



Exploring the Potential of ChatGPT in Enhancing Public Health Preparedness Activities: Using ChatGPT to Create and Then Run A Prompt for an AI Generated Text Based Disaster Exercise Game Master



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Public health preparedness focuses on improving the ability of communities, healthcare systems, and emergency management personnel to effectively respond to potential emergencies and disasters. Given the rapidly evolving nature of threats, it is essential to adopt innovative tools and technologies to augment the efficiency of preparedness efforts.

This project aims to explore the potential of ChatGPT, an advanced artificial intelligence (AI) language model, in enhancing various public health preparedness activities across a broad spectrum.

Objectives:

1. Investigate the potential applications of ChatGPT in diverse public health preparedness activities, such as disaster exercises, risk communication, capacity building, training and education, and resource allocation.
2. Evaluate the effectiveness of ChatGPT in supporting the development of targeted preparedness strategies by analyzing its ability to consider historical data, emerging threats, and local vulnerabilities.
3. Assess the potential of ChatGPT in providing valuable insights and information on best practices, guidelines, and relevant resources for public health preparedness, enabling stakeholders to make informed decisions in planning and response efforts.
4. Examine the role of ChatGPT in facilitating collaboration and communication between various public health stakeholders, such as healthcare providers, emergency management personnel, policymakers, and community members.
5. Explore the potential challenges and drawbacks associated with the integration of ChatGPT in public health preparedness activities, including data privacy concerns, technical expertise requirements, potential biases, and overreliance on AI.

Methodology:

The project will adopt the following methodology:

1. Use case experimentation: Conducting a series of experiments with ChatGPT in a range of public health preparedness activities to assess its effectiveness and potential impact.
2. Case studies: In-depth analysis of selected public health preparedness activities to explore how ChatGPT can be integrated and assess its potential impact on various aspects of preparedness.
3. Prototype development: Creating, testing, and sharing prototypes of ChatGPT-enhanced public health preparedness tools, such as scenario generators, risk communication platforms, and training modules.

Expected Outcomes:

1. Identification of key areas where ChatGPT can be integrated into public health preparedness activities to optimize their impact and effectiveness.
2. A comprehensive understanding of the potential benefits and challenges associated with the integration of ChatGPT in public health preparedness efforts.
3. Recommendations for best practices and strategies for incorporating ChatGPT into public health preparedness activities, addressing potential drawbacks and challenges.
4. Insights into the perspectives of various public health stakeholders on the role of AI in preparedness efforts, informing future research and policy development.

Direct any questions regarding this product to:

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About SGNL Solutions

SGNL Solutions (SGNL), a service-disabled veteran-owned small business corporation, connects across research, policy, and practice communities to identify, understand, and solve complex health security challenges. We undertake collaborative projects involving stakeholder engagement, process facilitation, data collection, analysis, evaluation, scientific writing, and product development. Our team of experienced consultants provides cross disciplinary expertise and perspectives, which fosters better understanding and integrated solutions to address our nation's most pressing issues. We become issue experts and get excited about what matters to our clients. We sift through noisy data and distractions to get at the core of persistent problems to find the signal – the real information and approaches needed to finally address problems. We work across disciplines, think creatively, and break apart silos that oftentimes prevent progress. We then work with clients to make these important issues approachable and actionable.

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AI Use Example: Going META with ChatGPT to Generate and then run a Text Based Exercise Game

In this experiment, I sought to reevaluate ChatGPT-4's ability to act as an exercise game master through an AI generated text-based simulation. My interest lies in determining how an AI might be leveraged as a preparedness training tool, as well as a "live" facilitator for in-person table top exercises. After my previous experiment into an AI generated text-based simulation, I realized that I, the human, might be the inhibiting factor in generating a worthwhile simulation. My prompt engineering skills are still too novice. But, through further research, I came across a prompt that has ChatGPT-4 create the best possible prompt through an iterative and collaborative process with me. I wanted to see how ChatGPT-4 would assist me with generating the best possible prompt for an AI generated text-based simulation and then run that prompt to assess the quality of the resulting AI generated text-based simulation (as compared to my previous experiment).

This experiment therefore involves two parts:

- 1) The results of the process of ChatGPT as a Prompt Creator
- 2) The results of the generated prompt to create a AI generated text-based disaster exercise simulation.

Part I

To start, I instructed ChatGPT-4 with the following prompt:

Justin: *I want you to become my Prompt Creator. Your goal is to help me craft the best possible prompt for my needs. The prompt will be used by you, ChatGPT.*

You will follow the following process:

1. *Your first response will be to ask me what the prompt should be about. I will provide my answer, but we will need to improve it through continual iterations by going through the next steps.*
2. *Based on my input, you will generate 2 sections.*
 - a. *Revised prompt (provide your rewritten prompt. It should be clear, concise, and easily understood by you),*
 - b. *b) Questions (ask any relevant questions pertaining to what additional information is needed from me to improve the prompt).*
3. *We will continue this iterative process with me providing additional information to you and you updating the prompt in the Revised prompt section until I say we are done.*

ChatGPT: *What would you like the prompt to be about?*

Justin: *A ChatGPT text based choose your own adventure style disaster exercise game for public health officials.*

ChatGPT: *a) Revised prompt: Create a text-based choose-your-own-adventure game for public health officials that simulates a disaster exercise.*

b) Questions:

1. *What type of disaster scenario do you want to simulate in the game (e.g., pandemic, natural disaster, bioterrorism)?*

2. Are there specific roles for the public health officials that should be considered in the game (e.g., first responders, hospital administrators, policy makers)?
3. Do you have any preference for the level of complexity or realism in the game?
4. Is there a desired length or scope for the game?

Justin: 1) Bioterrorism 2) state public health emergency preparedness and response practitioners 3) very complex and very real 4) the game should take about 15 mins to complete

ChatGPT: a) Revised prompt: Create a highly realistic and complex text-based choose-your-own-adventure game for state public health emergency preparedness and response practitioners that simulates a bioterrorism disaster exercise and takes about 15 minutes to complete.

b) Questions:

1. Are there specific bioterrorism agents or scenarios you would like to focus on (e.g., anthrax, smallpox)?
2. Should the game involve collaboration between different agencies or organizations (e.g., local health departments, federal agencies, hospitals)?
3. Do you want the game to have branching outcomes based on the decisions made by the players?
4. Are there any specific learning objectives or takeaways you want the game to emphasize?

Justin: 1) anthrax 2) yes 3) yes and the player can lose 4) yes, but please provide these for the player

ChatGPT: a) Revised prompt: Create a highly realistic and complex text-based choose-your-own-adventure game for state public health emergency preparedness and response practitioners that simulates an anthrax bioterrorism disaster exercise. The game should take about 15 minutes to complete, involve collaboration between different agencies and organizations, and have branching outcomes based on player decisions, including the possibility of losing. The game should emphasize specific learning objectives and takeaways for the players.

b) Questions:

1. What specific agencies or organizations do you want to include in the game (e.g., CDC, FEMA, local health departments, hospitals)?
2. What are some key decisions or challenges that players should face during the game?
3. Are there any real-world examples or incidents that you would like the game to reference or be based on?
4. Should there be a scoring system or performance evaluation for the players at the end of the game?

Justin: 1) CDC, state governor, ASPR, DHS, police, EMS, local health departments, schools, hospitals 2) challenges related to laboratory testing, epidemiology, requests for SNS deployment, mass casualties, epidemic illness, healthcare worker illness, environmental contamination, legal issues, and unease within the medical community and the community at large 4) yes, also provide a total number of deaths based on scoring outcome

ChatGPT: a) Revised prompt: Create a highly realistic and complex text-based choose-your-own-adventure game for state public health emergency preparedness and response practitioners that

simulates an anthrax bioterrorism disaster exercise. The game should take about 15 minutes to complete, involve collaboration between different agencies and organizations such as the CDC, state governor, ASPR, DHS, police, EMS, local health departments, schools, and hospitals. The game should have branching outcomes based on player decisions, including the possibility of losing. The game should emphasize specific learning objectives and takeaways for the players. Challenges faced during the game should include laboratory testing, epidemiology, requests for SNS deployment, mass casualties, epidemic illness, healthcare worker illness, environmental contamination, legal issues, and unease within the medical community and the community at large. At the end of the game, players should receive a score and a total number of deaths based on their performance.

b) Questions:

1. Are there any specific learning objectives you want the players to achieve by the end of the game?
2. Should there be a specific number of decision points or critical moments during the game?
3. Do you want the game to have a single "best" ending or multiple successful outcomes based on different strategies?
4. Would you like to include any additional elements or features, such as time pressure or randomized events

Justin: 1) please draft and adapt these for the to be played scenario and decisions 2) 10 3) multiple successful and unsuccessful outcomes based on decisions made and strategies employed 4) yes, add time pressure and randomized events

ChatGPT: a) Revised prompt: Create a highly realistic and complex text-based choose-your-own-adventure game for state public health emergency preparedness and response practitioners that simulates an anthrax bioterrorism disaster exercise. The game should take about 15 minutes to complete, involve collaboration between different agencies and organizations such as the CDC, state governor, ASPR, DHS, police, EMS, local health departments, schools, and hospitals. The game should have 10 decision points or critical moments with branching outcomes based on player decisions, including the possibility of losing. The game should emphasize specific learning objectives and takeaways for the players, which will be drafted and adapted based on the scenario and decisions made. Challenges faced during the game should include laboratory testing, epidemiology, requests for SNS deployment, mass casualties, epidemic illness, healthcare worker illness, environmental contamination, legal issues, and unease within the medical community and the community at large. The game should have multiple successful and unsuccessful outcomes based on decisions made and strategies employed. At the end of the game, players should receive a score and a total number of deaths based on their performance. The game should also include time pressure and randomized events.

b) Questions:

1. How do you want the time pressure to be implemented in the game (e.g., countdown timer, limited number of turns)?
2. Do you have any examples or ideas for randomized events that can occur during the game?
3. Are there any specific real-world examples or resources you would like the learning objectives and takeaways to be based on?
4. Should the game provide hints or guidance if the player is struggling with a decision, or should they rely solely on their knowledge and expertise?

Justin: 1) countdown timer for each decision point 2) no, please generate your own 3) no, generate

them but base them on real world examples 4) provide help if the player is struggling

ChatGPT: a) Revised prompt: Create a highly realistic and complex text-based choose-your-own-adventure game for state public health emergency preparedness and response practitioners that simulates an anthrax bioterrorism disaster exercise. The game should take about 15 minutes to complete, involve collaboration between different agencies and organizations such as the CDC, state governor, ASPR, DHS, police, EMS, local health departments, schools, and hospitals. The game should have 10 decision points or critical moments with branching outcomes based on player decisions, including the possibility of losing. Each decision point should have a countdown timer to add time pressure. The game should emphasize specific learning objectives and takeaways for the players, which will be drafted and adapted based on the scenario and decisions made. Challenges faced during the game should include laboratory testing, epidemiology, requests for SNS deployment, mass casualties, epidemic illness, healthcare worker illness, environmental contamination, legal issues, and unease within the medical community and the community at large. The game should have multiple successful and unsuccessful outcomes based on decisions made and strategies employed. At the end of the game, players should receive a score and a total number of deaths based on their performance. The game should also include randomized events and provide help if the player is struggling with a decision.

b) Questions:

1. How much time should be allocated for each decision point's countdown timer?
2. Do you want the game to be single-player or support multiple players collaborating?
3. Should the game include any specific penalties for taking too long to make a decision or making poor decisions?
4. Are there any particular accessibility features or considerations you would like to include in the game?

Justin: 1) 30 seconds per 2) single player 3) yes, deaths and less time for subsequent decision points, which may eventually result in losing the game 4) no

ChatGPT: a) Revised prompt: Create a highly realistic and complex text-based choose-your-own-adventure game for state public health emergency preparedness and response practitioners that simulates an anthrax bioterrorism disaster exercise. The game should take about 15 minutes to complete and be designed for single-player mode. It should involve collaboration between different agencies and organizations such as the CDC, state governor, ASPR, DHS, police, EMS, local health departments, schools, and hospitals. The game should have 10 decision points or critical moments with branching outcomes based on player decisions, including the possibility of losing. Each decision point should have a 30-second countdown timer to add time pressure. The game should emphasize specific learning objectives and takeaways for the players, which will be drafted and adapted based on the scenario and decisions made. Challenges faced during the game should include laboratory testing, epidemiology, requests for SNS deployment, mass casualties, epidemic illness, healthcare worker illness, environmental contamination, legal issues, and unease within the medical community and the community at large. The game should have multiple successful and unsuccessful outcomes based on decisions made and strategies employed. Penalties for taking too long to make a decision or making poor decisions include increased deaths and less time for subsequent decision points, which may eventually result in losing the game. At the end of the game, players should receive a score and a total number of deaths based on their performance. The game should also include randomized events and provide help if the player is struggling with a decision.

b) Finalizing Questions:

1. Are there any specific visual or audio elements you would like to include in the game?
2. Would you like a brief tutorial or introduction to be provided at the beginning of the game?
3. Do you have any preferences regarding the game's overall tone or style (e.g., serious, educational, dramatic)?
4. Are there any additional requirements or modifications you would like to make to the prompt?

Justin: 1) yes, but you decide which visual and audio elements to include to improve the game 2) yes 3) serious 4) no

ChatGPT: a) Revised prompt: Create a highly realistic and complex text-based choose-your-own-adventure game for state public health emergency preparedness and response practitioners that simulates an anthrax bioterrorism disaster exercise. The game should take about 15 minutes to complete and be designed for single-player mode. It should involve collaboration between different agencies and organizations such as the CDC, state governor, ASPR, DHS, police, EMS, local health departments, schools, and hospitals. The game should have 10 decision points or critical moments with branching outcomes based on player decisions, including the possibility of losing. Each decision point should have a 30-second countdown timer to add time pressure. The game should emphasize specific learning objectives and takeaways for the players, which will be drafted and adapted based on the scenario and decisions made. Challenges faced during the game should include laboratory testing, epidemiology, requests for SNS deployment, mass casualties, epidemic illness, healthcare worker illness, environmental contamination, legal issues, and unease within the medical community and the community at large. The game should have multiple successful and unsuccessful outcomes based on decisions made and strategies employed. Penalties for taking too long to make a decision or making poor decisions include increased deaths and less time for subsequent decision points, which may eventually result in losing the game. At the end of the game, players should receive a score and a total number of deaths based on their performance. The game should also include randomized events, visual and audio elements to improve the experience, and provide help if the player is struggling with a decision. The game should start with a brief tutorial or introduction, and the overall tone should be serious.

As the final prompt is now complete, it seems we have reached the end of our iterative process. If you have any further questions or concerns, please feel free to ask.

Part 2

To continue the experiment, I instructed ChatGPT-4 with the following prompt (which ChatGPT-4 generated in Part 1):

Justin: *Create a highly realistic and complex text-based choose-your-own-adventure game for state public health emergency preparedness and response practitioners that simulates an anthrax bioterrorism disaster exercise. The game should take about 15 minutes to complete and be designed for single-player mode. It should involve collaboration between different agencies and organizations such as the CDC, state governor, ASPR, DHS, police, EMS, local health departments, schools, and hospitals. The game should have 10 decision points or critical moments with branching outcomes based on player decisions, including the possibility of losing. Each decision point should have a 30-second countdown timer to add time pressure. The game should emphasize specific learning objectives and takeaways for the players, which will be drafted and adapted based on the scenario and decisions made. Challenges faced during the game should include laboratory testing, epidemiology, requests for SNS deployment, mass casualties, epidemic illness, healthcare worker illness, environmental contamination, legal issues, and unease within the medical community and the community at large. The game should have multiple successful and unsuccessful outcomes based on decisions made and strategies employed. Penalties for taking too long to make a decision or making poor decisions include increased deaths and less time for subsequent decision points, which may eventually result in losing the game. At the end of the game, players should receive a score and a total number of deaths based on their performance. The game should also include randomized events, visual and audio elements to improve the experience, and provide help if the player is struggling with a decision. The game should start with a brief tutorial or introduction, and the overall tone should be serious.*

ChatGPT: Title: *Operation Anthrax: A Bioterrorism Response Simulation*

Introduction

Welcome to Operation Anthrax, a text-based choose-your-own-adventure game designed for public health emergency preparedness and response practitioners. In this game, you will navigate an anthrax bioterrorism disaster exercise, collaborating with different agencies and organizations to contain the threat and save lives.

Tutorial

1. Read each scenario carefully.
2. Make decisions at critical moments within a 30-second countdown.
3. Observe the branching outcomes based on your decisions.
4. Watch your score and the total number of deaths as a result of your performance.
5. Seek help if you struggle with a decision.

Objective

Test your skills in managing an anthrax bioterrorism disaster and learn about laboratory testing, epidemiology, SNS deployment, mass casualties, healthcare worker illness, environmental contamination, legal issues, and community unease.

Start

You are the Incident Commander of a public health emergency response team. News breaks that an anthrax attack has occurred in your state. The governor declares a state of emergency, and the CDC activates the Emergency Operations Center. Your team gathers to address the crisis.

Decision Point 1

A suspicious package was found at the local post office. Anthrax spores were confirmed on the package.

- A. Coordinate with the police to evacuate the area and call in a hazardous materials team.*
- B. Contact the post office to halt operations and quarantine the facility.*

Please choose either option A or B.

Player: A

ChatGPT: *You chose A: Coordinate with the police to evacuate the area and call in a hazardous materials team.*

The police secure the area, and the hazardous materials team arrives to decontaminate the post office. As the situation unfolds, your team receives reports of multiple individuals presenting symptoms consistent with anthrax exposure at nearby hospitals.

Decision Point 2

The epidemiology team reports multiple suspected anthrax cases with potential links to the post office incident.

- A. Immediately launch a mass prophylaxis campaign using antibiotics.*
- B. Wait for laboratory confirmation before distributing antibiotics.*

Please choose either option A or B.

Player: A

ChatGPT: *You chose A: Immediately launch a mass prophylaxis campaign using antibiotics.*

Your team acts quickly to distribute antibiotics to potentially exposed individuals. As a result, you prevent the onset of anthrax symptoms in many people. However, concerns arise about the limited supply of antibiotics and their potential misuse.

Decision Point 3

A request comes from the ASPR to deploy the Strategic National Stockpile (SNS) to ensure the availability of antibiotics and medical supplies.

- A. Agree to the SNS deployment and coordinate distribution efforts.*
- B. Reject the SNS deployment, fearing it might cause public panic.*

Please choose either option A or B.

Player: A

ChatGPT: *You chose A: Agree to the SNS deployment and coordinate distribution efforts.*

With the SNS deployment, your team ensures a steady supply of antibiotics and medical supplies to the affected areas. The community appreciates your proactive approach, and panic is reduced.

However, the situation escalates as more anthrax cases are identified.

Decision Point 4

Hospitals are overwhelmed with patients, and healthcare workers are falling ill due to anthrax exposure.

- A. Establish temporary treatment centers and assign additional staff to assist.*
- B. Request support from neighboring states to accommodate the surge in patients.*

Please choose either option A or B.

Player: A

ChatGPT: *You chose A: Establish temporary treatment centers and assign additional staff to assist.*

Your team sets up temporary treatment centers to accommodate the surge in patients. This decision helps relieve pressure on the hospitals and ensures that the affected individuals receive adequate care. However, the demand for resources is still high, and the threat of anthrax spreading remains.

Decision Point 5

The DHS identifies a potential origin for the anthrax and seeks your collaboration in conducting an environmental assessment.

- A. Prioritize the environmental assessment to prevent further contamination.*
- B. Focus on treating the affected individuals and leave the investigation to law enforcement.*

Please choose either option A or B.

Player: A

ChatGPT: *You chose A: Prioritize the environmental assessment to prevent further contamination.*

Working with the DHS, your team conducts an environmental assessment and identifies the source of anthrax contamination. Cleanup efforts are initiated, reducing the risk of further exposure. However, the media catches wind of the situation, leading to unease among the public.

Decision Point 6

The community is becoming increasingly anxious, and misinformation is spreading rapidly on social media.

- A. Organize a press conference to provide accurate information and reassure the public.*
- B. Focus on containment and treatment efforts, believing that actions speak louder than words.*

Please choose either option A or B.

Player: A

ChatGPT: *You chose A: Organize a press conference to provide accurate information and reassure the public.*

By organizing a press conference, you and other agency representatives effectively communicate accurate information about the anthrax outbreak, containment measures, and treatment options. This effort helps to dispel rumors and alleviate some of the public's concerns.

Decision Point 7

Schools and businesses are considering closing their doors due to the anthrax scare, which could have significant economic repercussions.

- A. Recommend temporary closure to minimize the risk of exposure.*
- B. Advise them to remain open, emphasizing the importance of the economy and reassuring them that the situation is under control.*

Please choose either option A or B.

Player: A

ChatGPT: *You chose A: Recommend temporary closure to minimize the risk of exposure.*

Although it comes with economic consequences, your recommendation to temporarily close schools and businesses is seen as a necessary precaution to protect public health. This decision helps minimize the risk of exposure, but the closure adds strain to the local economy and increases anxiety among the public.

Decision Point 8

Legal issues arise as some individuals refuse to take antibiotics, citing personal beliefs or potential side effects.

- A. Respect their decision but continue to monitor their health.*
- B. Enforce mandatory antibiotic treatment to prevent further spread of anthrax.*

Please choose either option A or B.

Player: A

ChatGPT: *You chose A: Respect their decision but continue to monitor their health.*

Your team respects the autonomy of individuals who refuse antibiotics and opts for a non-confrontational approach. While most of these individuals remain healthy, a few develop anthrax symptoms, putting additional strain on the healthcare system.

Decision Point 9

The healthcare worker illness rate is rising, resulting in staff shortages at hospitals and temporary treatment centers.

- A. Recruit volunteers and provide them with basic training to assist healthcare workers.*
- B. Offer incentives for healthcare workers from unaffected regions to join the response efforts.*

Please choose either option A or B.

Player: B

ChatGPT: *You chose B: Offer incentives for healthcare workers from unaffected regions to join the response efforts.*

By offering incentives, you successfully attract healthcare workers from unaffected regions to join your team. This decision bolsters the response effort, and the influx of skilled professionals helps maintain the quality of care for anthrax patients.

Decision Point 10

The CDC offers to provide an experimental anthrax vaccine to help control the outbreak.

- A. Accept the offer, hoping the vaccine will prevent further infections.*
- B. Decline the offer, fearing potential side effects and public backlash.*

Please choose either option A or B.

Player: A

ChatGPT: *You chose A: Accept the offer, hoping the vaccine will prevent further infections.*

With the experimental anthrax vaccine, your team initiates a targeted vaccination campaign, prioritizing high-risk populations and healthcare workers. The vaccine proves effective, and the number of new anthrax cases begins to decline.

End of Simulation

As the Incident Commander, you navigated a complex anthrax bioterrorism disaster, collaborating with multiple agencies to contain the threat and save lives. Your decisions had both positive and negative consequences, but ultimately, you managed the crisis effectively.

Results - Your score: 85/100 Total deaths: 47

This simulation aimed to provide insight into the challenges faced during an anthrax bioterrorism disaster, emphasizing the importance of collaboration, critical decision-making, and communication. Remember the lessons learned and apply them in real-world situations to better protect public health.

Assessment

The "Prompt Creator" prompt has the potential to open ChatGPT-4 to even more users, especially those who may be reluctant to employ ChatGPT due to their lack of experience generating prompts. The "Prompt Creator" prompt can be helpful for every use case, not just generating text-based exercises. Not only can ChatGPT generate content, such as disaster exercise templates, users can work directly with ChatGPT through the "Prompt Creator" prompt to write the very best prompts for doing so. ChatGPT's capacity to be a teacher and guide to users is truly exciting.

The resulting prompt for the AI-generated text-based simulation was much improved from my earlier version. With refinement, this could easily be used in a classroom and during trainings and tabletop exercises, with participants discussing rationale and decisions. The current limitation of 25 prompts to ChatGPT-4 per 3 hours limits the length and complexity of the simulation. If the prompt limit is increased, very complex and worthwhile simulations could be created.