HEALTH CARE MANAGEMENT

Pandemic influenza preparedness plan in Liguria, Italy: a valuable tool for Public Health

DANIELA AMICIZIA[1,2,3], IRENE SCHENONE[2], CAMILLA STICCHI[2], FEDERICO GRAMMATICO[2], MATTEO ASTENGO[2], ALBERTO BATTAGLINI[2], FRANCESCA MARCHINI[2], MARIA FRANCESCA PIAZZA[2], SILVANO RUFFONI[2], GIOVANNI BATTISTA ANDREOLI[2], FILIPPO ANSALDI[1,2,3]

[1] Department of Health Sciences, University of Genoa, Italy; [2] Regional Health Agency of Liguria (Azienda Ligure Sanitaria - A.Li.Sa.), Genoa, Italy; [3] CIRI-IT, University of Genoa Italy

Keywords

Influenza • Epidemiological surveillance • Pandemic preparedness • Influenza pandemic plan

Summary

As known, influenza presents a multifaceted challenge to public health, causing disease that ranges from mild cases to severe pandemics with significant morbidity and mortality. Effective pandemic preparedness demands a comprehensive strategy that integrates research, surveillance, response coordination and community engagement, to mitigate the impact of future health emergencies. The pandemic preparedness cycle involves dynamic, cyclical phases of preparation and response aimed at enhancing response capacity. Italy's 2021-2023 National Strategic-Operational Plan for Pandemic Influenza (PanFlu) incorporates lessons learned from past pandemics and serves as a framework for regional plans, such as Liguria's. The Ligurian plan delineates governance structures, surveillance strategies, healthcare services and communication measures necessary for effective pandemic management. It emphasizes the need to strengthen links between emergency structures, to avoid duplication and to adopt flexible approaches to scale actions appropriately and highlights the need for risk/benefit analysis to support evidence-based decision-making as well as clear guidance on data collection and communication activities. By integrating these elements, the region's overall readiness and resilience against influenza pandemics are expected to be reinforced.

Introduction

Influenza, a leading cause of upper and lower respiratory tract infections, holds significant epidemiological, clinical and socioeconomic implications for public health [1]. The seasonal epidemic trend of influenza is well-documented and the disease ranges from mild, self-limiting forms to acute respiratory conditions requiring hospitalization and, in critical cases, assisted ventilation [2].

There are four types of viruses (A, B, C, and D), with A and B causing acute disease in humans. Type A viruses, which are capable of major antigenic shifts, have been responsible for severe global pandemics and, as they cause high levels of morbidity and mortality, have the potential to pose a significant health risk and disrupt the community both socially and economically [3].

Both type A and, to a lesser extent, type B, can accumulate mutations, leading to variations in surface glycoproteins and resulting in the emergence of immunologically distinct viral strains (antigenic drift). Consequently, seasonal epidemics recur, and vaccines need to be updated according to the circulating mutated strain [4].

While type C viruses cause sporadic human cases, the more recently identified type D viruses infect swine and cattle; their involvement in human infections is unclear [5], though a study on human serum samples found an increase in the prevalence of antibodies against virus D following epidemics in animals [6].

Given its mutable nature and pandemic history, influenza poses a significant threat to all of us. Indeed, experts predict that a major influenza pandemic is likely to occur in the future, prompting global efforts in pandemic preparedness [7]. Moreover, the World Health Organization (WHO) has noted that the pandemic risk has increased, owing to population growth, closer human-animal proximity, and more frequent travel. Thus, in addition to establishing definitions to classify pandemic phases, since the late 1990s the WHO has urged member countries to develop pandemic response plans [8, 9].

Three major influenza pandemics occurred in the 20th century: in 1917, 1957 and 1968. The latest influenza pandemic, in 2009-2010, and the COVID-19 pandemic have further highlighted the ongoing risk and the unpredictability of pandemic events, emphasizing the need for comprehensive preparedness at local, national and global levels. The availability of a pandemic response plan offers the opportunity to strengthen preparations for the management of influenza and similar health threats. Coordinated regional actions and national communication are essential during a pandemic, as emphasized by the European Centre for Disease Prevention and Control [10].

A pandemic vaccine is crucial to reducing the impact of the disease, alongside interventions such as hand hygiene and the use of personal protective equipment, the primary goal being to prevent severe and complicated forms

of influenza and reduce premature mortality among individuals at risk of severe disease [11]. Moreover, several antiviral drugs that reduce symptom duration, infectious complications and influenza-associated mortality are available [12] and can be stocked by governments for use in the event of a pandemic.

Recently, Italy drew up its 2021-2023 National Strategic-Operational Plan for Pandemic Influenza (PanFlu) to replace previous pandemic influenza plans. Since then, each region, including Liguria, has had to contextualize the national document and formulate its own regional pandemic influenza plan. Here, we briefly present Liguria's regional pandemic influenza preparedness plan. Although not updated before COVID-19, it has now undergone revisions to address the ongoing risk and enhance regional readiness for future pandemics.

Influenza preparedness

In recent decades, there has been an increase in both smaller-scale outbreaks and large-scale pandemics caused by emerging infectious diseases, and scientists anticipate a rise in such events in the coming years [13]. Some evidence suggests that the probability of another pandemic occurring within our lifetime is about 17% and may increase to 44% within the next couple of decades [14].

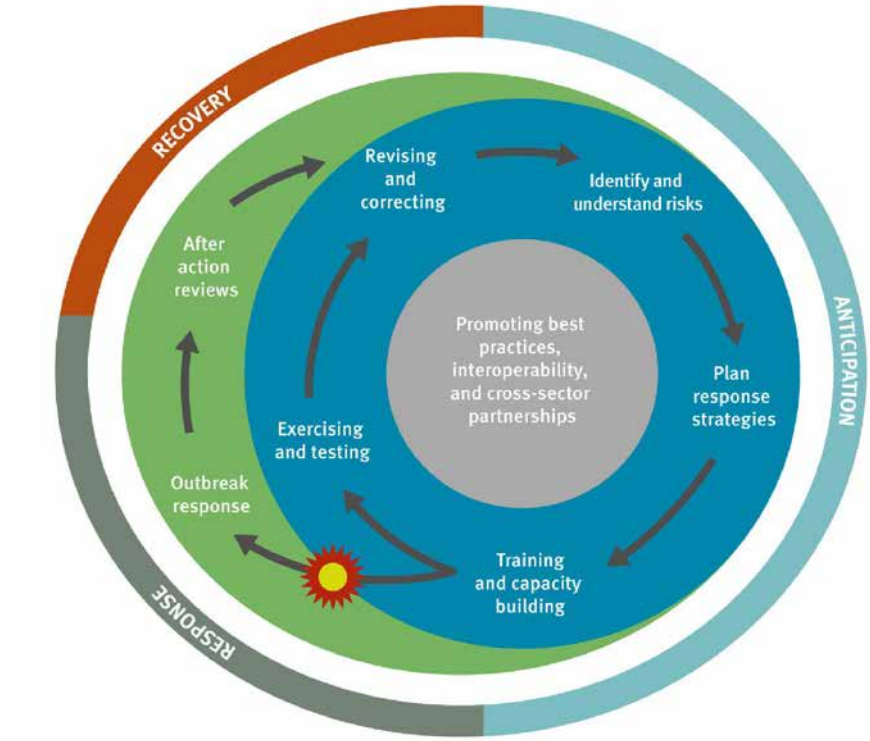
Hospitals and health professionals are accustomed to dealing with emergencies every day. However, sudden surges in the number of people seeking help, either from mass-casualty events or from outbreaks of infectious disease, are challenging to manage. Therefore, all hospitals and health agencies have established emergency plans to deal with such events. The possibility of a pandemic adds an extra dimension to emergency planning, potentially affecting the whole of society and requiring national coordination.

The WHO has initiated a global scientific process to update the list of priority pathogens/agents that can cause outbreaks or pandemics, in order to guide global investment, research and development, especially with regard to vaccines, tests and treatments. Targeting priority pathogens and virus families for research and the development of countermeasures is essential for a rapid and effective epidemic and pandemic response [15], although researchers agree that it is difficult to determine what pathogen will cause the next pandemic [16].

A pandemic will increase the demand for specialist skills, particularly in acute care, emergency medicine, patient transport services and intensive care, and will require dedicated staff, such as anaesthetists, emergency medicine specialists and intensive care nurses. There could also be an increased demand for specialist equipment, such as extracorporeal membrane oxygenation (ECMO). In the event of a pandemic, the demand for basic healthcare will also rise.

Pandemic preparedness, tailored to infectious disease emergencies of interest to Public Health, includes activities aimed at minimizing the risks posed by infectious diseases and mitigating their impact during a public health emergency, regardless of the extent of the event (local, regional, national, international). The pandemic preparedness cycle is a dynamic, cyclical

Fig. 1. Pandemic preparedness cycle from ECDC.



Tab. I. The main activities of the preparedness and response phases.

PREPAREDNESS	Interpandemic	• Definition of operational agreements/procedures for the development and maintenance of the plan • Apply sound strategies for the identification and management of pandemic influenza • Ensure ready availability for quick response • Monitor the emergence of diseases with pandemic potential, and investigate possibile outbreaks • Training of healthcare workers
RESPONSE	Alert	• Identify and characterize the nature of the disease, confirm the design of its governance • Train health workers • Communicate and raise awareness
	Pandemic	• Initial activities (when information about the disease is scarce): - Prepare and support the Regional Health System (SSR) - Manage initial cases - Identify and characterize the virus circulating in the area - Provide information to support best healthcare practices and enable the community and healthcare workers to manage their risk of exposure - Support effective governance • Targeted activities (when you have enough information about the disease to take specific measures): - Support and maintain quality care - Ensure an adequate response based on the pandemic phase - Provide a coordinated and coherent approach - Conduct immunization interventions with the pandemic vaccine preparation - Communicate to engage, empower and build trust in the community
	Transition	• Support and mantain quality care • Cessation of activities no longer necessary and transition to pre-emergency • Monitor a potential second wave of the epidemic • Monitor the development of antiviral resisteance • Communicate effectively • Evaluate systems and review plans and procedures

pathway of preparation for and response to emergencies. It involves the implementation of specific activities in the various pre- and post-emergency phases in order to improve response capacity (Fig. 1).

This continuous cycle is part of a broader system of prevention, response, recovery and mitigation of the emergency event. In each country, planning, coordination, timely diagnosis, assessment, investigation, response, and communication skills are required during a public health infectious emergency [17]. Indeed, pandemic preparedness requires comprehensive efforts right from the earliest stages of research to enable the effective development of countermeasures, monitor pandemic threats and coordinate the pandemic response in real time. Influenza pandemics are characterised by the global spread of a novel type of virus and may cause unusually high morbidity and mortality for an extended period [18]. A severe pandemic can overwhelm the resources of a society, owing to the exceptional number of people affected. However, it is crucial that action be initiated during non-pandemic times, as this enables a more effective response in subsequent phases of emergency [19]. The WHO defines four phases of the progression of an epidemic: inter-pandemic, alert, pandemic and transition phases. Each phase involves specific activities and responses.

In the inter-pandemic phase, normal epidemiological surveillance of influenza-like syndromes and influenza virology activities are expected. In the alert phase, once a new subtype of influenza virus has been identified in humans, higher levels of epidemiological and virological surveillance and careful risk assessment are required. If a potentially pandemic strain is not detected, such activities may be stepped down to the level of the inter-pandemic phase.

The transition between the inter-pandemic, alert and pandemic phases may occur rapidly or gradually, as indicated by global risk assessment, which is primarily based on virological, epidemiological and clinical data. The pandemic phase corresponds to the period of global spread of human influenza caused by a new subtype and requires precise actions.

The transition phase occurs with the decrease in global risk, and allows a de-escalation of actions, a reduction in national epidemic response activities and a shift towards recovery actions, based on country-specific risk

assessments. Table I reports the main activities, broken down by phases.

The COVID-19 pandemic revealed the need for clear, consistent, and reliable communications, especially in periods when misinformation goes viral. If people refuse vaccines or ignore public-health safety precautions, all other preparations become ineffectual. Thus, in order to ensure an effective, coordinated response to the next pandemic, it is necessary to foster public trust in the authorities that manage pandemic responses and in scientific and medical leaders. Those in power must therefore implement better, clearer and more coordinated communications than they did during the COVID-19 pandemic. Equally important is gaining broad agreement among policymakers that responding to public health crises requires working in partnership. The building of trust requires funding, commitment, intention and time, and must begin immediately if there is to be an effective response to the next pandemic [20, 21].

The impact of a pandemic on the community depends on factors such as clinical severity, transmissibility, and the healthcare system's ability to respond efficiently. Planning and coordination are therefore crucial to ensuring an effective response [22, 23]. In this context, the State-Regions Conference, in its session of January 25, 2021, sanctioned the agreement between the Government, the Regions and the autonomous Provinces of Trento and Bolzano on the national strategic-operational plan for preparation and response to an influenza pandemic (PanFlu 2021-2023) [24].

The overall goal of the Pandemic Influenza Plan is to enhance preparedness at the national and local levels so to protect the population, healthcare workers, essential services and economic activities. The plan updates and replaces previous Pandemic Influenza Plans and was prepared in conformity with the WHO recommendations. At the national level, it is based on the 2020-2025 National Prevention Plan and the 2017-2019 National Vaccine Prevention Plan.

To implement the plan, an extensive multidisciplinary and multi-sector institutional working group was formally established. Subsequently, considering the lessons learned from the 2009 pandemic and the COVID-19 pandemic, the document was collectively re-evaluated and revised by the main actors involved. This activity produced the final form of the document [24].

The 2021-2023 Pandemic Influenza Plan identifies the key actions to be implemented in the various operational areas over three years and defines the roles and responsibilities of the National Health Service in preparing for and responding to an influenza pandemic. This plan focuses on preparing for pandemic scenarios caused by influenza viruses. Four scenarios are envisaged: $Rt < 1$, $Rt = 1$, $Rt > 1.4$, $Rt > 1.7$.

This is an innovative, transitional plan that operates within a pandemic context in which international guidelines for pandemic preparedness are evolving; it therefore sets up new networks and introduces new ways of working. The regional pandemic plans derived from it are also recent.

The Liguria Region's plan is based on the recommendations laid down in the national plan [25]. The experience gained during the health emergency caused by COVID-19 constituted the basis of the regional plan to prepare the response to an influenza pandemic. To support decision-makers, the document specifies the key public health measures to be applied in Liguria during the various phases.

Since knowledge of any new influenza virus will be acquired over a variable timeframe, and the epidemiological scenario will be influenced by both the evolution of the epidemiological framework and the availability of new vaccines and effective technologies for detecting the new pathogen, these areas of primary interest will be periodically reviewed in order to ensure updated and comprehensive information.

Among the actions recommended, the epidemiological surveillance of influenza syndrome cases plays a crucial role in monitoring the pandemic's impact on the population and its evolving characteristics. This involves adopting the most effective control measures and assessing their efficacy. Equally important are the utilization and enhancement of the regional health system (RHS) and governance mechanisms and the exploitation of existing systems of prompt response to seasonal influenza.

The key principles guiding the plan are: (i) the strengthening of links between all the structures dedicated to emergencies by capitalizing on existing systems and avoiding unnecessary duplication; (ii) application of the plan in case the burden on healthcare facilities due to seasonal influenza increases), in order to preserve the RHS; (iii) the adoption of a flexible approach, whereby actions are scaled according to the phases and modulated to adapt to contingent needs; (iv) the implementation of risk/benefit analysis of the main public health measures that could be applied during the pandemic phase to support "evidence-based" decision-making; (v) the adoption of clear and detailed guidance on the collection of epidemiological and virological surveillance data, with particular emphasis on communication as a major component of response management.

A One Health approach to surveillance includes a dedicated focus on pathogens in wildlife, livestock and pets. Such surveillance provides early warnings of pathogens that have a pandemic potential and which could jump from animals to humans. In this regard, comprehensive monitoring systems need to provide accurate, timely and comprehensive information [26].

To support an integrated and coordinated response, the plan provides guidance on the roles and responsibilities of key health sectors. Additionally, it constitutes a reference for decision-makers and will be used to develop local operational plans.

Ligurian Plan

The regional technical committee for the "Strategic Operational Plan for the Preparation and Response to an Influenza Pandemic (PanFlu) 2021-2023" was established (A.Li.Sa. Resolution N° 165/2021) to contextualize the

actions to be implemented in Liguria and to draw up the regional influenza planning document [25].
Through A.Li.Sa. (Ligurian Health Agency), Liguria Region conducts activities of coordination and guidance for the various local health agencies (Aziende Sanitarie Locali, ASL), which are responsible for providing services throughout the Region in accordance with common guidelines. Additionally, it makes use of the activities of the Inter-Agency Regional Department (D.I.A.R.), which serves as the organizational tool for strategic planning, inter-organization integration and various activities of healthcare and social assistance.
The Regional Pandemic Committee coordinates the activities outlined in the 2021-2023 National Strategic Operational Plan for the Preparation and Response to an Influenza Pandemic (PanFlu) at the local level through constant cooperation with the Health Directors and General Directors of the Health Agencies.
For each phase, macro-areas of action, references, and types of activities have been defined, including governance, epidemiological and virological surveillance, preventive healthcare services, territorial healthcare assistance services, clinical management, hospital healthcare services, infection prevention and control measures, training and communication activities, and research and development [26].
After the adoption of Liguria Regional Plan, revision phases are expected. The preparedness cycle is a dynamic, cyclical process of preparation and response to emergencies and involves specific activities aimed at enhancing readiness in various pre- and post-emergency phases [12]. The WHO defines readiness as the ability to respond promptly and effectively to emergencies by implementing previously prepared actions. A simulation exercise, as defined by the European Centre for Disease Prevention and Control, is an activity guided by an evolving scenario, designed to practice the response, or elements of response, to an emergency event. PanFlu simulations are therefore carried out within the preparedness cycle. These simulation exercises are integral to the preparedness cycle, with the objective of assessing the 2021-2023 strategic-operational plan for preparation and response to an influenza pandemic.
The "Mosaico" simulation exercise is the first national, pandemic and public health simulation exercise of its kind in Italy and is expected to yield valuable insights for the future. Between January 16 and 19, 2023, the first of two simulation exercises (SIMEX), "Mosaico", took place, involving regional delegates, including those from Liguria. This was a national command-post simulation exercise (also known as functional) which enabled participants to remotely access and test existing systems, such as communications and computer tools. The goal of the simulation was to test the mechanisms for activating pandemic alerts and the functions of situation analysis and risk assessment. The "Mosaico" exercise allowed protocols to be revised and will result in a revision of the plan itself.
International guidelines for pandemic preparedness are evolving, with the WHO shifting its focus from influenza to respiratory pathogens. Although PanFlu remains valuable even in the event of pandemics caused by other X viruses, given the many overlaps, protocols are expected to evolve according to this new focus.

Conclusions

In conclusion, effective pandemic preparedness requires a comprehensive approach, ranging from the initial stages of research for the development of countermeasures to the continuous monitoring of potential pandemic threats and real-time coordination of response efforts.
Enhancing pathogen surveillance and monitoring is crucial for enabling early warnings and timely interventions The surveillance infrastructure should facilitate accurate, rapid and harmonised global reporting of data concerning novel viruses. As seen in the case of the COVID-19 pandemic, the benefits of global collaboration and data sharing around an emerging virus must be preserved and strengthened.
Epidemic risk monitoring will be achieved through the integration of surveillance systems that deal with epidemiological and virological data, healthcare service-related flows and positive-case mapping.
Proactive measures during non-pandemic periods are imperative to ensure a more robust response during emergencies. Accurate planning for primary healthcare, hospital response, the procurement of personal protective equipment, and comprehensive training and communication strategies is fundamental. Many of the recommendations may also apply to local and regional responses to other health emergencies, from smaller-scale disease outbreaks to biosecurity threats and weather-related catastrophes.

Conflict of interest statement

The authors declare that they have no commercial or financial relationships that could be construed as a potential conflict of interest.

Data availability statement

Not applicable.

Authors' contributions

FA and DA conceived and supervised the work. The review of international, national and regional documents was carried out by DA and IS. MA, AB, FG, FM and IS wrote the first draft of the manuscript. DA and IS had the final responsibility for the decision to submit for publication. All authors reviewed and edited the manuscript, contributed to the article and approved the version submitted.

References

[1] Calabrò GE, Boccalini S, Panatto D, Rizzo C, Di Pietro ML, Abreha FM, Ajelli M, Amicizia D, Bechini A, Giacchetta I, Lai PL, Merler S, Primieri C, Trentini F, Violi S, Bonanni P, de Waure C. The new Quadrivalent Adjuvanted Influenza Vaccine for the Italian elderly: a health technology assessment. Int J Environ Res Public Health 2022;19:4166. https://doi.org/10.3390/ijerph19074166.

[2] Gasparini R, Amicizia D, Lai PL, Panatto D. Influenza vaccination: from epidemiological aspects and advances in research to dissent and vaccination policies. J Prev Med Hyg 2016;57:E1-4.

[3] Taubenberger JK, Morens DM. Influenza: the once and future pandemic. Public Health Rep 2010;125(Suppl 3):16-26.

[4] Kim H, Webster RG, Webby RJ. Influenza Virus: Dealing with a Drifting and Shifting Pathogen. Viral Immunol 2018;31:174-83. https://doi.org/10.1089/vim.2017.0141.

[5] Trucchi C, Paganino C, Amicizia D, Orsi A, Tisa V, Piazza MF, Icardi G, Ansaldi F. Universal influenza virus vaccines: what needs to happen next? Expert Opin Biol Ther 2019;19:671-83. https://doi.org/10.1080/14712598.2019.1604671.

[6] Trombetta CM, Marchi S, Manini I, Kistner O, Li F, Piu P, Manenti A, Biuso F, Sreenivasan C, Druce J, Montomoli E. Influenza D Virus: Serological Evidence in the Italian Population from 2005 to 2017. Viruses 2019;12:30. https://doi.org/10.3390/v12010030.

[7] Dzau V, Yadav P. The influenza imperative: we must prepare now for seasonal and pandemic influenza. Lancet Microbe 2023;4:e203-e205. https://doi.org/10.1016/S2666-5247(23)00013-7.

[8] Spernovasilis N, Markaki I, Papadakis M, Tsioutis C, Markaki L. Epidemics and pandemics: Is human overpopulation the elephant in the room? Ethics Med Public Health 2021;19:100728. https://doi.org/10.1016/j.jemep.2021.100728.

[9] WHO. Available at https://www.who.int/health-topics/health-security#tab=tab_1 (Accessed on: 1/12/2023).

[10] European Centre for Disease Prevention and Control. Pandemic influenza. Available at: https://www.ecdc.europa.eu/en/pandemic-influenza (Accessed on: 11/12/2023).

[11] Fauci AS. Pandemic influenza threat and preparedness. Emerg Infect Dis 2006;12:73-7. https://doi.org/10.3201/eid1201.050983.

[12] WHO. Pandemic influenza. Global Influenza Programme. Pandemic influenza preparedness. Available at: https://www.who.int/teams/global-influenza-programme/public-health-preparedness (Accessed on: 11/12/2023).

[13] Williams BA, Jones CH, Welch V, True JM. Outlook of pandemic preparedness in a post-COVID-19 world. NPJ Vaccines 2023;8:178. https://doi.org/10.1038/s41541-023-00773-0.

[14] Marani M, Katul GG, Pan WK, Parolari AJ. Intensity and frequency of extreme novel epidemics. Proc Natl Acad Sci USA 2021;118:e2105482118. https://doi.org/10.1073/pnas.2105482118. Erratum in: Proc Natl Acad Sci USA 2023;120(12):e2302169120.

[15] WHO. WHO to identify pathogens that could cause future outbreaks and pandemics. Available at: https://www.who.int/news/item/21-11-2022-who-to-identify-pathogens-that-could-cause-future-outbreaks-and-pandemics (Accessed on: 11/12/2023).

[16] Williams BA, Jones CH, Welch V, True JM. Outlook of pandemic preparedness in a post-COVID-19 world. NPJ Vaccines 2023;8:178. https://doi.org/10.1038/s41541-023-00773-0.

[17] European Centre for Disease Prevention and Control. Why is pandemic preparedness planning important? Available at: https://www.ecdc.europa.eu/en/seasonal-influenza/preparedness/why-pandemic-preparedness (Accessed on: 2/12/2023).

[18] Oshitani H, Kamigaki T, Suzuki A. Major issues and challenges of influenza pandemic preparedness in developing countries. Emerg Infect Dis 2008;14:875-80. https://doi.org/10.3201/eid1406.070839.

[19] Dzau V, Yadav P. The influenza imperative: we must prepare now for seasonal and pandemic influenza. Lancet Microbe 2023;4:e203-e205. https://doi.org/10.1016/S2666-5247(23)00013-7.

[20] Creating a Communication Strategy for Pandemic Influenza. Creating a Communication Strategy for Pandemic Influenza. Available at: https://www.paho.org/en/file/25285/download?token=OFlngfvy (Accessed on: 11/12/2023).

[21] WHO. Outbreak communication: Best practices for communicating with the public during an outbreak. Available at: https://www.who.int/publications/i/item/outbreak-communication-best-practices-for-communicating-with-the-public-during-an-outbreak (Accessed on: 11/12/2023).

[22] Ridenhour B, Kowalik JM, Shay DK. Unraveling R0: considerations for public health applications. Am J Public Health 2014;104:e32-41. https://doi.org/10.2105/AJPH.2013.301704.

[23] Tan X, Yuan L, Zhou J, Zheng Y, Yang F. Modelling the initial transmission dynamics of influenza A H1N1 in Guangdong Province, China. Int J Infect Dis 2013;17:e479-84. https://doi.org/10.1016/j.ijid.2012.11.018.

[24] Minister of Health. Pandemic Influenza Plan 2021-2023. Available at: https://www.salute.gov.it/imgs/C_17_pubblicazioni_3005_allegato.pdf (Accessed on: 11/12/2023).

[25] Delibera di Giunta regionale n. 139/2022. "Approvazione Piano Regionale di preparazione e risposta ad una pandemia influenzale (PanFlu) 2021-2023". Available at: https://decretidigitali.regione.liguria.it/ArchivioFile/AMM2022139/REG_AMM_A_139_2022.pdf (Accessed on: 20/03/2024).

[26] US Centers for Disease Control and Prevention. One Health. Available at: https://www.cdc.gov/onehealth/index.html (Accessed on: 12/12/2023).

Received on December 14, 2023. Accepted on May 9, 2024.

Correspondence: Irene Schenone, Piazza della Vittoria 15 16121 Genova (GE), Italy. E-mail: irene.schenone@alisa.liguria.it

How to cite this article: Amicizia D, Schenone I, Sticchi C, Grammatico F, Astengo M, Battaglini A, Marchini F, Piazza MF, Ruffoni S, Andreoli GB, Ansaldi F. Pandemic influenza preparedness plan in Liguria, Italy: a valuable tool for Public Health. J Prev Med Hyg 2024;65:E245-E250. https://doi.org/10.15167/2421-4248/jpmh2024.65.2.3146