2: pandemic management involving stakeholders and their activities

Dealing with pandemic issues require managers to consider public safety factors, need response and disposition from the city government, hospitals, other organizations, and individuals. Otherwise,

well managed public health emergencies involve smart elements including data and supporting technologies and their interoperability.

A basic structure (Fig.1) for citizen concerns analysis in a pandemic can be derived from these two principles which will be used in citizen concerns analysis.
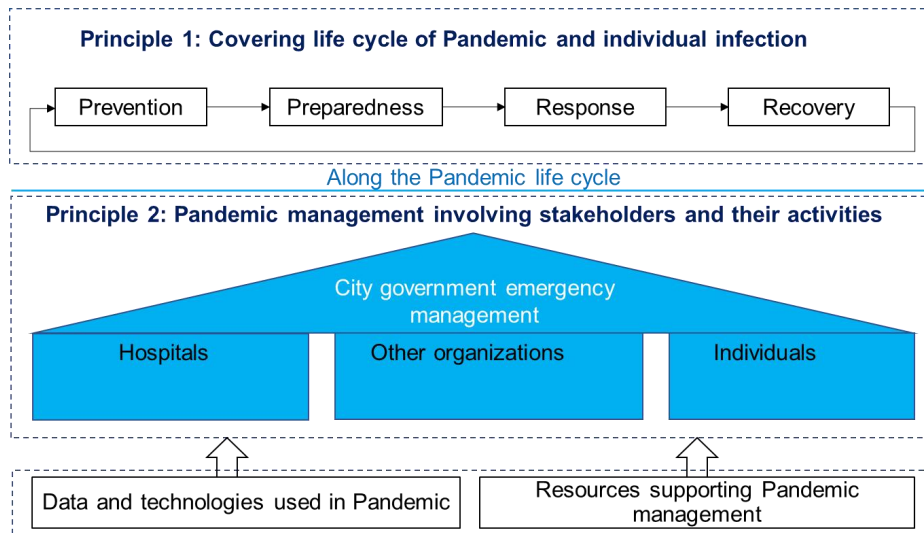


Fig. 1 A basic structure for citizen concerns analysis in a pandemic

## 3. Stakeholders Activities and Concerns in Pandemic

PHEs impacts nearly all systems in a city which facilitate the method based on use cases [4, 5] that are used for standards identification. Use cases for management of a pandemic are collected and analyzed [6]. From these use cases, the stakeholders' activities and their concerns are identified in scenarios of a pandemic. With the stakeholders' concerns, city managers would discover the solutions to prevent and control a pandemic.

Table 1. Stakeholders and their activities, concerns

| Stakeholder | Activities | Concerns |
|---|---|---|
| Citizen | · Reside in a city.<br>· Live in a community.<br>· Own health code.<br>· Take public transport.<br>· Drive private transport.<br>· Take infectious disease testing.<br>· Inquire about testing result.<br>· Work in an organization.<br>· Study at / Graduate from a school/university/college.<br>· Eat at a restaurant/café/canteen. | Safe and secure living space |
| Visitor | · Travel from a city to another city. | Whether a public health event occurred in the passing area or there are confirmed cases |
| Isolated individual | · Isolate at a hotel/community. | Basic living security and the time required for isolation |
| Patient | · Has disease.<br>· Has disease symptom.<br>· See doctor at a clinic/hospital. | Treatment effect and cost |

| | · Be hospitalized.<br>· Take medicine.<br>· Take medical examination.<br>· Take medical operation.<br>· Schedule a medical appointment.<br>· Use medical Insurance.<br>·  Pay medical bills. | |
|---|---|---|
| Government | · Manage subordinate organizations.<br>· Provide government services.<br>· Publish law/policy/measure. | Comprehensive ability to respond to emergencies |
| Public health department | · Manage medical organizations.<br>· Publish infectious case reports.<br>· Take measures to control epidemic.<br>· Collect and analyse epidemic-related data.<br>· Predict epidemic development.<br>· Coordinate and allocate medical resources.<br>· Redeploy medical personnel.<br>· Publish itinerary of confirmed cases.<br>· Track close-contact person.<br>· Identify vulnerable people.<br>· Identify at-risk areas.<br>· Notify eligible people to get a vaccine.<br>· Promote vaccines to people.<br>· Track Adverse Events Following Immunization.<br>· Focus on people's mental health.<br>· Investigate cause of food poisoning incidents.<br>· Monitor hospital beds usage.<br>· Decide to build mobile, temporary hospitals.<br>· Recruit and train epidemic prevention volunteers.<br>· Take health quarantine for public places. | Comprehensive capacity to respond to a pandemic |
| Transportation department | · Manage city transport.<br>· Manage travel.<br>· Manage emergency supplies transportation.<br>· Lock down areas with high-level epidemic risk.<br>· Set up special vehicles for medical personnel.<br>· Set up site to check people and vehicles from other cities. | Pedestrian management and trajectory tracking |
| Financial department | · Distribute financial subsidies to affected person/organization. | Financial capacity to deal with emergencies |
| Public safety department | · Investigate willful public health emergencies. | Comprehensive capacity to investigate a pandemic |
| Environmental | ·  Deal with urban environmental pollution. | A green and healthy ecological |

| protection department | · Assist in investigating environmental pollution factors of public health emergencies. | environment |
|---|---|---|
| Hospital | · Pre-test patient about infectious disease.<br>· Provide medical service.<br>· Provide infectious testing.<br>· Provide vaccination.<br>· Report infectious case to public health department.<br>· Order and receive medical resources and equipment.<br>· Sell medical resources.<br>· Pick up patients. | Effective treatment of infected patients |
| Clinic | · Sell medical resources.<br>· Order and receive medical resources and equipment.<br>· Provide basic medical service. | Basic medical capabilities |
| Pharmacy | · Sell medical resources.<br>· Order and receive medical resources and equipment. | Provide medical resources to help patients treat diseases |
| Medical personnel | · Treat patients.<br>· Perform medical activities.<br>· Diagnose the patient's condition<br>· Develop vaccine and medicine against infectious disease. | Medicines, vaccines, and other medical equipment to respond to PHE |
| Epidemic prevention personnel | · Disinfect public places.<br>· Maintain the order of people in line for vaccination or testing.<br>· Assist in distributing epidemic prevention materials.<br>· Promote epidemic prevention measures. | The ability to eliminate bacteria and viruses for epidemic prevention |
| Medical resource manufacturer | · Produce medical resources and equipment.<br>· Sell medical resources and equipment. | Producing medical equipment to help stakeholders respond to a pandemic |
| Laboratory | · Test the sample and specimen.<br>· Test swab. | Ability to test samples quickly and accurately |
| Cafe/Restaurant/Canteen | · Provide catering services.<br>· Order food.<br>· Accept health quarantine. | Customer's health information |
| Logistics provider | · Ship medical resources and equipment. | Traffic control policies in different areas |

## 4. Reale needs statistic from city service hotline in the city

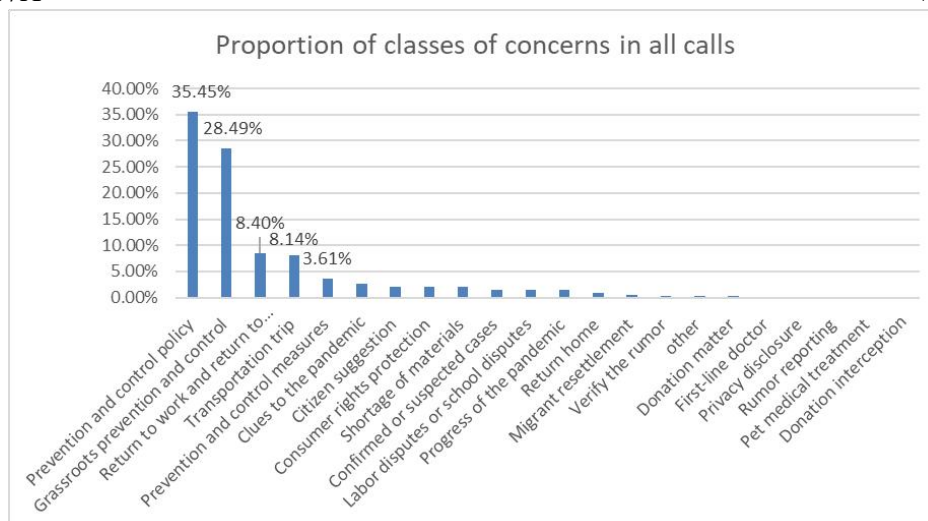In some months of 2020, the service hotline received nearly 16,2410 calls.

Fig. 2 Proportion of classes of concerns in all calls

From Fig. 2, most citizens in a city are concerned about the Prevention and Control Policy and Grassroots prevention and control. The city government and public health department should keep polices and any changes transparently to the citizens. Hence the citizens will understand the way to keep themselves away from infections.

Return to work and return to school and Transportation trip are mostly relevant to citizens' work and life in a city.

The calls under separate classes are also being collected in more detailed classifications and shown in Fig. 3. With the analysis of citizens' concerns, the city government and related departments in a city know what the key aspects that they need to focus urgently and the corresponding method to deal with the citizens' concerns. For instance, in the Prevention and Control Policy, citizens are highly concerned about the Quarantine registration. In a pandemic, Quarantine registration is the most useful treatment to escape large-scale propagation.
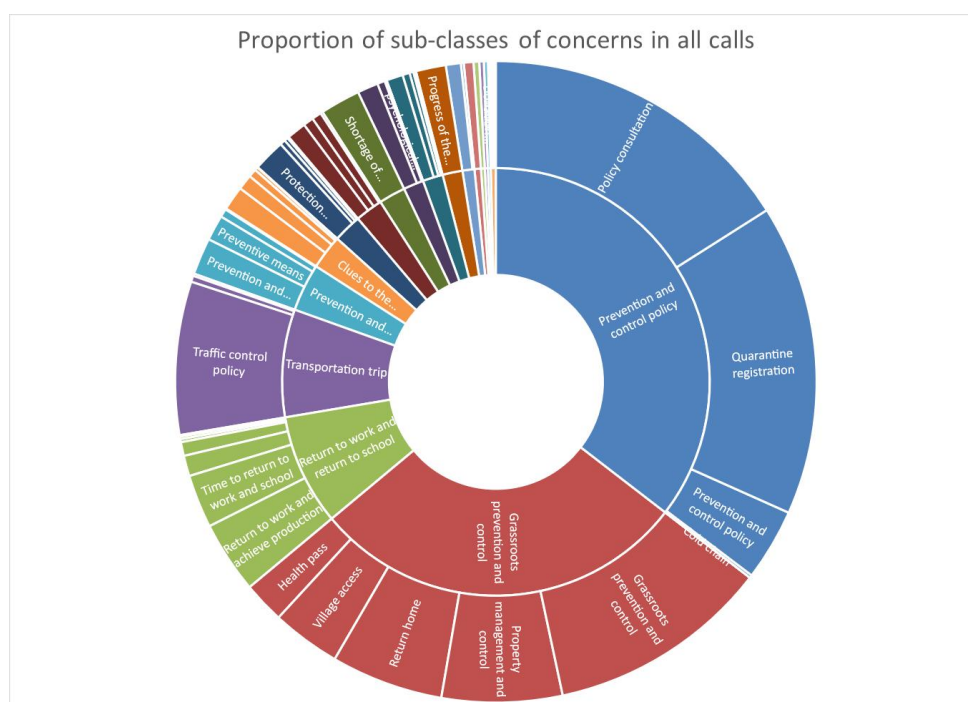


Fig. 3 Proportion of sub-classes of concerns in all calls

## 5. Summary

Public health emergencies, such as pandemics, affect various stakeholders in cities with different concerns and responsibilities. In this paper, the concerns of different stakeholders in a city are analyzed, especially the aspects that citizens pay the most attention to when facing a pandemic. This could provide decision-making basis for city managers. In order to ensure the health and normal life and work of citizens, city managers should work together with other stakeholders in the city, prioritizing the needs of citizens and carrying out grassroots urban governance. Only in this way can the practical problems that citizens care about could be solved and the quality of life and the rate of happiness can be improved.

## References

[1] ISO 22320:2021 Security and resilience — Emergency management — Guidelines for incident management

[2] Smart public health emergency management and ICT implementations. U4SSC (United for Smart Sustainable Cities), 2021.

[3] IEC SRD 63233-1:2022 Smart city standards inventory and mapping - Part 1: Methodology

[4] IEC TR 62559-1:2019 Use case methodology — Part 1: Concept and processes in standardization

[5] IEC 62559-2:2015 Use case methodology — Part 2: Definition of the templates for use cases, actor list and requirements list

[6] Gao Yongchao, Wang Qiuyue and Fox Mark. Use Cases and Competency Questions for the Management of Public Health Emergencies. Technical Report, Urban Data Centre, School of Cities, University of Toronto, Canada, March 3, 2022.