

## AI Can Be a Useful Quality Improvement Team Member

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*"Many ideas grow better when transplanted into another mind than the one where they sprang up."  
--- Oliver Wendell Holmes<sup>2</sup>*

### Introduction:

When we form a Quality Improvement (QI) Team, we always hope to obtain the most skilled and knowledgeable team members to assist in the improvement efforts. We want team members who are willing to embrace the problem needing improvement, open to helping other team members, ready to take initiative, actively listen, follow the agenda, complete assigned tasks, arrive on time for team meetings, and never complain. Meet Artificial Intelligence (AI) tools, that have all of these characteristics and more.

I have been using AI tools to generate and brainstorm ideas, write outlines for QI plans<sup>3</sup>, strategic plans, workforce development plans, performance management plans<sup>4</sup>, process steps for a clinic performing vaccinations<sup>5</sup>, and determining the major causes of low vaccination rates<sup>6</sup> or solutions<sup>7</sup> to improve the vaccination process. Some examples of these outputs can be found in appendices A, B, C, D, and E. These appendices have been shortened to show what the output may look like.

One available AI tool, ChatGPT<sup>8</sup>, "is an artificial intelligence (AI) chatbot that uses natural language processing to create humanlike conversational dialogue. The language model can respond to questions and compose various written content, including articles, social media posts, essays, code and emails<sup>9</sup>." The GPT stands for Generative Pre-trained Transformer which allows the AI app to generate and interpret text-based data; other AI models can generate images.

Many AI tools allow a few free trials to get a feel for the tool and become comfortable with its uses and potential.

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<sup>2</sup> <https://www.rock.so/blog/teamwork-quotes>

<sup>3</sup> [Appendix A](#)

<sup>4</sup> [Appendix B](#)

<sup>5</sup> [Appendix C](#)

<sup>6</sup> [Appendix D](#)

<sup>7</sup> [Appendix E](#)

<sup>8</sup> <https://chatgpt.com/>

<sup>9</sup> <https://www.techtarget.com/whatis/definition/ChatGPT>

**When To Use:** After you complete a QI tool as a team on the problem you are trying to improve, I suggest you use an AI tool to obtain new insights. You can then see what other ideas AI would suggest. You should compare the AI output to the team's output and see if anything should be added. AI tools can help an improvement team develop more in-depth root cause analysis<sup>10</sup> and more robust solutions.

AI is not a subject matter expert, but a subject matter *helper*. Its outputs need to be analyzed by the team for their relevance. *AI can be wrong*.

#### **How To Use an AI Tool:**

1. Go to the AI tool's website or app and open the program.
2. Develop the prompt you want it to respond to. The more specific the prompt the better the output.
3. Enter the prompt and within seconds it will begin to respond with suggestions.
4. Remember that the AI tool does not know your health department, your QI culture, the expertise of your team members, the skill base of your workers, or your community. It will offer responses based on its knowledge base. The more specific information you can provide to the AI tool, the better it can respond to your request.
5. The improvement team needs to review the output of its prompt and decide what is relevant to the problem they are researching. Treat the output as advice and use what is helpful.
6. Since the AI tool is learning all the time, its response to a prompt may vary over time.

**Multiple AI Tool Options:** In addition to the ChatGPT AI tool I used for the examples included in this paper, you can also try AI tools such as Gemini.<sup>11</sup> Different AI tools may provide unique perspectives, so it's beneficial to test multiple options.

On your computer, you may already have Microsoft Copilot<sup>12</sup> installed. I have found this is not as advanced as a tool such as ChatGPT. But, as with each of the current AI tools, their capabilities are constantly evolving and improving.

Some AI tools for developing images are Napkin.ai, DALL-E3, and Midjourney. Other more powerful AI tools are available, but they come with a cost, and you need to decide if they are worth it for your organization.

#### **Summary:**

AI tools are not meant to replace but augment the QI problem solving process. It helps expand a team's horizon on other possibilities they might not have considered.

Review the appendices and see how ChatGPT responded to my prompts. Then try using an AI tool yourself, and you'll start to understand how dynamic AI is.

You are probably wondering if I wrote this paper or did AI – you may never know.

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<sup>10</sup> [Appendix F](#)

<sup>11</sup> <https://gemini.google.com/app>

<sup>12</sup> <https://copilot.microsoft.com/chats/V6dh4ZcVotBZHUEJH2y3o>

## Appendix Overview

The table below outlines the appendix sections, their topics, and corresponding prompts.

Appendix	Topic	Prompt
<a href="#">A</a>	Quality Improvement Plan	Develop a quality improvement plan for a local public health department
<a href="#">B</a>	Performance Management Plan	Develop a performance management framework for a local public health department
<a href="#">C</a>	Clinical Vaccination Process	What are the steps in a clinical vaccination process in a public health clinic?
<a href="#">D</a>	Major Causes of Low Vaccination Rates	What would be the major causes associated with low vaccination rates in a public health department?
<a href="#">E</a>	Major Solutions to Improve Vaccination Rates	What would be the major solutions to improve vaccination rates in a public health department?
<a href="#">F</a>	Root Cause Analysis	Do a root cause analysis of financial barriers in a clinic giving vaccines

The below responses were produced by ChatGPT.

### »» Appendix A: Quality Improvement Plan

**Prompt:** Develop a Quality Improvement Plan for a local public health department

**ChatGPT said:**

Developing a Quality Improvement (QI) Plan for a local Public Health Department is crucial to enhancing the efficiency, effectiveness, and overall health outcomes of the community. The plan should be systematic, data-driven, and focused on continuous improvement in services, processes, and outcomes. Below is a comprehensive structure for a QI Plan tailored for a local public health department.

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#### Quality Improvement Plan for [Local Public Health Department]

##### 1. Vision and Mission Statement

- **Vision:**  
To create a healthier, more resilient community through continuous improvement in public health services, promoting equity and accessibility for all residents.

- **Mission:**  
To improve the health of the community through evidence-based programs, services, and policies while continually evaluating and improving the quality of our efforts.
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## 2. QI Team and Leadership Structure

- **QI Team:**  
Establish a cross-functional QI team, including leadership, staff from various departments (e.g., epidemiology, health promotion, environmental health), community stakeholders, and other relevant partners.
  - **QI Lead/Coordinator:**  
Designate a QI lead or coordinator responsible for overseeing and guiding the QI efforts. This person should have expertise in public health and quality improvement methodologies.
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## 3. QI Goals and Objectives

- **Overall Goal:**  
To improve the effectiveness and efficiency of public health programs and services, resulting in improved health outcomes for the community.
- **Objectives:**
  - Improve client satisfaction with public health services.
  - Increase efficiency in disease surveillance and reporting.

## »» Appendix B: Performance Management Plan

**Prompt:** Develop a performance management framework for a local public health department

**ChatGPT said:**

Performance Management is a systematic process that involves setting goals, monitoring progress, and evaluating the performance of employees and organizational processes to improve efficiency, effectiveness, and alignment with strategic objectives. For a Public Health Department, effective performance management is essential to ensuring that the department is meeting its health objectives, improving services, and achieving desired health outcomes for the community. Below is a detailed framework for implementing Performance Management in a Public Health Department:

### 1. Performance Management System Overview

**Purpose:** The purpose of the Performance Management System (PMS) in the Public Health Department is to align individual and team performance with the department's mission and strategic objectives. The system is designed to improve the quality of services, enhance public health outcomes, and optimize resource use.

## Core Objectives:

- **Align individual performance with organizational goals.**
  - **Promote continuous improvement in service delivery and health outcomes.**
  - **Provide a clear and fair method for evaluating employee performance.**
  - **Foster accountability, motivation, and professional development.**
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## 2. Performance Management Process

### A. Goal Setting and Alignment

- **SMART Goals:**  
Set clear, measurable, achievable, relevant, and time-bound (SMART) goals for individuals and teams. These should be aligned with both short-term and long-term public health objectives.
  - **Examples of SMART goals in public health:**
    - Increase the vaccination coverage rate by 10% over the next 12 months.
    - Improve the response time to public health emergencies by 15% within the next 6 months.
- **Departmental and Team Goals:**  
Ensure that team and departmental goals are aligned with the overarching public health goals of improving health outcomes (e.g., reducing the incidence of chronic diseases, improving maternal and child health, reducing health disparities).

### B. Ongoing Monitoring and Feedback

## »» Appendix C: Clinical Vaccination Process

**Prompt:** What are the steps in a clinical vaccination process in a public health clinic?

**ChatGPT said:**

The clinical vaccination process in a public health clinic typically follows several steps to ensure the safe and effective administration of vaccines. Here's an outline of the general process:

### 1. Pre-Vaccination Preparation

- **Check Clinic Hours & Availability:** Ensure the clinic is open and the vaccines are available.
- **Verify Eligibility:** Confirm that the individual is eligible for the vaccine, based on age, health status, and any specific public health guidelines (e.g., pregnancy, allergies).
- **Collect Medical History:** Gather relevant health information, including any history of allergies, previous vaccinations, medical conditions (e.g., immune disorders), or prior reactions to vaccines.

- **Provide Information:** Offer educational materials about the vaccine, its benefits, potential side effects, and any precautions. Answer any questions to ensure informed consent.

## 2. Screening and Assessment

- **Health Screening:** The healthcare professional will conduct a brief health check to ensure there are no contraindications to receiving the vaccine (e.g., severe allergic reactions to components in the vaccine).
- **Assess for Contraindications:** This includes reviewing any history of severe allergies (anaphylaxis), ongoing illnesses (such as fever), or other factors that might prevent vaccine administration.
- **Check for Prior Vaccinations:** Review the individual's vaccination record to determine if the vaccine is needed, and if so, which dose.

## 3. Consent and Education

- **Obtain Informed Consent:** Explain the purpose and risks associated with the vaccine, including potential side effects. This consent may be verbal or written, depending on the clinic's policies.
- **Provide Vaccine Information Sheet (VIS):** If applicable, the clinic may provide a vaccine information sheet that includes detailed information about the specific vaccine being given.

## 4. Vaccine Administration

- **Preparation of the Vaccine:** Ensure the correct vaccine is chosen, prepared, and checked for proper storage conditions (e.g., temperature).
- **Proper Site Selection:** Select an appropriate injection site (e.g., deltoid muscle for adults or thigh for infants).

## »» Appendix D: Major Causes of Low Vaccination Rates

**Prompt:** What would be the major causes associated with low vaccination rates in a public health department?

**ChatGPT said:**

Low vaccination rates in a public health department can be attributed to a variety of factors. These factors often interact in complex ways, and addressing them requires a multifaceted approach. Some of the major causes include:

### 1. Misinformation and Vaccine Hesitancy

- **Misinformation:** The spread of incorrect or misleading information about vaccines (e.g., safety concerns, myths about side effects) can contribute to hesitancy and fear. This misinformation may come from social media, news outlets, or even personal networks.
- **Vaccine Hesitancy:** Some individuals may have concerns or doubts about vaccines due to cultural beliefs, past negative experiences, or trust issues with the healthcare system.

## 2. Access Barriers

- **Geographical Barriers:** In rural or underserved areas, individuals may have limited access to vaccination clinics, especially if transportation is an issue.
- **Financial Barriers:** Lack of insurance or high out-of-pocket costs for vaccines can deter individuals from getting vaccinated.
- **Lack of Availability:** Limited vaccine supply or reduced availability in clinics or pharmacies can delay or prevent people from receiving vaccines.

## 3. Socioeconomic Factors

- **Poverty and Inequality:** People from lower socioeconomic backgrounds may face a combination of financial and logistical barriers that make it difficult for them to access vaccines.
- **Low Health Literacy:** A lack of understanding about the importance of vaccines and their role in preventing disease can contribute to low vaccination rates.
- **Cultural and Linguistic Barriers:** Immigrant populations or non-English-speaking groups may have difficulties understanding vaccination campaigns or accessing information and services in their preferred language.

## 4. Distrust in the Healthcare System

- **Historical Mistrust:** Some populations, particularly certain racial or ethnic groups, may have a long history of medical mistreatment or exploitation, leading to distrust in government health initiatives and vaccination programs.
- **Perceived Inequities:** If people feel that vaccines or healthcare services are not provided equitably, they may be less likely to participate in vaccination programs.

## »» Appendix E: Major Solutions to Improve Vaccination Rates

**Prompt:** What would be the major solutions to improve vaccination rates in a public health department?

**ChatGPT said:**

Improving vaccination rates in a public health department requires a comprehensive approach that addresses multiple barriers to vaccination, such as accessibility, misinformation, and community trust. Here are major solutions that could help:

### 1. Public Education and Awareness Campaigns

- **Targeted Messaging:** Tailor educational campaigns to address common concerns or misconceptions specific to different communities or demographics.
- **Use of Media:** Utilize social media, radio, TV, and print to spread factual, science-based information on vaccine safety, benefits, and importance.

- **Influencers and Community Leaders:** Engage trusted local figures to advocate for vaccination, as their endorsement can have a significant impact on public trust.

## 2. Improved Access to Vaccines

- **Mobile Vaccination Units:** Bring vaccines directly to underserved areas, especially rural, remote, or low-income communities.
- **Expanded Hours and Locations:** Make vaccinations available during evening hours and weekends at pharmacies, schools, clinics, and community centers to accommodate working families.
- **Partnerships with Schools and Employers:** Work with schools, colleges, and workplaces to offer vaccination clinics.

## 3. Community Engagement and Outreach

- **Community Health Workers:** Train and employ individuals from local communities who can offer information and support to their peers, making vaccination less intimidating and more accessible.
- **Focus Groups and Surveys:** Actively listen to community concerns through surveys or focus groups and use this feedback to address specific barriers or misconceptions.
- **Tailored Interventions for Vulnerable Populations:** For example, targeted outreach to immigrant communities, people with disabilities, or those with language barriers.

## 4. Incentives and Reminders

- **Incentive Programs:** Offer small incentives such as gift cards, discounts, or event tickets to encourage vaccination.
- **Reminder Systems:** Use text messages, emails, or calls to remind people when it's time for their next vaccine dose or booster.

## »» Appendix F: Root Cause Analysis

**Prompt:** Do a root cause analysis of financial barriers in a clinic giving vaccines

**ChatGPT said:**

Root cause analysis (RCA) involves identifying the fundamental factors that contribute to a particular issue or problem. In this case, we are analyzing financial barriers to vaccine distribution in a clinical setting. Below is an RCA that outlines key contributing factors and their root causes.

### 1. High Cost of Vaccines

- **Root Cause:**
  - **Manufacturing Costs:** The production cost of vaccines can be high due to research, development, quality control, and distribution.



- **Profit Margins:** Vaccine manufacturers often price vaccines to ensure a profit, leading to higher retail prices.
  - **Impact:** Clinics with limited budgets or underfunded public health systems may not afford to purchase adequate vaccine supplies.
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## 2. Inadequate Funding from Government or Insurance Providers

- **Root Cause:**
    - **Limited Public Funding:** Governments may not allocate sufficient funding for vaccines, especially in low-income areas or countries.
    - **Insurance Coverage Gaps:** Some insurance plans may not fully cover vaccine costs, leaving patients with out-of-pocket expenses.
  - **Impact:** Financial constraints on public health systems can prevent clinics from acquiring vaccines at necessary quantities or from administering them to a wider population.
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## 3. Lack of Reimbursement for Vaccine Administration

- **Root Cause:**
    - **Insufficient Reimbursement Rates:** In some regions, health insurance companies or government programs (e.g., Medicaid) may not reimburse clinics adequately for the costs of vaccine administration (e.g., the cost of staff time, equipment, and facilities).
    - **Complex Billing Processes:** Difficulties in navigating reimbursement policies and processes can discourage clinics from offering vaccines.
  - **Impact:** Clinics may be reluctant to offer vaccines because the financial return does not cover the operational costs, especially if there are administrative burdens involved.
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## 4. High Cost of Vaccine Storage and Distribution

- **Root Cause:**
    - **Cold Chain Requirements:** Many vaccines require specific temperature controls, adding costs related to refrigeration and transportation.
    - **Logistics and Supply Chain Costs:** The distribution process often involves complex logistics, further increasing expenses.
  - **Impact:** Small or under-resourced clinics may lack the infrastructure to properly store and handle vaccines, which can lead to inefficiencies and increased costs.
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## 5. Limited Awareness and Education on Financial Assistance Programs

- **Root Cause:**
    - **Lack of Outreach:** Many clinics and patients may not be aware of available financial assistance or subsidies, such as those provided by government programs (e.g., Vaccines for Children in the U.S.).
    - **Communication Gaps:** Clinics may not have adequate systems in place to inform patients about funding options.
  - **Impact:** Financial assistance programs go underutilized, and patients may not seek out vaccines due to perceived cost barriers.
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## 6. Economic Disparities Among Patients

- **Root Cause:**
    - **Income Inequality:** Patients from lower-income backgrounds may struggle to pay out-of-pocket costs or may not have insurance to cover vaccination expenses.
    - **High Co-pays or Deductibles:** Even insured individuals might face financial barriers due to high out-of-pocket costs for vaccines.
  - **Impact:** Patients may delay or avoid vaccinations due to financial strain, which can result in lower vaccine coverage rates.
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## 7. Lack of Collaboration Between Stakeholders (Public and Private Sectors)

- **Root Cause:**
    - **Fragmented Healthcare Systems:** The division between public and private healthcare sectors can result in inefficiencies in distributing resources like vaccines.
    - **Misaligned Incentives:** Private pharmaceutical companies, healthcare providers, and insurance companies may prioritize profits over public health needs, creating barriers to access.
  - **Impact:** Collaboration between governmental bodies, NGOs, and private entities may be insufficient, making it difficult to reduce costs or improve access to vaccines.
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## 8. Supply Chain Issues (Unexpected Price Hikes)

- **Root Cause:**
  - **Global Supply Chain Disruptions:** The pandemic or other factors may disrupt global supply chains, causing vaccine shortages and price fluctuations.

- **Price Gouging:** Some vaccine suppliers may increase prices during periods of scarcity, increasing the financial burden on clinics.
  - **Impact:** Clinics may be forced to purchase vaccines at inflated prices, potentially causing budgetary issues or reducing the number of vaccines they can administer.
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#### **Summary of Root Causes:**

1. **High cost of vaccine production and distribution**
  2. **Inadequate funding or reimbursement for vaccines**
  3. **Lack of financial assistance awareness or communication**
  4. **Economic disparities among patients**
  5. **Limited infrastructure for vaccine storage and handling**
  6. **Fragmented healthcare system and lack of collaboration**
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#### **Recommendations to Address Financial Barriers:**

1. **Increase government subsidies and funding:** Governments should allocate more resources toward vaccine purchase and distribution, particularly for underserved populations.
2. **Reform insurance reimbursement models:** Health insurance plans should include better coverage for vaccine administration costs.
3. **Improve public-private partnerships:** Collaborations between private companies, non-profits, and public health systems can help reduce costs and streamline vaccine distribution.
4. **Awareness campaigns for financial assistance:** Clinics should actively educate patients about available financial assistance programs and coverage options.
5. **Address logistical and cold-chain requirements:** Invest in better vaccine storage infrastructure to reduce handling costs.

By addressing these root causes, financial barriers to vaccine administration in clinical settings can be reduced, ultimately improving access and equity in vaccination programs.