Under the Weather

A Rapid Forecast Exploring the Futures of Global Pandemics

Prepared by
VISION FORESIGHT STRATEGY LLC
The rise and fall of pandemic outbreaks may be determined by evolving issues such as gene editing technology, health discrimination, and shifting cultural attitudes towards disease.

**SUMMARY**

COVID-19 has captured the world’s attention, but the way it has spread, and the hysteria it has evoked is not unlike that of previous pandemics and global health crises. As the situation unfolds, VFS has generated a quick forecast to generate forward-looking conversations around how the future could unfold, and how various trends, emerging issues, and stabilities might influence those outcomes.

**HIGHLIGHTS**

- Pandemics have shaped history, often influencing policy, culture, and social norms.
- Trends such as increased urbanization, decreased air quality, and climate change are factors in the increasing number of pandemic crises forecasted for the future.
- Advancing biotechnologies may provide treatment and prevention options in the future and may result in unforeseen and unintended consequences.
- Poorer populations are more vulnerable during pandemic outbreaks, their high rates of infection may prompt health discrimination due to widespread misinformation.
- Cultural forgetting during times of peace have historically resulted in cyclical patterns, could we one day become desensitized to disease?

**SCENARIOS**

1. **Lessons Unlearned** (continuity): The world’s experience with pandemics is a recurring cycle of crisis, institutional change, losing interest over time, then crisis, institutional change, etc.
2. **Responding to Change... Kind of** (incremental change, low disruption): With successive – and more frequent – outbreaks, society gradually improves its preparation for and response to health emergencies.
3. **The Untouchable Generation** (incremental change, high disruption): Fear and mass hysteria follow a surge of deadly pandemics, and misinformation allows for discriminatory practices to become the norm.
4. **The Novel Zoonotic Viral Future** (abrupt, disruptive change): Digital/bio tools permit much better response to outbreaks, which unintentionally accelerates the evolution of disease.
Before Forecasting

In order to develop grounded forecasts, it is important to critically analyze the history of our topic, while also assessing the current state of affairs. This allows us to best orient ourselves in order to define distinct, logical scenarios that will help us to better explore what the future could look like.

"Those who cannot remember the past are condemned to repeat it." - George Santayana
History

Pandemics have been documented as early as 430 B.C and have had devastating effects throughout history. Despite this, these diseases have resulted in some of the most revolutionary biomedical advances that have shaped our society. Some of the most notable pandemics throughout history include:

1. 11th Century: Leprosy
2. 1350: The Black Death
3. 1665: The Great Plague of London
4. 1817: First Cholera Pandemic
5. 1855: The Third Plague Pandemic
6. 1918: Spanish Flu
8. 2003: SARS
9. 2014: Ebola
10. 2020: COVID-19

Risk Factors and Drivers

Pandemics are driven by a variety of risk factors that range from socioeconomic to environmental. Although there may be no single risk factor that can predict the spread of a pandemic, some common factors include:

- Bushmeat consumption and animal-based traditional medicine
- Natural resource extraction Increased urbanization and populations encroaching into wildlife habitats
- Populations faced with poor sanitation and lack of access to clean water
- High population density
- Inadequate public health infrastructure/surveillance
- Infodemics/misinformation surrounding public health knowledge

These risk factors have historically had a disproportionate impact on marginalized populations, who suffer the highest infection and mortality rates during a pandemic.
Patterns

Although our natural and built environment is remarkably different when compared to previous pandemic eras, research suggests that the spread of pandemics has maintained the same pattern of spreading over the years, we just haven’t been viewing it from the right lens. This pattern looks similarly to that of the ripples formed when a rock is dropped into water; concentrically.

Mitigating Factors

Pandemics can be mitigated by a number of factors. Among them, timely identification of threats, and the coordinated response once a threat has been identified are critical. The National Center for Biotechnology Information has identified the following as additional mitigating factors for responding to these threats:

- **Solid public health structure:** sanitation, water, monitoring, **public awareness**, etc.
- **Rapid, coordinated response once a pandemic has started:** effective communication with the public, treatment options for ill, travel/movement restrictions to avoid spread
- **Contingency planning:** effective measures in place to scale up the response to pandemics depending on their severity
- **Ability to contain outbreaks with limited foreign aid:** as disease spreads globally, foreign aid may not be available to poorly prepared countries as it is during localized outbreaks **sovereign-level catastrophe insurance provides a viable option for managing pandemic risk**
Many different trends and emerging issues will contribute to the rise and fall of pandemics in the years ahead. Trends can include quantifiable statistics that show measured change over time. Related to pandemics, these can include increasing or decreasing human movement (such as migration/refugee crises), shifting global temperatures, and the overall rate of epidemic outbreaks throughout the years.

Similarly, emerging issues, developments that are on the horizon and not yet mainstream issues, will also contribute to the future of pandemics. Emerging issues are things that are generally experimental or fringe thinking today and may, should they continue to develop, impact the future of tomorrow.

"The point for foresight is not to predict but to gain insight, insight that can both improve your current strategy and also help you rethink your basic goals and preferences for the future." - VFS CEO Dr. Richard Lum
The following are some of the relevant trends.

<table>
<thead>
<tr>
<th>Title</th>
<th>Description</th>
<th>Sparkline</th>
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</thead>
<tbody>
<tr>
<td>Increasing urbanization</td>
<td>Individuals are moving out of rural areas and into densely packed cities at a rapid rate</td>
<td>1960-2018</td>
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<tr>
<td>Increasing Number of Epidemics Per year</td>
<td>Increasing instances of epidemics occurring in each year</td>
<td>2001-2019</td>
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<tr>
<td>Increasing migrant population</td>
<td>Humans increasingly migrate from their place of origin, including refugees</td>
<td>1990-2019</td>
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<tr>
<td>Global temp increase</td>
<td>As temperature increases due to global warming, there is more opportunity for novel diseases to propagate</td>
<td>1980-2016</td>
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<tr>
<td>Rapidly increasing global population</td>
<td>Post-industrial society has seen rapid population growth as life expectancy rises</td>
<td>1920-2018</td>
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Trends consist of quantifiable data over a period of time, which is useful in surveying the landscape of a topic.
A particularly important trend for this topic is the rising number of epidemics, a precursor to a global pandemic.
Emerging Issues are weak signals of change that may drive change in the future. In contrast to trends, which are quantifiable facts, emerging issues have not yet reached mainstream common knowledge.

<table>
<thead>
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<tbody>
<tr>
<td>AI accidentally creating/introducing diseases</td>
<td>Rise of AI used to engineer disease treatment poses the risk of technology accidentally introducing pathogens into the environment</td>
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<tr>
<td>Antibiotic resistant diseases</td>
<td>More super bugs infiltrating society, less treatment options available</td>
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<td>Anti-Contagion Design</td>
<td>Hyper-sanitation related technology is used to build cities, transportation, and objects that help the masses protect themselves from the spread of disease</td>
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<tr>
<td>Ban/regulation of live animal sales and wildlife markets</td>
<td>Due to increase in zoonotic disease, more regulation on wildlife sale is introduced</td>
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<tr>
<td>Criminalization of sickness</td>
<td>Sickness, even the common cold is a crime. Police conduct random temperature/vital checks in public places that can result in fines/imprisonment if a person is found to be sick.</td>
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<tr>
<td>Cultural taboo surrounding sickness</td>
<td>Sickness is not to be talked about, as the mention of any cold/flu could cause social ostracization for fear of an outbreak.</td>
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<tr>
<td>Discrimination against marginalized populations</td>
<td>Poor and marginalized people are disparately impacted by pandemics, their high rates of infection/death lead others to view them as inherently unclean and essentially untouchable.</td>
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<td>Engineered pathogens</td>
<td>Lab created diseases, the ability to introduce pandemics into a society</td>
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<td>Expedited Vaccines</td>
<td>Push to change regulations that would enable vaccines and treatments to be introduced to the public quicker</td>
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<td>Fear of government/healthcare</td>
<td>Mistrust towards the government and traditional healthcare leads more people to choose natural/holistic lifestyles, and reject modern medicine</td>
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<td>Infodemics/Influence warfare</td>
<td>The rise in information leads to more misinformation which can cause widespread panic</td>
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<tr>
<td>Mandatory isolation/drastic lifestyle changes</td>
<td>More individuals fear the potential of disease and choose to largely remain isolated from the rest of society</td>
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<td>Novel viruses due to climate change</td>
<td>Newly introduced especially virulent diseases, as well as the introduction of ancient diseases released from thawing permafrost</td>
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<tr>
<td>Quantum computing/computers formulating cures</td>
<td>Cures that are not manmade, super computers able to rapidly develop cures</td>
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<td>Shift away from meat consumption</td>
<td>More zoonotic diseases result in a widespread plant-based lifestyle</td>
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<td>Universal healthcare</td>
<td>The push towards universal healthcare is increased as disease spreads rapidly without access to healthcare</td>
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Scenarios

"Scenarios are at most forecasts of logical but different ways in which the future could unfold." - VFS CEO Dr. Richard Lum

4 Steps to the Future

Scenarios are built off of historical drivers, new sources of change, and stabilities present across time. These scenarios are descriptions of alternative futures that help us to anticipate change and generate visions of possible futures.

The scenarios are broken up into four distinct scenarios that gradually escalate in the amount of change they produce. They are designed to tell logical stories about how things may change.
The 2020 COVID-19 crises resulted in major institutional policy overhaul and socio-cultural adaptations that seemed ideal for preventing and responding to future health crises. Increased attention to the effectiveness of national disaster plans and pandemic task forces introduced more measures such as swifter and more stringent travel bans, increased funding for disease test kits, increased access to care for the uninsured (including homeless, migrant, etc), and more coordinated responses across government agencies.

Other measures, such as testing and introducing new vaccines and treatment plans for novel viruses were introduced. The turnaround time for the average pandemic-related vaccine was cut to six months, down from the year long process associated with the COVID-19 crisis, resulting in more quickly controlled outbreaks. Culturally, COVID-19 sparked changes as well. Unnecessary human contact such as the handshake were replaced with contact-free greetings, while being sick in public became a major social taboo.

Time passed, and by 2035 a new generation that had never experienced a frightening global pandemic such as COVID-19 was growing up. By this time, the experiences of the past were fading from the memories of all generations, leading to the gradual abandonment of earlier social norms. Similarly, attention drifted away from pandemic preparedness as other, more pressing, issues took precedence. When, as some predicted, a new viral outbreak resulted in a damaging global pandemic, there was another frantic cycle of rapid response, institutional change, and hurried efforts to protect global health. This cycle would continue over the years.

**Important Scenario Elements:**
- **Trend:** Increasing pandemics
- **Trend:** Increasing travel bans
- **EI:** Cultural forgetting
- **EI:** Less attention for preparedness
- **Stability:** Congress resistant to change
- **Stability:** Cyclical historical behavior
The COVID-19 outbreak of 2020 was a catalyst for promoting public awareness about disease control and provoked some modest institutional change. After the disease was contained, people generally had a better understanding about avoiding travel during disease outbreak, proper methods of sanitation, and how the “process” of a pandemic unfolds, from outbreak to vaccine. Institutionally, COVID-19 resulted in more efforts taken to prepare for future health crises, and improved research methods for treating novel diseases.

Over the next 15 years, the world saw many more disease outbreaks, and as the number of outbreaks increased, so did the lessons learned from them. With each outbreak, the systems in place for responding to them and preventing future outbreaks improved, albeit slightly. From improved disaster plans to more coordinated efforts for testing large numbers of people, the world generally got better at dealing with disease outbreak, even as they occurred more frequently. With outbreaks better contained, less misinformation was spread about them to the public, who responded to the outbreaks in an increasingly calm, organized fashion. Disease outbreaks became almost normalized in society, to the point that a certain amount of desensitization could be seen when compared to the wide-spread panic to the 2020 outbreak of COVID-19.

**Important Scenario Elements:**

- **Trend:** Number of disease outbreaks
- **EI:** Calmer responses to disease, less hysteria
- **EI:** Desensitization to diseases
- **Stability:** Incrementally changing policy as more disease outbreaks occur
- **Stability:** Public awareness steadily increasing
**The Untouchable Generation (incremental change, high disruption)**

Fear and mass hysteria follow a surge of deadly pandemics, and misinformation allows for discriminatory practices to become the norm.

A surge of novel viruses and diseases infiltrated society. Almost as soon as a realistic treatment option was developed for one illness, a new, more deadly disease emerged. The role of climate change in this surge could not be denied, as rising temperatures escalated antibiotic resistance, and increasing temperatures created breeding grounds for new bacteria. After years of fighting off increasingly deadly pandemics, a particularly devastating novel influenza pandemic tragically killed 10% of the world’s population in 2034. Amidst the devastation, technology provided rapid access to information, and misinformation about the disease spread quickly.

Poor and marginalized populations were hit the hardest during the influenza pandemic, suffering the highest rates of infection and mortality due to poor sanitation and lack of access to health care. The ‘infodemic’ of fake news surrounding the high rate of illness within certain communities influenced public perception. Eventually, mass hysteria erupted over the notion that certain groups of people were inherently unclean and posed a major public health risk to the rest of society. This culminated in an unofficial caste system of which the poor and marginalized were an “untouchable” class of people who were largely ostracized from society.

Policy began to catch up with the demand for disease control, and new measures were put in place to curtail further pandemics. Health surveillance became the norm, and the flurry of AI health metric monitoring and the connectivity of devices from previous generations became a tool for government bio metric monitoring. Census tracts with high instances of infection faced heavier surveillance and required medical clearance to leave their designated zones. Random temperature and vital checks became a regular part of life, and those found in public with any sign of fever or infection were subject to immediate quarantine and possible imprisonment. This criminalization of sickness persisted across all social classes and mention of suffering from even the most minor illnesses was a highly taboo subject. This hyper-sanitized cultural shift as well as the frenzied push towards disease control and vaccine development resulted a sharp decline in the spread of global pandemics. Despite this disease control, society was faced with increased discrimination, paranoia, and government surveillance which had effects on overall quality of life.

**Important Scenario Elements:**
- **Trend:** Increasingly deadly novel disease outbreaks
- **Trend:** Poor/Marginalized suffer high rates of infection
- **E1:** Discrimination against poor
- **E1:** Criminalized sickness
- **E1:** Hyper-sanitation
- **E1:** Biometric surveillance
- **Stability:** Classism
The Novel Zoonotic Viral Future (abrupt, disruptive change)

Digital/bio tools permit much better response to outbreaks, which unintentionally accelerates the evolution of disease.

Following the COVID-19 crisis, countries became more proactive in combating outbreaks and more willing to share data when new viruses were discovered. Using digital tools to recreate the genetic make-up of diseases and using advanced computing to rapidly formulate vaccines and treatments for them was essential in keeping newly discovered diseases contained. This technology also proved capable of genetically engineering deadly diseases, and concerns mounted over its destructive potential. Much of these concerns were silenced, as the results of rapidly developed cures vastly overshadowed any potential risks.

Although groundbreaking, this technology had unintended consequences; super virulent diseases started to evolve at faster rates and became harder to treat. One such disease, L0r1-34, had quantum computers working at full capacity for months with no significant progress being made, and rumors mounted that this disease had been an act of biological warfare. Its global presence had forced people indoors for fear of getting infected, with employers widely adopting work from home policies. As L0r1-34 surged, it became increasingly important to avoid contact with others to avoid the spread of disease. Because of this, home greenhouses became popular, and communities became increasingly insular, forming enclaves of trusted individuals and avoiding most contact with those outside of those circles.

L0r1-34 resulted in large numbers of individuals under mandatory quarantine with travel restrictions, severely damaging the economy as travel diminished. The emerging, insular village-based lifestyle took on a self-governance role, as law enforcement shifted its attention to public health and enforcing quarantine laws. L0r1-34 continued to evade scientists who could not find a cure for the disease.

It eventually became apparent that the warnings of those who initially spoke out against the genetically engineered technology should have been heeded. As evidenced by the surge in treatment-resistant diseases, the imbalanced ecosystem, and the increase in synthetic pathogens as acts of war, the new tools of biotechnology introduced an entirely new world order that few were prepared for.

**Important Scenario Elements:**
- Trend: Increasing use of gene-editing to combat disease
- Trend: Decreasing rates of diseases outbreaks
- EI: Quarantine and travel restrictions
- EI: Misuse of gene editing
- EI: Village-mentality
- Stability: Mistrust of “unknown” people/populations
- Stability: Silenced naysayers until it is too late
Visions for the Future

"Vision: An articulation of the organization's preferred future, informed by purpose, foregith, and aspiration." - VFS CEO Dr. Richard Lum

The future of pandemics and other global health crises will have major implications for life as we know it, regardless of how that future looks. For example, given the rise in epidemics, it can be assumed that pandemics will occur more frequently. This would have obvious public health implications, as sanitation, human contact, travel regulations, and food sourcing would all need to be reconsidered, among many other aspects of life. Poorer countries that are more vulnerable to the effects of pandemics would also likely require more foreign aid, and an outbreak could halt the markets of many foreign industries we rely upon, taking a toll on the economy.

Similarly, if we can curtail disease spread and eliminate the vast majority of pandemic outbreak, this would still play a major role in the society of the future. Deciding which types of technologies are ethical to utilize (such as gene edited cures/treatments) or dealing with the ramifications of technology abuse for biological warfare (E.g. targeted COVID-19 attacks) could come along with breakthrough technology. Even without the use of advanced technology, a world without pandemics may have resulted from increased segregation in society, and increased government biometric surveillance.

Although the aforementioned examples err on the extreme side, the main takeaway from this exercise is that the future of pandemics need not be an apocalyptic nightmare in order to shape a new world order. Being mindful of the trends and emerging issues on the horizon is just one way we can help to anticipate and plan for the best possible outcomes regarding global health crises.
## Implications Table

<table>
<thead>
<tr>
<th>Verge Framework Category</th>
<th>Exploring Implications from the Scenarios</th>
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</thead>
<tbody>
<tr>
<td>How we <em>define</em> the world around us</td>
<td>If pandemics continue to become more prevalent, will there be a limit to what communities will sacrifice for more security?</td>
</tr>
<tr>
<td>How we <em>relate</em> to one another</td>
<td>If disruptive outbreaks become more common, in what ways will society alter how people organize to conduct business?</td>
</tr>
<tr>
<td>How we <em>connect</em> with one another</td>
<td>What kinds of long-term adaptations might different industries adopt to minimize risks in a pandemic-prone future?</td>
</tr>
<tr>
<td>How we <em>create value in the world</em></td>
<td>What roles might communities create for “smart” infrastructure like AI, IoT, and public surveillance?</td>
</tr>
<tr>
<td>How we <em>consume value</em></td>
<td>How might the roles and responsibilities of citizens change with regard to governance?</td>
</tr>
<tr>
<td>How we <em>destroy value in the world around us</em></td>
<td>In futures of greater biological disruption, what new forms of crime and criminal arrangements might emerge?</td>
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</table>
Rapid Forecasts are a Vision Foresight Strategy technique used to help our clients jump start thinking about the future. The technique briefly analyzes the history, trends, and emerging issues of a topic, and then develops original scenarios about the topic. The technique utilizes a condensed version of the 4 Steps to the Future model, designed by Dr. Richard Lum, CEO of Vision Foresight Strategy LLC.

Being rapid forecasts, they are not exhaustive analyses of a topic; rather, they are very quick explorations of the topic under consideration.

Vision Foresight Strategy LLC

Vision Foresight Strategy is a foresight and strategic analysis firm headquartered in Honolulu. We are a global network of trained foresight professionals that works with organizational leaders to navigate the uncertainty and complexity they face in the world today. Our services include original futures research and analysis, facilitated workshops, and foresight training.

Find out more at www.visionforesightstrategy.com

4 Steps the Future: A Quick and Clean Guide to Creating Foresight, is available to order from Amazon.com, Barnes & Noble, and other book sellers.