Polio Eradication

Instructor's Note

2017

Overview

This instructor's note provides a framework for using the "Polio Eradication" teaching pack, which centers on a *National Geographic* Series about eradication efforts in Pakistan and Syria. Through the classroom activities provided, students will learn about the opportunities and challenges globalization presents with respect to polio eradication in conflict settings. More specifically, students will compare and contrast a diverse array of contributing factors, discuss potential response strategies, and analyze the extent to which globalization-related social determinants of health may serve as barriers to vaccination coverage.

The teaching pack is composed of this Instructor's Note and the following companion materials:

Teaching Materials

- *National Geographic* Series
  - McGirk T. Part 1: How the Bin Laden Raid Put Vaccinators under the Gun in Pakistan. National Geographic 2015; Feb 25. https://www.nationalgeographic.com/science/article/150225-polio-pakistan-vaccination-virus-health.
    Archival Link:
    https://web.archive.org/web/20150714143306/http://news.nationalgeographic.com/2015/02/150225-polio-pakistan-vaccination-virus-health.
  - Mullaney A, Hassan S. Part 2: He Led the CIA to Bin Laden – and Unwittingly Fueled a Vaccine Backlash. National Geographic 2015; Feb 27.
    https://www.nationalgeographic.com/science/article/150227-polio-pakistan-vaccination-taliban-osama-bin-laden.
    Archival Link:
    https://web.archive.org/web/20150311090103/https://news.nationalgeographic.com/2015/02/150227-polio-pakistan-vaccination-taliban-osama-bin-laden.
  - McGirk T. Part 3: Taliban Assassins Target Pakistan's Polio Vaccinators. National Geographic 2015; Mar 3. https://www.nationalgeographic.com/culture/article/150303-polio-pakistan-islamic-state-refugees-vaccination-health.
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    https://web.archive.org/web/20150311224228/https://news.nationalgeographic.com/2015/03/150303-polio-pakistan-islamic-state-refugees-vaccination-health.

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    - Motlagh J. Part 4: Fighting Polio Amid the Chaos of Syria's Civil War. National Geographic 2015; Mar 5. https://www.nationalgeographic.com/culture/article/150305-polio-syria-iraq-islamic-state-refugees-vaccination-virus-jihad.
      Archival Link:
      https://web.archive.org/web/20150311223127/https://news.nationalgeographic.com/2015/03/150305-polio-syria-iraq-islamic-state-refugees-vaccination-virus-jihad.
- Lesson Plan: Polio Risk in a Messy World
  This lesson plan, based on the *National Geographic* Series, Parts 1, 2, and 3, suggests class activities and discussion to enable students to place the factors contributing to polio's persistence within a social determinants of health framework.
- Lesson Plan: Eradicating Polio in Conflict Settings
  This lesson plan, based on the *National Geographic* Series, Parts 3 and 4, suggests class activities and discussion to enable students to consider the ways in which the social determinants of health influence the effectiveness of response efforts in conflict settings.

Additional Resources

- Resource Pack: Eradicating Polio
- Polio Eradication: Annotated Bibliography
- Polio Eradication: Glossary of Terms

Learner Level

- Undergraduate, Graduate

Learning Objectives

This lesson will enable students to:

1. Apply a global health framework of conditions and responses to understand the complex factors contributing to the spread of polio in conflict settings.
2. Use a social determinants of health framework to map out the proximal and distal determinants of the virus and discuss the various ways factors may influence each other to shape current conditions.
3. Brainstorm polio eradication efforts that can be made by both the health sector and non-health sectors to contain the virus.
4. Critique the extent to which response strategies successfully address globalization-related challenges impacting the transmission of polio both within and across borders.

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Polio Risk in a Messy World

Lesson Plan 1

2017

Purpose

The purpose of this lesson plan is to disentangle the complex interplay of social factors influencing major polio outbreaks in conflict zones over the past decade. Students will read a *National Geographic* series from 2015 on the reemergence of polio in Pakistan that describes the broad societal forces that have shaped the health landscape in the region. Through class activities and discussions, factors contributing to polio's persistence will be placed within a social determinants of health framework.

Learner Level

- High School, Undergraduate

Time

One 1-hour session

Required Materials

- Multicolored sticky notes
- Markers
- Dry-erase board or chalkboard

Required Pre-Reading

- McGirk T. Part 1: How the Bin Laden Raid Put Vaccinators under the Gun in Pakistan. National Geographic 2015; Feb 25. https://www.nationalgeographic.com/science/article/150225-polio-pakistan-vaccination-virus-health.
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- McGirk T. Part 3: Taliban Assassins Target Pakistan's Polio Vaccinators. National Geographic 2015; Mar 3. https://www.nationalgeographic.com/culture/article/150303-polio-pakistan-islamic-state-refugees-vaccination-health.
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Lesson Summary

Since the 1950s, polio has been eliminated from nearly all countries in the world, with the incidence of cases declining by 99 percent. Nevertheless, the virus is still present in a handful of countries facing political turmoil and weak health infrastructures. In these regions, a complex array of factors has contributed to polio's persistence, the most challenging perhaps stemming from sociopolitical drivers. For decades, eradication efforts in Pakistan have been fraught by social and cultural barriers, exacerbated most recently by regional and international conflict. In 2011, the raid in Abbotabad that resulted in the death of Osama bin Laden was found to be linked to a vaccination campaign conducted among children in the area, stoking regional distrust in vaccinations. While some may see this event as solely an issue of international relations, it also proved to have lasting repercussions on public health in the region. The National Geographic series assigned for this lesson articulates the complicated barriers that conflict presents to polio eradication. Through class discussions and group activities, students will use these articles as a case study to consider the complex factors hindering the containment of polio in Pakistan through a broader lens of the social determinants of health.

Learning Goals

1. To use a global health framework to organize the complex factors contributing to polio transmission.
2. To articulate the social determinants of polio transmission in Pakistan and organize relevant determinants by level (e.g., individual, community, and societal).
3. To identify how individual and social determinants may influence each other across levels and brainstorm the potential implications of these interactions for regional response efforts.

Procedure

Part 1: Using Simplifying Frameworks to Understand Complex Global Health Challenges
(15 Minutes)

For the first ten minutes of class, the instructor will introduce the concept of global health frameworks to help students organize their thinking about complex public health challenges, like polio. The purpose of this section is to introduce the framework to students, so instructors should emphasize that if any points are unclear, they will have an opportunity to walk through the concepts together as a class, using polio as a concrete example, after the framework has been reviewed.

A Conceptual Framework for Global Heath, Explained

When we think about complex public health challenges, it is easy to get lost in the vast web of causes and consequences impacting populations and individuals around the globe. With that in mind, instructors often use conceptual frameworks (or thinking tools) to break down complicated problems into their component parts when teaching about public health issues. Conceptual frameworks can help students organize the many relevant factors at play, understand how they contribute to the health issue at hand, and brainstorm potential responses or critique existing ones.

In order to understand any public health issue, we must first ask ourselves two overarching questions:

1. **What is the problem?** How do we understand and contextualize major health challenges?
2. **What are the solutions?** What are the ways we can draw upon all of the tools and mechanisms in our disposal to tackle these challenges?

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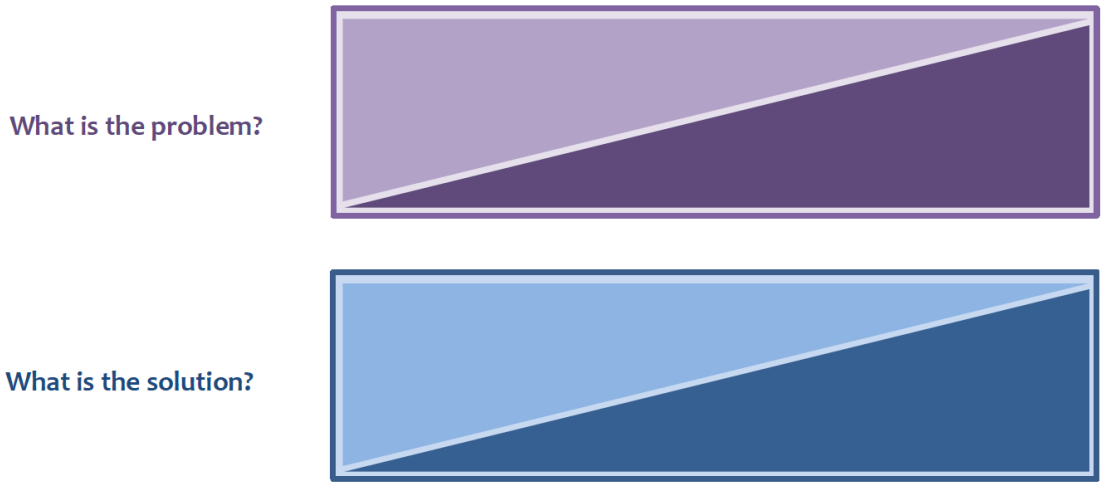
In order to unpack these core questions, we consider two dimensions within each. When teaching the framework, instructors should draw the following diagram on the board and emphasize that the diagonal across each box illustrates the two dimensions to each question:



Understanding the Problem

- **Dimension 1: Health Conditions.** When thinking about the nature of the public health challenge you are interested in, we must first *understand the health conditions we are referring to*. What are key biological or pathophysiological features of the issue that present within a person and cause them to not be healthy? To what extent does it contribute to death or impairment in the population? How are individuals and communities impacted by it? These are all salient features that give audiences a sense of the magnitude and impact of the health issue.
- **Dimension 2: Conditions for Health (i.e., Determinants).** Next, to understand the context of your given health issue, it is critical to *identify all other factors that contribute to it*. What are the individual (e.g., behavioral, attitudinal), social, political, and economic factors that may put people at risk or protect them from illness? In the past few decades, a broad field of study within public health has focused on specifically understanding the *social determinants of health*, which explicitly considers the ways the various environments individuals occupy (e.g., home, school, workplace, neighborhood, and society/culture, among others) impact health. In this lesson, students will be considering these factors in more detail through a group activity.

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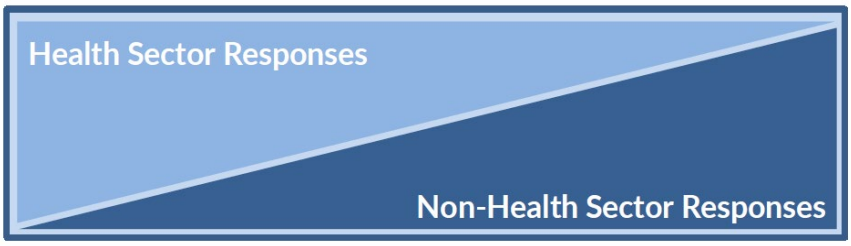
Identifying Solutions

- **Health Sector Responses:** After developing a firm understanding of the nature of a given health problem and the contextual factors influencing it, students can begin to consider potential responses to tackle the issue at the population level. Responses from the health sector refer to initiatives that are carried out by people or institutions whose primary focus is to improve people's health (e.g., physicians, nurses, hospitals/clinics, community health workers).
- **Non-Health Sector Responses:** While the health sector is often the first line of defense in the face of major challenges to public health, various other domains of society can also act to improve health outcomes in the population. Non-health sector responses refer to the various ways diverse actors across other areas in society (e.g., educators, economists, policy makers, and engineers, among many others) can work to advance health.



After reviewing the concepts and diagrams above with the class, it would be worthwhile to use the topic of polio as an opportunity to practice using this framework. Instructors should pose open-ended questions to students to assess whether they understand the concepts and if the framework was communicated clearly. Some examples of questions and correct answers are provided below:

Sample Questions and Answers:

Thinking back on the *National Geographic* articles you were assigned to read for today's class, what is the health condition we are interested in? What are its defining features both on the individual level (e.g., how does it present) and on the population level (e.g., how prevalent is it and where)?

(The following information was obtained through the Centers for Disease Control and Prevention, as well as from the assigned readings): Polio is an infectious disease caused by poliovirus that can seriously impact the brain and spinal cord, resulting in paralysis and death. The majority of adults who contract the virus will not develop symptoms, but one quarter will have flu-like symptoms that can develop into more serious paralysis of the arms or legs (or both), meningitis (infection of the spinal cord and/or brain), or paresthesia (feelings of pins and needles in the legs). Infants and children are most susceptible to the paralyzing effects of the virus, which is highly contagious and spread through contact with bodily fluids from an infected person (e.g., feces or mucous from a sneeze or cough). There is currently no cure to polio, but vaccines have succeeded at largely eradicating the virus from the globe, except in Nigeria, Afghanistan, and Pakistan, where it remains a persistent problem. In Pakistan, polio cases reached more than 300 in 2014, and the virus is currently present in the slums of Karachi and Peshawar.

What are some examples of contextual factors (or "determinants") that are described as influencing the spread of polio in Pakistan (or Syria)?

Examples of determinants of polio described in the article include individual choice regarding childhood vaccination, living in unsanitary conditions that may put one into contact with human feces or other bodily fluids from infected individuals, quality and success of vaccination campaigns, and regional and cross-

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national conflict among others. The rest of the class will be dedicated to exploring these factors in more detail, so students should be limited to only sharing one or two examples.

When thinking about responses to polio, the main approach discussed came from the health-sector: community-based mass vaccination campaigns. We will dig into the details of that approach later in class, but for now, can you think of any non-health sector responses that you think may have been promising alternative approaches to addressing polio? The approach you come up with did not have to be mentioned in any of the articles!

There is no single right answer to this question, but rather students should demonstrate that they read the article and understand that broader forces—beyond the actions of health workers on the ground—will result in successful polio eradication efforts. An example of a non-health sector response could perhaps involve efforts taken to address political conflicts in the region.

Depending on the students' familiarity with the topic of polio, instructors may consider presenting 2-3 background slides describing the health conditions above to ensure that all students are starting the conversation with a comparable understanding of what polio is. Slides can briefly describe salient features of the virus (e.g., how it is transmitted, signs and symptoms, how it is treated and prevented), summarize key facts about its history, and highlight polio eradication efforts globally.

For more information on these topics, see the annotated bibliography included in this teaching pack.

Part 2: Small Group Activity
(25 Minutes)

At this point in the class, students will transition to thinking about the conditions for polio (e.g., "determinants"). Briefly define social determinants of health as the social aspects of people's lives ranging from their relationships with their family and peers, to their communities, their culture, and place in a globalizing world. Emphasize that while these factors may not seem to have a relation to health, they shape the contexts in which people live and grow, and can give rise to specific health outcomes, including polio.

The table below provides a brief refresher on the various levels of factors defining the conditions for health:

Level of the Cause	Description	Examples
Distal (farthest away from an individual's health status) or society	Cultural, political, and infrastructural causes	Education, income, housing conditions, air quality, access to food and water, road safety
Intermediate	Relationships, social contexts	Community factors, including those related to work, school, family, and peer environments
Proximal (closest to an individual's health status) or individual	Behaviors, capabilities	Hygiene habits, exposure to disease vectors that cause diarrhea, dengue, malaria

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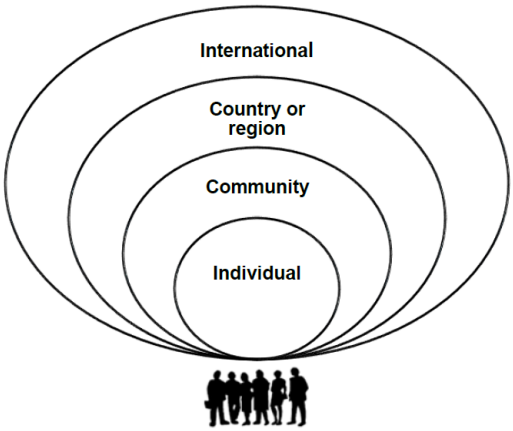
Draw the following diagram on the board to illustrate the various levels of conditions for health:



Split the class into four groups. Assign the groups to levels on the diagram, and give each group a stack of sticky notes, one color per group. Each group should spend 5-10 minutes thinking back on the articles they read describing polio transmission and generate a list of all the factors impacting the spread of polio. Each group should designate a scribe to write each factor on a different sticky note. Groups should also identify key themes that emerged from their discussion and summarize them in 2-3 sentences for the broader class discussion.

Part 3: Class Discussion
(20 Minutes)

Once all factors have been identified, each group's designated scribe should come to the board and stick their group's sticky notes in the appropriate area of the diagram. When all the groups have completed their section of the diagram, have each group point out the main points of their discussion. With the larger class, instructors should facilitate a discussion that touches on:

1. **How the factors at each of the defined levels interact to influence the spread of polio.** When considering the social determinants of health in the framework depicted above, it is important to note that all of the various spheres of influence in a person's life interact with each other to shape their individual risk of contracting polio. For instance, political violence aimed at polio vaccinators (a regional or community determinant) can impact an individual's decision to get vaccinated (an individual determinant), and terrorism-related geopolitical tensions (a societal determinant) may influence individuals' attitudes towards the polio vaccine (an individual determinant). Factors shaping the contexts in which polio transmission occurs do not happen in a vacuum, but rather are interrelated through often complex webs of connections.
2. **How social determinants of health (i.e., the community, country/regional, and international levels of the diagram) are different from the individual determinants.** More specifically, instructors should call students' attention to issues of accountability. For factors at each level, who is held accountable for polio risk?
3. **Optional: The relative importance of determinants across levels and their implications for the type of responses that can be developed to stem the tide of polio.** Although this lesson is focused on understanding the health conditions and conditions for health associated with polio, as students demonstrate a nuanced understanding of the complexities underlying the issue, instructors should challenge them to think about the relative importance of each determinant in the broader constellation of factors, and the implications of this for broader response efforts. For each level,

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instructors can choose a specific determinant and urge students to think about what type of response could be developed.

Issues related to polio responses should not be covered in-depth, but rather instructors can begin to introduce the ideas to students. Subsequent lessons will focus more on responses; however, the following table can be used as a template to facilitate conversation if time permits:

Determinant	Response	Advantage	Disadvantage
Individual: Distrust of the polio vaccine resulting in low engagement in vaccination efforts	Education campaign on vaccination	Dispels misinformation that may prevent people from getting vaccination	Assumes that personal attitudes are the only barrier preventing vaccination and does not take broader political drivers into account
Community: Poor sanitation in slum communities that increase the likelihood of contracting polio	Increased investments in urban sewage/sanitation infrastructure	Preventive act that would reduce disease transmission by addressing an environmental pathway to risk	Cost-intensive for long-term benefit without addressing immediate health challenges
Regional/International: Regional conflict related to national and international political tensions	Multi-lateral peace talks	Addresses the sociocultural root causes of multiple downstream factors, including attitudes towards vaccines and safety of vaccination campaigns	Would likely improve future outcomes but does not actively protect people who may be at risk currently.

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Summary

The purpose of this lesson was to teach students how to use a global health framework to organize their thinking around the "messy" and complex public health challenge of polio eradication in conflict zones. In the first part of class, students walk through a general overview of the framework, then break up into teams to paint a nuanced picture of the various conditions for health (or "determinants") influencing polio transmission through the lens of the assigned reading. Class discussions about the relationships between determinants and the implications they have for the types of responses that can be implemented will provide students with a nuanced understanding of the complicated ways individual and social determinants together influence population-level risk in conflict zones.

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Eradicating Polio in Conflict Settings

Lesson Plan 2

2017

Purpose

The purpose of this lesson plan is to disentangle the complex interplay of social factors influencing recent polio outbreaks of the past decade. Students will read a selection of articles from a 2015 *National Geographic* series on the reemergence of polio in Pakistan and Syria, and through class activities and discussions, consider the ways in which the social determinants of health influence the effectiveness of response efforts in conflict settings.

Learner Level

- High School, Undergraduate

Time

One 1-hour session

Required Materials

- Dry-erase board or chalkboard

Required Pre-Reading

- McGirk T. Part 3: Taliban Assassins Target Pakistan's Polio Vaccinators. National Geographic 2015; Mar 3. https://www.nationalgeographic.com/culture/article/150303-polio-pakistan-islamic-state-refugees-vaccination-health.
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Lesson Summary

Since the 1950s, polio has been eliminated from nearly all countries in the world, with the incidence of cases declining by 99 percent. Nevertheless, the virus is still present in a handful of countries facing political turmoil and weak health infrastructures. In these regions, a complex array of factors has contributed to polio's persistence, the most challenging perhaps stemming from sociopolitical drivers.

For decades, eradication efforts in Pakistan have been fraught by social and cultural barriers, exacerbated most recently by regional and international conflict. In 2011, the raid in Abbotabad that resulted in the death of Osama bin Laden was found to be linked to a vaccination campaign conducted among children in the area, stoking regional distrust in vaccinations. Meanwhile, the civil war in Syria has presented new obstacles for polio eradication efforts in a country where the virus has historically been contained through government-backed compulsory vaccination programs. In the face of political tumult, however, many children have been left unvaccinated, which in the context of war, has presented a "perfect polio storm" among an already vulnerable population.

The two articles from *National Geographic* assigned for this lesson articulate the complicated barriers to polio eradication in Pakistan and Syria and present different approaches to responding to outbreaks in conflict zones. Through class discussions and group activities, students will use these articles as a case study to consider the different circumstances in which polio has emerged in Pakistan and Syria, and implications for response efforts.

Learning Goals

1. To identify factors at the individual, community, and societal levels that have contributed to the spread of polio in Pakistan and Syria, and identify common factors shared across conflict settings.
2. To brainstorm possible health and non-health sector responses to mitigate the spread of the virus in these regions.
3. To consider the ways different responses to polio outbreaks are impacted by both individuals within communities and broader multi-national actors.

Procedure

Part 1: Using Simplifying Frameworks to Understand Complex Global Health Challenges
(10 Minutes)

For the first 10 minutes of class, the instructor will introduce the concept of global health frameworks to help students organize their thinking around complex public health challenges, like polio. The purpose of this section is to introduce the framework to students, so instructors should emphasize that if any points are unclear, they will have an opportunity to walk through the concepts together as a class, using polio as a concrete example, after the framework has been reviewed.

A Conceptual Framework for Global Heath, Explained

When we think about complex public health challenges, it is easy to get lost in the vast web of causes and consequences impacting populations and individuals around the globe. With that in mind, instructors often use conceptual frameworks (or thinking tools) to break down complicated problems into their component parts when teaching about public health issues. Conceptual frameworks can help students organize the many relevant factors at play, understand how they contribute to the health issue at hand, and brainstorm potential responses or critique existing ones.

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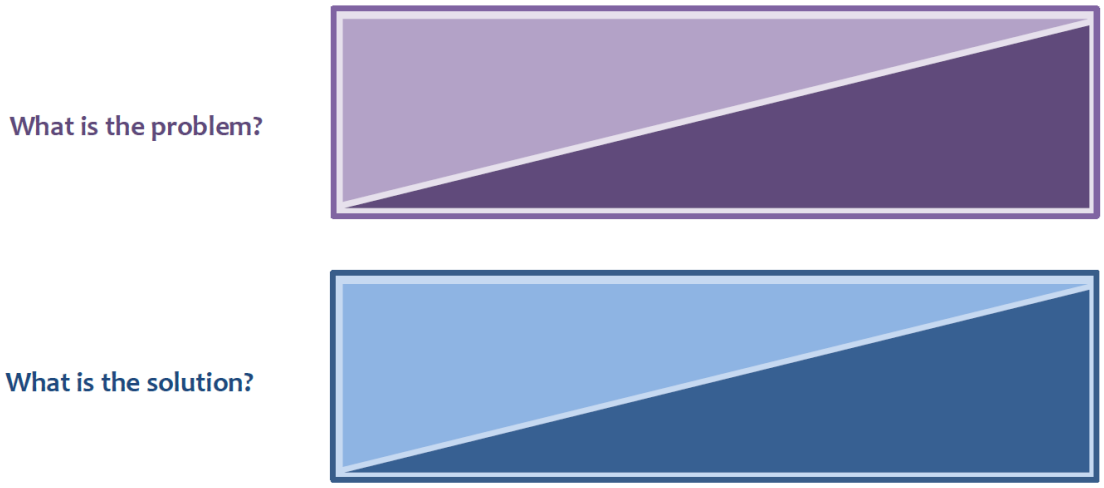
In order to understand any public health issue, we must first ask ourselves two overarching questions:

1. **What is the problem?** How do we understand and contextualize major health challenges?
2. **What are the solutions?** What are the ways we can draw upon all of the tools and mechanisms in our disposal to tackle these challenges?

In order to unpack these core questions, we consider two dimensions within each. When teaching the framework, instructors should draw the following diagram on the board and emphasize that the diagonal across each box illustrates the two dimensions to each question:



Understanding the Problem

- **Dimension 1: Health Conditions.** When thinking about the nature of the public health challenge you are interested in, we must first *understand the health conditions we are referring to*. What are key biological or pathophysiological features of the issue that present within a person and cause them to not be healthy? To what extent does it contribute to death or impairment in the population? How are individuals and communities impacted by it? These are all salient features that give audiences a sense of the magnitude and impact of the health issue.
- **Dimension 2: Conditions for Health (i.e., Determinants).** Next, to understand the context of your given health issue, it is critical to *identify all other factors that contribute to it*. What are the individual (e.g., behavioral, attitudinal), social, political, and economic factors that may put people at risk or protect them from illness? In the past few decades, a broad field of study within public health has focused on specifically understanding the *social determinants of health*, which explicitly considers the ways the various environments individuals occupy (e.g., home, school, workplace, neighborhood, and society/culture, among others) impact health. In this lesson, students will be considering these factors in more detail through a group activity.

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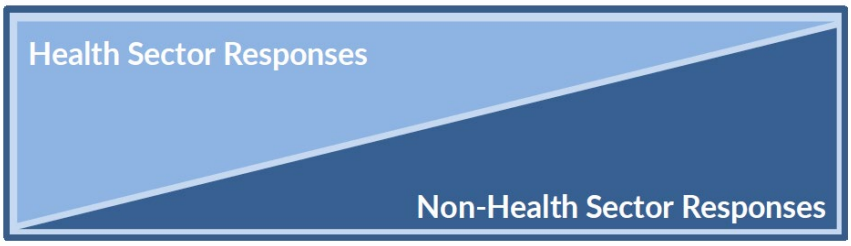
Identifying Solutions

- **Health Sector Responses:** After developing a firm understanding of the nature of a given health problem and the contextual factors influencing it, students can begin to consider potential responses to tackle the issue at the population level. Responses from the health sector refer to initiatives that are carried out by people or institutions whose primary focus is to improve people's health (e.g., physicians, nurses, hospitals/clinics, community health workers).
- **Non-Health Sector Responses:** While the health sector is often the first line of defense in the face of major challenges to public health, various other domains of society can also act to improve health outcomes in the population. Non-health sector responses refer to the various ways diverse actors across other areas in society (e.g., educators, economists, policy makers, and engineers, among many others) can work to advance health.



Part 2: Understanding Polio
(15 Minutes)

After reviewing the above framework with the class, the instructor will use it to help students make sense of the complex array of factors contributing to polio transmission in conflict zones. First, introductory information about polio should either be presented to the class or solicited through open-ended questions. If the topic of polio is new to the students, instructors may consider presenting 2-3 background slides describing the health conditions above to ensure that all students are starting the conversation with a comparable understanding of the virus. Slides can briefly describe salient features of the virus (e.g., how it is transmitted, signs and symptoms, how it is treated and prevented), summarize key facts about its history, and highlight polio eradication efforts globally. A brief summary is provided below, but for more information on polio, refer to the resource collection and annotated bibliography included in this teaching pack.

A Brief Primer on Polio: (The following information was obtained through the Centers for Disease Control and Prevention, as well as from the assigned readings): Polio is an infectious disease caused by poliovirus that can seriously impact the brain and spinal cord, resulting in paralysis and death. The majority of adults who contract the virus will not develop symptoms, but one quarter will have flu-like symptoms that can develop into more serious paralysis of the arms or legs (or both), meningitis (infection of the spinal cord and/or brain), or paresthesia (feelings of pins and needles in the legs). Infants and children are most susceptible to the paralyzing effects of the virus, which is highly contagious and spread through contact with bodily fluids from an infected person (e.g., feces or mucous from a sneeze or cough). There is currently no cure to polio, but vaccines have succeeded at largely eradicating the virus from the globe, except in Nigeria, Afghanistan, and Pakistan, where it remains a persistent problem. In Pakistan, polio cases reached more than 300 in 2014, and the virus is currently present in the slums of Karachi and Peshawar.

Next, the instructor will lead an informal conversation about the "conditions for health" (i.e., determinants) influencing polio transmission in Pakistan and Syria based on the students' recollection of the assigned readings. Students can call out important factors that they remember from the readings, and the instructor should record responses on the board using the following Venn diagram, organizing determinants by

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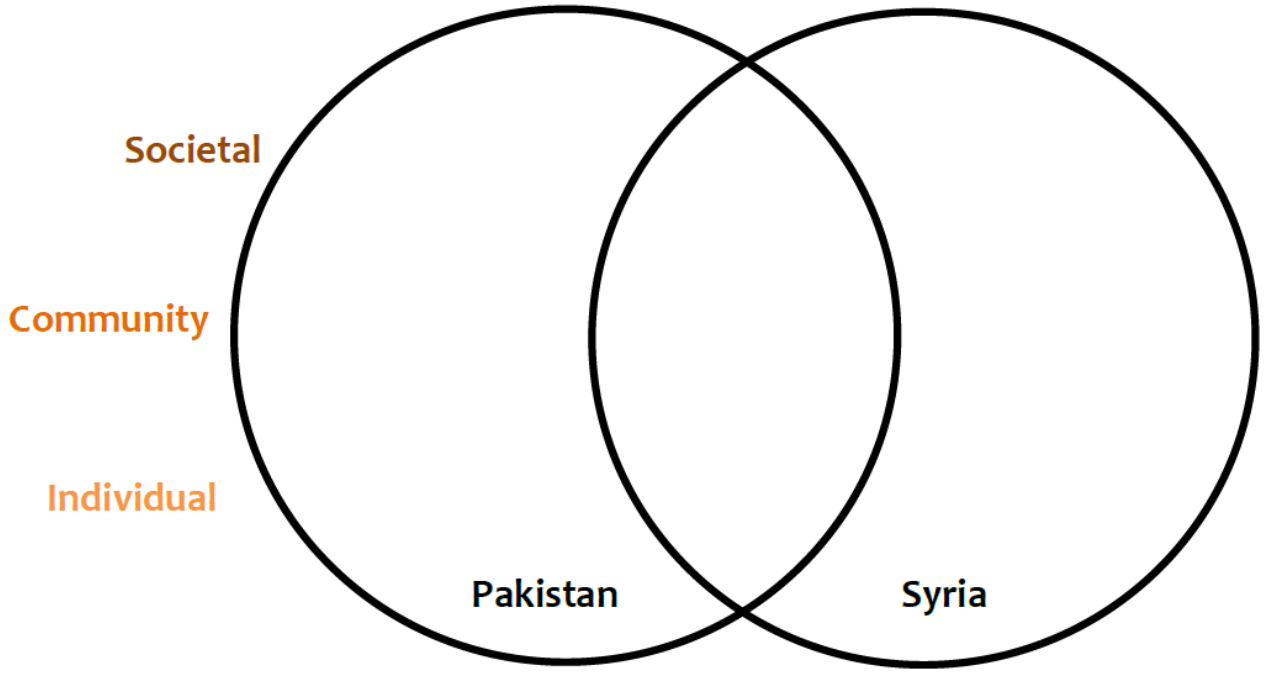
context (e.g., those only relevant in the Pakistani context, those only relevant in the Syrian context, or those relevant in both):



Organizing student responses in this way will allow them to think about how the shared experience of conflict may produce similar issues across countries while also considering how each country faces unique threats to the public's health due to the specific nature of their conflict. Instructors are urged to organize the determinants students identify by proximity to the individual (as shown above) to illustrate how determinants can operate at different levels.

Part 3: Group Activity
(20 Minutes)

Now, students will shift from understanding the conditions for polio to thinking about potential individual-level and population-level responses. **Individual-level responses** are strategies aimed at changing people's behaviors or attitudes in such a way that will reduce their risk of contracting polio, whether it be by mitigating environmental exposures or increasing vaccine uptake through outreach to individuals. **Population-level responses** are programs or policies that are targeted to groups of people (e.g., at the regional or country level) with the goal of reducing the population's risk of contracting polio by addressing its underlying social determinants.

Divide the class in half, then assign one group of students to brainstorm potential ways to address the spread of polio through responses from the **health sector**, and the other group to brainstorm responses from the **non-health sector**. Before starting the activity, each group should decide whether they want to focus specifically on Pakistan, Syria, or conflict settings more broadly, and assign one student to be the group note taker who will be responsible for recording the key points of their discussion and summarizing them for the class.

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Each group will brainstorm two potential responses that can be implemented at the individual level, and two that can be implemented at the population level to address social determinants. Groups should complete the following table and discuss questions that may emerge:

Table 1 - Group Activity: Brainstorm Solutions

Question	**Individual-Level Strategy 1**	**Individual-Level Strategy 2**	**Population-Level Strategy 1**	**Population-Level Strategy 2**
What is your Proposed Strategy?				
What determinant(s) of polio is this strategy intended to address?				
What determinant(s) does this strategy fail to address?				
How could this strategy be improved upon by working across sectors?				

After the groups complete the above table, they should choose one individual and one population-level response to share with the class, and consider the following prompt: **What do you think are the implications of adopting an individual vs. population-level response for community members in your given context?**

Part 4: Class Discussion
(20 Minutes)

In the last 15 minutes of class, the instructor will lead a discussion that encourages students to consider both the implications of adopting an individually focused response strategy compared to a population-focused strategy, as well as the ways in which health sector responses may differ from non-health sector responses.

First, each group's note taker should share their proposed responses and the key points of their discussion, focusing particularly on the last question. Once both groups have reported out, the instructor can ask the following the questions to prompt discussion among the class:

1. So far, we've seen that vaccine coverage is both a matter of personal choice and the result of a broad constellation of complex social factors. Yet, in this exercise, you were tasked with identifying either an individual-focused or a population-focused response. Is there a way to address both individual and social determinants in a single response strategy? What do you think that might look like?

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2. When public health professionals develop and implement response strategies, we have to consider both the factors that we know influence the spread of disease, but also the populations we are serving. The strategies we implement are implicitly and explicitly laden with assessments about who is responsible or accountable for the spread of polio and the best ways to prevent it. Thinking back about your individual- and population-level responses you brainstormed, who do you think is considered accountable for each? What might the implications of these approaches have for work on the ground?
3. What type of country-level and international buy-in do you think is necessary to ensure success? Are there actors or forces that we haven't taken into account when considering how to best tackle the spread of polio in conflict regions?

Summary

The purpose of this lesson was to encourage students to think beyond the determinants of polio and begin to brainstorm potential responses from the health and non-health sectors, as well as consider the implications these strategies may have within vulnerable communities facing conflict. In the first part of class, students walked through a general overview of a global health framework they can use to understand the complex web of factors impacting polio transmission, and then identified relevant contributors to the outbreaks described in the assigned readings. In the second half of class, students worked in teams to identify response efforts that could target specific determinants to work towards polio eradication in conflict zones. Class discussions about the implications of response efforts challenge students to think about issues of accountability inherent in specific strategies, and the ways approaches may be received on the ground. By the end of class, students will have a more nuanced understanding of the challenges conflict settings present with respect to polio eradication.

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Annotated Bibliography

Polio Eradication

2022

Overview

This bibliography is a selective sampling of educational resources that introduce students to issues surrounding outbreaks of polio in Syria and Pakistan. The multidisciplinary materials may be suitable for students at the undergraduate college and public health graduate school levels. Learning objectives and supporting materials will vary depending on how the material is used in a course. Brief annotations provide a cursory summary and indicate where certain materials may be particularly relevant.

This selective bibliography is part of a teaching pack on polio eradication in Syria and Pakistan. The materials listed here represent a diversity of viewpoints and opinions and do not necessarily reflect the viewpoints and opinions of the Incubator.

This annotated bibliography includes:

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Selected Resources

*indicates resource listed in GHELI's online Repository

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*** Report. Investment Case: Polio Eradication.**
Investment Case 2022-2026: Investing in the Promise of a Polio-Free World. Global Polio Eradication Initiative 2022. https://polioeradication.org/financing/financial-needs/investment-case-2022-2026.

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WHO Fact Sheet: Poliomyelitis. World Health Organization 2022. https://www.who.int/news-room/fact-sheets/detail/poliomyelitis.

Fact Sheet. 10 Facts on Polio Eradication
10 Facts on Polio Eradication. World Health Organization 2017. https://www.who.int/news-room/photo-story/photo-story-detail/10-facts-on-polio-eradication.

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Circulating Vaccine Derived Polio Virus. Global Polio Eradication Initiative 2017. https://polioeradication.org/polio-today/polio-now/this-week/circulating-vaccine-derived-poliovirus.

*** Article. Eradicating Polio: A Balancing Act**
Agol V et al. Eradicating Polio: A Balancing Act. Science 2016; 351(6271): 348.
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Article. When Amitabh's Voice Did the Trick to Make India Polio Free
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*** Teaching Case. Polio Elimination in Uttar Pradesh**
Ellner A et al. Polio Elimination in Uttar Pradesh. Harvard Medical School, Brigham and Women's Hospital 2011.
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Article. Lessons From Polio Eradication
Larson HJ, Ghinai I. Lessons from Polio Eradication. Nature 2011; 473: 446-447. DOI: http://doi.org/10.1038/473446a.

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Article. How the Bin Laden Raid Put Vaccinators Under the Gun in Pakistan
McGirk T. How the Bin Laden Raid Put Vaccinators Under the Gun in Pakistan. National Geographic 2015; Feb 25.
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Article. He Led the CIA to Bin Laden—and Unwittingly Fueled a Vaccination Backlash
Mullaney A, Hassan SA. He Led the CIA to Bin Laden—and Unwittingly Fueled a Vaccination Backlash. National Geographic 2015; Feb 27. https://www.nationalgeographic.com/science/article/150227-polio-pakistan-vaccination-taliban-osama-bin-laden.
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Article. Fighting Polio Amid the Chaos of Syria's Civil War
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Report. Investment Case 2022-2026: Polio Eradication Report
Investment Case 2022-2026: Investing in the Promise of a Polio-Free World. Global Polio Eradication Initiative 2022. https://polioeradication.org/financing/financial-needs/investment-case-2022-2026.
GHELI repository link: https://repository.gheli.harvard.edu/repository/11722
This report from the Global Polio Eradication Initiative explores the success of previous polio prevention projects and describes the need for continued funding in order to make the world polio-free. Although wild poliovirus cases are at historic lows, COVID-19 has threatened progress: In February 2022, Malawi reported its first wild polio case in three decades, while Pakistan reported its first case in a year. Simultaneously, cases of vaccine-derived polio have emerged in Ukraine, Israel, and parts of Asia and Africa. The report notes that eradicating polio will save the U.S. $33.1 billion in this century, compared to the cost of controlling future outbreaks.

Fact Sheet. WHO Fact Sheet: Poliomyelitis
WHO Fact Sheet: Poliomyelitis. World Health Organization 2022. https://www.who.int/news-room/fact-sheets/detail/poliomyelitis.
This fact sheet from the World Health Organization (WHO) provides a snapshot of polio's symptoms and reported cases and describes the WHO's current efforts to eradicate the disease. Since the Global Polio Eradication Initiative (GPEI) was launched in 1988, the number of polio cases has fallen by over 99 percent. As the fact sheet elaborates, however, failure to implement strategic approaches to eliminating polio has led to ongoing transmission of the disease.

Fact Sheet. 10 Facts on Polio Eradication
10 Facts on Polio Eradication. World Health Organization 2017. https://www.who.int/news-room/photo-story/photo-story-detail/10-facts-on-polio-eradication.
This fact sheet from the World Health Organization (WHO) provides a snapshot of polio prevention efforts today. Although the global community is 99 percent of the way to eradicating the disease, and cheap, effective vaccines exist, polio still continues to affect children worldwide. Large-scale vaccination efforts improve immunity, while work is still ongoing to strengthen routine immunization. The global effort to eradicate polio—the Global Polio Eradication Initiative—is the largest public-private partnership for public health.

Data. Circulating Vaccine Derived Polio Virus
Circulating Vaccine Derived Polio Virus. Global Polio Eradication Initiative 2017. https://polioeradication.org/polio-today/polio-now/this-week/circulating-vaccine-derived-poliovirus.
This data table from the Global Polio Eradication Initiative (GPEI) summarizes the number of vaccine-derived polio cases globally between 2000 and 2017, by year. Vaccine-derived polio cases, while rare, are a product of genetic mutation of the live, weakened vaccine-virus in the oral poliovirus vaccine.

Article. Eradicating Polio: A Balancing Act
Agol V et al. Eradicating Polio: A Balancing Act. Science 2016; 351(6271): 348.
DOI: http://doi.org/10.1126/science.351.6271.348-b.
GHELI repository link: https://repository.gheli.harvard.edu/repository/11727
This article from *Science* challenges a previous editorial from the magazine, "Eradicating Polio," which celebrated the fact that only 70 wild poliovirus cases had been reported in 2015 and lauded the World Health Organization for leading the charge. While the reduction in wild poliovirus cases represents a major public health accomplishment, the author argues that by ignoring the vaccine-derived poliovirus cases, the public is getting a one-sided view of a complex issue. The vaccine-derived virus can plague communities for years, affecting immuno-compromised individuals, as well as existing under the radar in those who are asymptomatic. Complete eradication of the disease cannot be accomplished if vaccine-derived polio is ignored.

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Article. When Amitabh's Voice Did the Trick to Make India Polio Free
Vincent PL. When Amitabh's Voice Did the Trick to Make India Polio Free. The Hindu 2014. https://www.thehindu.com/news/cities/Delhi/when-amitabhs-voice-did-the-trick-to-make-india-polio-free/article6257123.ece.
This article explains how a popular Indian actor, Amitabh Bachchan, served as the "brand ambassador" for the Polio Eradication Campaign, following the high number of polio cases being detected in the early 2000s in India. Bachchan was featured in ads meant to encourage viewers to vaccinate their children for polio. View an example of an ad.

Teaching Case. Polio Elimination in Uttar Pradesh
Ellner A et al. Polio Elimination in Uttar Pradesh. Harvard Medical School, Brigham and Women's Hospital 2011. http://www.globalhealthdelivery.org/case-collection/case-studies/asia-and-middle-east/polio-elimination-in-uttar-pradesh.
GHELI repository link: https://repository.gheli.harvard.edu/repository/10723
This teaching case explores the challenges of a large-scale polio immunization campaign in India, focusing on the Global Polio Eradication Initiative's (GPEI) campaign and its inability to eliminate polio from the state of Uttar Pradesh. Throughout the 1990s, India began implementing coordinated national polio immunization days to supplement routine immunization in health clinics in an effort to eliminate polio from the nation. The case includes background context on India and Uttar Pradesh as well as polio and polio vaccines. It examines the roles of key partners in the GPEI, including Rotary International, the World Health Organization, the United States Centers for Disease Control and Prevention, and the United Nations Children's Fund. It describes the local operational challenges of the campaign in Uttar Pradesh, and program leaders' responses to identify ways to improve the campaign's performance.

Article. Lessons From Polio Eradication
Larson HJ, Ghinai I. Lessons from Polio Eradication. Nature 2011; 473: 446-447. DOI: http://doi.org/10.1038/473446a.
This article takes stock at the global level of the quest to eradicate the world of polio, explaining that the current efforts to curtail the disease in the last few regions where it still exists has proven to be extremely challenging. This article could be given to students as a quick overview of the fight against polio on a global scale, how that fight has evolved over the last 30 years, and what is left to accomplish.

Article. The Polio Endgame
Aylward B, Yamada T. The Polio Endgame. The New England Journal of Medicine 2011; 364: 2273-2275. DOI: http://doi.org/10.1056/NEJMp1104329.
This article describes the history of the global polio epidemic since the World Health Assembly declared an initiative to eradicate the virus. An in-depth analysis of the history of the epidemic is laid out, with both success and failures, as well as data describing the percent decrease of cases as the initiative gained support. The article describes the need to move away from oral polio vaccine in order to prevent vaccine-derived polio virus and completely eradicate the disease.

Organization. Global Polio Eradication Initiative
Global Polio Eradication Initiative. http://polioeradication.org.
GHELI repository link: http://repository.gheli.harvard.edu/repository/11721
The Global Polio Eradication Initiative (GPEI) works around the world with the goal of eradicating all types of polio, from wild to vaccine-related as well as Sabin polioviruses. The organization was founded in 1988 after the World Health Organization passed a resolution making the elimination of polio a global priority. GPEI is a public-private partnership led by national governments with five partners—the World Health Organization, Rotary International, the U.S. Centers for Disease Control and Prevention, the United Nations Children's Fund, and the Bill and Melinda Gates Foundation. GPEI's current countries of focus are Afghanistan, Nigeria, and Pakistan.

Data. Data and Monitoring: Polio Cases by Country. Polio Global Eradication Initiative: Every Last Child
Data and Monitoring: Polio Cases by Country. Polio Global Eradication Initiative: Every Last Child. Global Polio Eradication Initiative. http://polioeradication.org/polio-today.
GHELI repository link: https://repository.gheli.harvard.edu/repository/11288
This data portal is maintained by the Global Polio Eradication Initiative, which provides insight to a lasting polio-free world and beyond. The portal includes resources such as monitoring reports and eradication targets, as well as information on immunization coverage and surveillance.

POLIO IN PAKISTAN

Article. How the Bin Laden Raid Put Vaccinators Under the Gun in Pakistan
McGirk T. How the Bin Laden Raid Put Vaccinators Under the Gun in Pakistan. National Geographic 2015; Feb 25. https://www.nationalgeographic.com/science/article/150225-polio-pakistan-vaccination-virus-health.
Archival Link: https://web.archive.org/web/20150714143306/http://news.nationalgeographic.com/2015/02/150225-polio-pakistan-vaccination-virus-health.
This article is the first in a series on "Polio's Surprising Comeback," on the forces behind the resurgence of polio in conflict settings in Pakistan and Syria. The article describes how volunteers fighting polio in Pakistan became assassination targets after U.S. Central Intelligence Agency agents used a Pakistani health official and a door-to-door hepatitis B vaccination campaign to capture Osama bin Laden.

Article. He Led the CIA to Bin Laden—and Unwittingly Fueled a Vaccination Backlash
Article. Mullaney A, Hassan SA. He Led the CIA to Bin Laden—and Unwittingly Fueled a Vaccination Backlash. National Geographic 2015; Feb 27. https://www.nationalgeographic.com/science/article/150227-polio-pakistan-vaccination-taliban-osama-bin-laden.
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This article is the second in a series on "Polio's Surprising Comeback," on the forces behind the resurgence of polio in conflict settings in Pakistan and Syria. The article profiles the story of Dr. Shakil Afridi, the Pakistani health official whose involvement with U.S. Central Intelligence Agency efforts to capture Osama bin Laden through a vaccination campaign resulted in national setbacks to well-established vaccination efforts against polio.

Article. Taliban Assassins Target Pakistan's Polio Vaccinators
McGirk T. Taliban Assassins Target Pakistan's Polio Vaccinators. National Geographic 2015; Mar 3. https://www.nationalgeographic.com/culture/article/150303-polio-pakistan-islamic-state-refugees-vaccination-health.
Archival Link: https://web.archive.org/web/20150311224228/https://news.nationalgeographic.com/2015/03/150303-polio-pakistan-islamic-state-refugees-vaccination-health.
This article is the third in a series on "Polio's Surprising Comeback," on the forces behind the resurgence of polio in conflict settings in Pakistan and Syria. The article describes how health workers—many of them women—face Taliban threats and violent attempts to thwart their commitment to vaccinate Pakistan's children against polio.

Infographic. Pakistan Polio Update
Pakistan Polio Update. Infographic. End Polio Pakistan 2018. http://endpolio.com.pk/media-room/pakistan-polio-update.
GHELI repository link: http://repository.gheli.harvard.edu/repository/11732
This infographic produced by End Polio Pakistan illustrates the current polio situation in Pakistan by a map of cases by location. The infographic also includes information on the history of polio in the country and data about the number of children targeted during the vaccination campaigns, the number of vaccinators, and the percentage of people who accept the vaccination campaign.

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Report. National Emergency Action Plan for Polio Eradication 2016-2017
Pakistan: National Emergency Action Plan for Polio Eradication 2016-2017. National Emergency Operations Centre 2016. http://polioeradication.org/wp-content/uploads/2016/11/NEAP2016-2017_Pakistan.pdf.
This government report considers Pakistan's recommendations to a Technical Advisory Group with the goal of disrupting wild poliovirus in Pakistan. The group's objectives include sustaining the progress made as well as building on successful approaches to ending the epidemic, noting the dramatic declines in confirmed cases from 306 in 2014 to only 13 by June 2016.

Article. Lessons From India: How to Promote the Polio Vaccine in Pakistan
Mahajan A. Lessons From India: How to Promote the Polio Vaccine in Pakistan. The New York Times 2013; Jan 11. https://archive.nytimes.com/india.blogs.nytimes.com/2013/01/11/lessons-from-india-how-to-promote-the-polio-vaccine-in-pakistan
This blog article identifies reasons for the apparent success in controlling polio in India as of January 2013. Between January 2011 and January 2013 (the time of writing), no new polio cases had been reported in India. Communication strategies that have been successful in India may be useful in Pakistan. For example, to overcome cultural misconceptions about polio vaccination, efforts in India have involved outreach to community-level religious leaders and scholars and get their support in vaccinating all children. The article also chronicles part of India's polio eradication journey, providing examples that may be useful for students who are interested in learning how large-scale public health threats need to be approached.

Article. Hurdles to the Global Antipolio Campaign in Pakistan: An Outline of the Current Status and Future Prospects to Achieve a Polio Free World
Khan T, Qazi J. Hurdles to the Global Antipolio Campaign in Pakistan: An Outline of the Current Status and Future Prospects to Achieve a Polio Free World. Journal of Epidemiology and Community Health 2013; 67(8): 696-702. DOI: http://doi.org/10.1136/jech-2012-202162.
This article reviews the barriers to polio eradication to Pakistan, evaluates them one at a time, and provides specific recommendations for strategies to combat each. It presents the barriers and suggestions in a simple, systematic way that may be useful for students to understand the challenges of eradicating polio in Pakistan. Some eradication barriers discussed include war and conflicts; prejudices against the vaccine; decline in number of vaccinators; ignorance, politics, and social considerations; natural tragedies; and the inefficacy of vaccines.

Article. Why We Must Provide Better Support for Pakistan's Female Frontline Health Workers
Closser S, Jooma R. Why We Must Provide Better Support for Pakistan's Female Frontline Health Workers. PLoS Medicine 2013; 10(10): e1001528. DOI: http://doi.org/10.1371/journal.pmed.1001528.
This article examines the role of Pakistan's 106,000 Lady Health Workers (LHWs) who are at the front lines of polio vaccination efforts through the Global Polio Eradication Initiative. LHWs have been targeted by militant groups, resulting in the murder of at least 29 LHWs in 2012 and 2013. The article takes the position that LHWs are necessary for polio eradication and advocates for better support for LHWs in a variety of forms including paying them higher wages, offering opportunities to them for career advancement, and reducing the visible involvement of political leaders in anti-polio efforts. Through the lens of one particular actor within the health system, this article helps demonstrate the connections between structural, cultural, and political forces and the work that is being done "on the ground" to combat global health threats.

Article. Pakistan, Politics, and Polio
Nishtar S. Pakistan, Politics, and Polio. Bulletin of the World Health Organization 2010; 88: 159-160. DOI: http://doi.org/10.2471/BLT.09.066480.
This article provides context that would be useful for students regarding the geopolitical and socioeconomic challenges that stand in the way of polio eradication in Pakistan. It includes recent statistics about the impact of polio in Pakistan, while also explaining progress and effects of the Global Polio Eradication Initiative (GPEI) within this context. The article concludes by advocating for reforms to address systemic problems which have prevented basic services from being properly delivered within the population.

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Article. Achieving Polio Eradication: A Review of Health Communication Evidence and Lessons Learned in India and Pakistan
Obregón R et al. Achieving Polio Eradication: A Review of Health Communication Evidence and Lessons Learned in India and Pakistan. Bulletin of the World Health Organization 2009; 87: 624-630. DOI: http://doi.org/10.2471/BLT.08.060863.
This review describes how the Global Polio Eradication Initiative (GPEI) has come close to eradicating polio. The review outlines the remaining difficulties in immunizing those who are located in remote areas. It highlights communication efforts on polio in India and Pakistan between 2000 and 2007, and it explains the research-driven focus of recent communication strategies to make them as effective as possible in order to help GPEI succeed.

POLIO IN SYRIA

Article. Fighting Polio Amid the Chaos of Syria's Civil War
Motlagh J. Fighting Polio Amid the Chaos of Syria's Civil War. National Geographic 2015; Mar 5. https://www.nationalgeographic.com/culture/article/150305-polio-syria-iraq-islamic-state-refugees-vaccination-virus-jihad
Archival Link: https://web.archive.org/web/20150311223127/https://news.nationalgeographic.com/2015/03/150305-polio-syria-iraq-islamic-state-refugees-vaccination-virus-jihad.
This is the fourth and final article in a series on "Polio's Surprising Comeback," on the forces behind the resurgence of polio in conflict settings in Pakistan and Syria. The article describes how civil war has increased polio risk in Syria, a country that had insisted on compulsory and free vaccinations for all children, nearly eliminating the virus in the 1990s. It highlights dedicated volunteer efforts to carry out vaccinations, often at risk to their own lives, despite violence, roadblocks, and civil unrest.

Article. Polio Paralyzes 17 Children in Syria, W.H.O. Says
Gladstone R. Polio Paralyzes 17 Children in Syria, W.H.O. Says. The New York Times 2017; Jun 20. https://nyti.ms/2sOefhv.
This article reports that at least 17 children in Syria were paralyzed due to polio in an outbreak in 2017. It emphasizes the urgency of vaccinating children under age five. The 2017 outbreak, distinct from an earlier outbreak in 2013, was caused by the vaccine itself, which can mutate in the fecal matter of vaccinated children and then infect those who are unvaccinated. Conflicts in places such as Syria and Yemen pose a big threat to public health because they do not allow vaccination campaigns to proceed as planned. If used in classroom discussions, this article might be paired with the World Health Organization's short article about the outbreak.

Podcast. Polio Outbreak in War-Torn Syria
Polio Outbreak in War-Torn Syria. Center for Strategic and International Studies 2017. https://www.csis.org/podcasts/take-directed/polio-outbreak-war-torn-syria.
This 28-minute podcast discusses the 30 cases of vaccine-derived polio reported in Syria in 2017. Dr. John Vertefeuille joins host J. Stephen Morrison to discuss this rare situation in which the vaccine causes the virus. They discuss the relationship between war and polio, the response measures taken when an outbreak (of any kind) occurs, and the global strategy to eradicate the disease.

Article. Syrian Crisis: Health Experts Say More Can Be Done
Cousins S. Syrian Crisis: Health Experts Say More Can Be Done. The Lancet 2015; 385(9972): 931-934. DOI: http://dx.doi.org/10.1016/S0140-6736(15)60515-3.
This article highlights the major health problems that faced Syria as the country entered its fifth year of conflict. The article describes how violence has shattered Syria's health care system and led to the reemergence of polio in October 2013—14 years after the country had been declared polio-free. Although 27 million children across the region were targeted in a huge immunization campaign, many experts fear that lack of facilities, diagnostic tools, and methods for surveillance present roadblocks to addressing polio's reemergence in Syria.

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Article. Polio in Syria
Aylward RB, Alwan A. Polio in Syria. The Lancet 2014; 383(9916): 489-491. DOI: http://dx.doi.org/10.1016/S0140-6736(14)60132-X.
This article provides an overview of the onset of polio in Syria as a global health concern. It explains the extent of the polio burden in Syria, surveillance efforts in place, the international response to this health emergency, and the barriers the country continues to face to implementation. It particularly explores how polio has been detected in areas controlled by those in opposition to the government, and the barrier faced by populations within those areas who are unable to access the vaccine.

Article. War and Infectious Diseases: Challenges of the Syrian Civil War
Sharara SL, Kanj SS. War and Infectious Diseases: Challenges of the Syrian Civil War. PLoS Pathogens 2014; 10(11): e1004438. DOI: https://doi.org/10.1371/journal.ppat.1004438.
This article addresses the relationship between the Syrian Civil War and the epidemics of multiple infectious diseases, including polio. After providing a very brief background on the war, it explains how conflict impacts the health system and specifically how war can cause the spread of infectious disease. Polio is also addressed in a separate section.

Article. Polio in Syria: An Outbreak That Threatens the Middle East
Whewell T. Polio in Syria: An Outbreak That Threatens the Middle East. BBC News 2014; Mar 14. http://www.bbc.com/news/magazine-26734465.
This article on the polio crisis in Syria is an overview of how war is affecting public health and the role of the World Health Organization and other health organizations in fighting the disease. It includes narrative examples from those affected by polio as well as the perspectives of key actors in eradication efforts.

Article. Syria: A Healthcare System on the Brink of Collapse
Article. Stone-Brown K. Syria: A Healthcare System on the Brink of Collapse. British Medical Journal 2013; 347: f7375. DOI: https://doi.org/10.1136/bmj.f7375.
This article examines the Syrian health care system within the context of the ongoing civil war. It outlines the multiple, severe challenges that the system faced, including the need to care for nearly 600,000 injuries due to war, the departure of approximately 80,000 doctors from the country (leaving behind just 37,000), medicine shortages, and the re-emergence of polio within Syria. The article also features a useful table of statistics related to the civil war and the health system.

Report. Commission on Syria: Health in Conflict
Commission on Syria: Health in Conflict. The Lancet 2017. http://www.thelancet.com/commissions/Syria.
This *Lancet* series addresses the state of health in Syria in the current conflict. The series includes an article on health workers and the weaponization of health care in Syria as well as an editorial, comment, infographic, and links to related articles, reports, policy reviews, and other publications on Syria in related Lancet journals. Most resources include either a direct or indirect link to the fight to eradicate polio in Syria amidst a number of mitigating factors.

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Glossary

Polio Eradication

2017

Acute Flaccid Paralysis (AFP)
Sudden onset of paralysis/weakness in any part of the body of a child less than 15 years of age. (World Health Organization Country Office for India 2017)

Advocacy
Strategic effort to achieve change by creating political commitment and an enabling environment. For strengthened routine immunization, this includes necessary policies and laws, government infrastructures such as health systems or immunization delivery systems, budgets and government financing, community engagement and support. (Advocacy for Immunization 2017)

Armed Conflict
A dispute involving the use of armed force between two or more parties. International humanitarian law distinguishes between international armed conflicts (a war involving two or more states, regardless of whether a declaration of war has been made or whether the parties recognize that there is a state of war) and non-international armed conflicts (a conflict in which government forces are fighting with armed insurgents, or armed groups are fighting amongst themselves). (United Nations 2003)

Armed Group
An armed non-state actor engaged in conflict and distinct from a governmental force, whose structure may range from that of a militia to rebel bandits. (United Nations 2003)

Armed Violence
The use or threatened use of weapons to inflict injury, death, or psychosocial harm, which undermines development. (Organization for Economic Cooperation and Development 2009)

Asymptomatic
Not showing signs or symptoms of disease. (Kaiser Global Health 2013)

CDC (Centers for Disease Control and Prevention)
CDC is one of the major operating components of the U.S. Department of Health and Human Services. Its mission is to develop and apply disease prevention and control, environmental health, and health promotion and education activities designed to improve the health of the people of the United States. The agency also achieves this through its involvement in global health. The Coordinating Office of Global Health, one of the CDC's six Coordinating Centers, provides national leadership, coordination, and support for CDC's global health activities in collaboration with CDC's global health partners. The National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention (NCHHSTP), housed under CDC's Coordinating Center for Infectious Diseases (CCID) works to prevent and control HIV/AIDS, viral hepatitis, sexually transmitted diseases, and tuberculosis at the community, state, national, and international levels. (Kaiser Global Health 2013)

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Civil Society
Structures independent from government, such as non-governmental organizations and human rights groups, independent activists and human rights defenders, religious congregations, charities, universities, trade unions, legal associations, families, and clans. Domestic civil society represents one of the most critical sources of humanitarian assistance and civilian protection during humanitarian emergencies. (United Nations 2003)

Civilian Personnel
Non-military individuals who form part of a peacekeeping operation and perform duties, among other things, relating to the human rights, humanitarian, or political situation on the ground, and the financial and administrative management of a mission. (United Nations 2003)

Civilian Populations
Groups of unarmed people, including women, children, the sick and elderly, refugees, and internally displaced persons who are not directly engaged in the armed conflict. (United Nations 2003)

Collective Violence
The instrumental use of violence by people who identify themselves as members of a group—whether this group is transitory or has a more permanent identity—against another group or set of individuals in order to achieve political, economic, or social objectives. (Rutherford et al. 2007)

Combatant
A person who takes an active part in hostilities, who can kill, and who, in turn, is a lawful military target. S/he can be a member of the armed forces, other than medical personnel or chaplains, or of an organized group. (United Nations 2003)

Communicable (as in disease)
Capable of being transmitted from person to person, animal to animal, animal to human, or human to animal. See also *contagious* and *infectious*. (Kaiser Global Health 2013)

Community Mobilization
A strategic effort, often involving a broad coalition of campaigners, organizations and importantly, communities themselves, to raise awareness, increase knowledge, and change perceptions about a health issue by working to solve problems through the community itself. (Advocacy for Immunization 2017)

Conflict Affected Countries
Countries in which ongoing conflict makes implementation of vaccination and surveillance activities particularly challenging, compounded by a destroyed or weakened health infrastructure. (United Nations 2003)

Conflict Prevention
Measures to avert violent conflict and put in place the means to resolve future disputes non-violently. Strategies for prevention fall into two categories: operational prevention (measures applicable in the face of immediate crisis), and structural prevention (longer term measures to ensure that crises do not arise in the first place, or if they do, that they do not recur). (United Nations 2003)

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Conflict Resolution
The resolution of a conflict usually by a process or method of helping parties reach agreement. (United Nations 2003)

Confirmed Case (of disease or infection)
A case that: 1) meets the clinical case definition or has clinically compatible illness, and 2) is either laboratory confirmed or is epidemiologically linked to a confirmed case. (Kaiser Global Health 2013)

Contagious (as in disease)
Communicable by contact; capable of being transmitted from one person to another by contact or close proximity. (Kaiser Global Health 2013)

Days of Immunization
A specified period of ceasefire agreed upon by parties to an armed conflict during which humanitarian agencies are granted access to immunize civilian populations. (United Nations 2003).

Disease Surveillance
The systematic collection, analysis, interpretation, and dissemination of health data on an ongoing basis, to gain knowledge of the pattern of disease occurrence and potential in a community, in order to control and prevent disease in the community. (Kaiser Global Health 2013)

Education, Information, and Communication (EIC)
EIC involves creating communications materials, such as posters, brochures, and content, to educate and inform specific population groups, individuals, communities, and health care workers about healthy behaviors. (Advocacy for Immunization 2017)

Elimination (of disease or infection)
Reduction to zero of the incidence of a specified disease (or infection) in a defined geographical area as a result of deliberate efforts; continued intervention measures are required. (Kaiser Global Health 2013)

Endemic
Having a constant measurable incidence both of cases and of natural transmission in an area over a succession of years. (Kaiser Global Health 2013)

Epidemic
The occurrence of more cases of disease than expected in a given area or among a specific group of people over a particular period of time. (Kaiser Global Health 2013)

Epidemiology
The study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems. (Kaiser Global Health 2013)

Eradication (of disease or infection)
Permanent reduction to zero of the worldwide incidence of a disease (or infection) as a result of deliberate efforts; intervention measures are no longer needed. (Kaiser Global Health 2013)

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Extinction (of disease or infection)
When a specific infectious agent no longer exists in nature or in the laboratory. Theoretically, extinction of an infectious disease is possible; however, proving that the infectious agent no longer exists in nature or in any controlled environment has proven impossible. (Kaiser Global Health 2013)

Global Alliance for Vaccines and Immunizations (GAVI)
A public-private partnership created in 2000 to save children's lives and protect people's health by increasing access to immunization in poor countries. (Kaiser Global Health 2013)

Global Polio Eradication Initiative (GPEI)
A public private partnership led by national governments and spearheaded by the World Health Organization (WHO), Rotary International, the U.S. Centers for Disease Control and Prevention (CDC), and the United Nations Children's Fund (UNICEF). Its goal is to eradicate polio worldwide. GPEI is currently leading a global effort to eradicate polio, known as "The Polio Eradication & Endgame Strategic Plan 2013–2018." (Advocacy for Immunization 2017)

Herd Immunity
A population with a high proportion of individuals with immunity to a particular pathogen, as a consequence of immunization or infection and recovery, may confer protection from infection on the small proportion of its non-immune members because there are too few susceptible people in the "herd" for the infection to circulate. (World Health Organization 2017)

Humanitarian Access
Where protection is not available from national authorities or controlling non-state actors, vulnerable populations have a right to receive international protection and assistance from an impartial humanitarian relief operation. Such action is subject to the consent of the state or parties concerned and does not prescribe coercive measures in the event of refusal, however unwarranted. (United Nations 2003)

Humanitarian Assistance
Aid that seeks to save lives and alleviate suffering of a crisis-affected population. Assistance must be provided in accordance with the basic humanitarian principles of humanity, impartiality, and neutrality, and in full respect for the sovereignty of states. (United Nations 2003)

Humanitarian Operations
Operations conducted to relieve human suffering, especially in circumstances where responsible authorities in the area are unable or unwilling to provide adequate service support to civilian populations. (United Nations 2003)

Immune System
The body's system of defense against foreign organisms such as bacteria, viruses, or fungi. (Kaiser Global Health 2013)

Immunization
The process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine. Vaccines stimulate the body's own immune system to protect the person against subsequent infection or disease. (Kaiser Global Health 2013)

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Inactivated Polio Vaccine (IPV)
An inactivated (killed) polio vaccine, developed in 1955 by Dr. Jonas Salk. Unlike oral polio vaccine, a live, attenuated vaccine (LAV), IPV must be injected to produce the desired immune response. (World Health Organization 2017)

Incidence
The number of new events, such as new cases of a disease, occurring over a specific period of time. It is often expressed as a rate, for example the number of cases per 100,000 in the population. (Kaiser Global Health 2013)

Incidence Rate
The number of persons contracting a disease per 1,000 population at risk, for a given period of time. (Population Reference Bureau 2016)

Incubation Period
The period of time between disease infection and the onset of symptoms. (Kaiser Global Health 2013)

Infectious Disease(s)
Infectious diseases are caused by pathogenic microorganisms, such as bacteria, viruses, parasites, or fungi; they are potentially transferable to others, directly or indirectly, but may not be communicable. Zoonotic diseases are infectious diseases of animals that can cause disease when transmitted to humans. (Kaiser Global Health 2013)

National Immunization Days (NIDs)
During NIDs, all children aged five years or less in a country receive two doses of OPV one month apart, regardless of their prior immunization status. NIDs are needed for at least three consecutive years to interrupt wild poliovirus transmission. Subnational immunization days (SNIDs) are similar to NIDs, but target children for polio vaccination in specific high-risk regions of countries rather than the entire country. (World Health Organization 2000)

Oral Polio Vaccine (OPV)
A preparation of live attenuated polio virus, used to immunize against polio and developed by Dr. Albert Sabin in 1961. OPV is administered orally (by mouth). (World Health Organization 2017)

Outbreak (of disease or infection)
Often synonymous with "epidemic," generally refers to the spread of disease over a short period of time in a limited geographic area but may extend over a longer period time across several countries if the disease is not contained. (Kaiser Global Health 2013)

Pandemic
A worldwide epidemic; occurring over a wide geographic area and affecting an exceptionally high proportion of the population. (Kaiser Global Health 2013)

Pathogen
Microorganisms (such as a bacteria or viruses) that causes disease. (U.S. Government 2016)

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Poliomyelitis (Polio)
A crippling disease caused by any one of three related viruses; poliovirus types 1, 2 or 3. Polio is transmitted solely through fecal and oral routes and enters the body through the mouth when people eat food or drink water contaminated with excreta. The virus is easily spread in areas with poor hygiene. Polio is preventable by vaccine. (Kaiser Global Health 2013)

Political Lobbying
Sometimes used interchangeably with advocacy, but a more specifically targeted effort to influence a specific piece of government legislation by working directly through or with legislative influencers and decision makers. (Advocacy for Immunization 2017)

Prevention
Reducing the risk of disease infection, and transmission. (Kaiser Global Health 2013)

Preventive Diplomacy
Action to prevent disputes from arising between parties, to prevent existing disputes from escalating into conflicts, and to limit the spread of the latter when they occur. (United Nations 2003)

Probable Case (of disease or infection)
A case that meets the clinical case definition without laboratory confirmation and is epidemiologically linked to a clinically compatible case. (Kaiser Global Health 2013)

Reservoir Countries
Countries characterized by large high-density populations, high birth rates, low routine immunization coverage in at least some areas of the country, and sub-optimal sanitation. With intense poliovirus transmission and large numbers of cases, they serve as "global reservoirs" of poliovirus, exporting the virus to neighboring countries. (World Health Organization 2000)

Resource Mobilization or Fundraising
Targeting organizations or individuals who can provide funding for a health initiative, campaign, or advocacy outcome. (Advocacy for Immunization 2017)

Routine Infant Immunization
Routine immunization is the foundation of polio eradication. All countries aim to immunize at least 90% of infants with four oral polio vaccine (OPV) doses by one year of age through routine immunization services. High routine immunization coverage decreases the incidence of polio and sets the stage for eradication. (World Health Organization 2000)

Social Marketing
Employing mass marketing and advertising techniques and channels, developing campaigns for TV, radio, and other mass media to raise awareness and persuade communities, population groups, and individuals to change their health behaviors. (Advocacy for Immunization 2017)

Suspected Case (of disease or infection)
A case with clinically compatible illness or that meets the clinical case definition without laboratory testing or a case with laboratory tests suggestive of a disease without clinical information. (Kaiser Global Health 2013)

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Terrorism
While there is no agreed upon international definition of terrorism yet, it is a concept generally understood to mean a criminal act or acts intended to inflict dramatic and deadly injury on civilians and to create an atmosphere of fear, generally in furtherance of a political or ideological (whether secular or religious) purpose. Terrorism is most often carried out by sub-national or transnational groups, but it has also been known to be practiced by rulers as an instrument of control. (United Nations 2003)

Vaccine
A substance that contains a deactivated infectious organism designed to stimulate the immune system to protect against subsequent infection from the active organism. A preventive vaccine preempts infection from that organism, like a virus. A therapeutic vaccine improves the ability of the immune system of a person already infected with the organism to defend itself. (Kaiser Global Health 2013)

Vaccine-Derived Poliovirus (VDPV)
Where polio vaccine coverage rates decline but oral polio vaccine use continues, person-to-person spread of vaccine polioviruses can lead to increased virulence that resemble the wild virus. (World Health Organization 2017)

Violence
The intentional use of physical force or power, threatened or actual, against oneself, another person, or against a group or community that either results in or has a high likelihood of resulting in injury, death, psychological harm, maldevelopment or deprivation. (Rutherford et al. 2007)

Virus
A microbe that invades cells and is not subject to antibiotics. Viruses cause many common infections such as flu and colds. Vaccines can prevent the spread of some viral illnesses (including polio), and other medications can ease viral disease symptoms but not cure the illness. (Kaiser Global Health 2013)

Vulnerable Populations
Populations that are at increased risk of exposure to diseases due to socioeconomic, cultural, or behavioral factors. Vulnerable populations include racial and ethnic minorities, refugees, poor people, men who have sex with men, injection drug users, sex workers, and women where gender inequality is pronounced. (Kaiser Global Health 2013)

Wild Poliovirus
A strain of poliovirus that occurs naturally, as opposed to vaccine-related strains. (World Health Organization 2017)

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