

## LESSON: Caring for Children Amidst Chaos

**Summary:** Students read an article about the need for comprehensive clinical guidelines to help save the lives of children in complex emergency situations such as war or natural disasters. Students then analyze two different clinical guidelines in the context of a hypothetical scenario in Afghanistan.

**Lesson Type:** Integrated Lesson—This lesson extends beyond traditional science content and can be used in other academic subjects.

**EHP Article:** “Caring for Children Amidst Chaos: Guidelines to Maintain Health”  
*EHP Student Edition*, January 2007, p. A584–A591  
<http://www.ehponline.org/members/2006/114-10/focus.html>

**Objectives:** By the end of this lesson, students should be able to

1. read a data table and identify potential correlations between children’s mortality rates and other factors;
2. read an article and extract key information; and
3. critically analyze two different children’s clinical guidelines for similarities, differences, strengths, and weaknesses.

**Class Time:** 2–3 hours

**Grade Level:** 9–12

**Subjects Addressed:** Social Studies, General Science, Health

### ► Prepping the Lesson (15 minutes)

#### INSTRUCTIONS:

1. Download the entire January 2007 *EHP Student Edition* at <http://www.ehponline.org/science-ed/>, or download just the article “Caring for Children Amidst Chaos: Guidelines to Maintain Health” at <http://www.ehponline.org/members/2006/114-10/focus.html>.
2. Review the Background Information, Instructions, and Student Instructions.
3. Make copies of the article, the Student Instructions (including Table 1), and the clinical guidelines (“Clinical Practice Guidelines: Diarrhoea and Vomiting” and “Does the Young Infant have Diarrhoea?”).

#### MATERIALS (per student):

- 1 copy of *EHP Student Edition*, January 2007, or 1 copy of “Caring for Children Amidst Chaos: Guidelines to Maintain Health,” preferably in color
- 1 copy of the Student Instructions
- 1 copy of Table 1
- 1 copy of “Clinical Practice Guidelines: Diarrhoea and Vomiting”
- 1 copy of “Does the Young Infant have Diarrhoea?”

#### VOCABULARY:

- asphyxia
- clinical guidelines
- diarrhoea, diarrhea (note the spelling differences)
- neonatal infection
- prematurity

NOTE: There are numerous vocabulary words in the clinical guidelines. Students do not need to know those definitions to successfully complete this activity.



**BACKGROUND INFORMATION:**

The article provides sufficient information to complete the activity. Students may wonder why Singapore and Sweden have zero deaths of children under the age of 5. This would be an excellent opportunity for students to think critically and identify possible reasons. First you can have students study the table for potential reasons. For example Sweden and Singapore have comparatively small populations. It is easier to have zero deaths in a group of 10 people compared to 100,000. Astute students may also notice that Sierra Leone, the country ranked #1 in children's deaths under the age of 5, has a similar population size as Singapore (~4-5 million). In statistics, population size is adjusted for via rates and per capita calculations so people can compare apples to apples. Other possible explanations of the zero deaths in Singapore and Sweden include inaccurate data collection, the table only represents one year (other years they may be some infant deaths), or the data are correct and there are societal and environmental factors impacting child mortality (which are explored in this lesson).

This lesson uses a small excerpt of the UNICEF and the Royal Children's Hospital clinical guidelines. Visit the websites listed in the Resources section to view the complete documents.

**RESOURCES:**

*Environmental Health Perspectives*, Environews by Topic page, <http://ehp.niehs.nih.gov/>. Choose Infectious Disease.

U.S. Department of Health and Human Services, Pandemic flu, <http://www.pandemicflu.gov/>

BBC News, country profiles:

Afghanistan, [http://news.bbc.co.uk/2/hi/south\\_asia/country\\_profiles/1162668.stm](http://news.bbc.co.uk/2/hi/south_asia/country_profiles/1162668.stm)

Angola, [http://news.bbc.co.uk/2/hi/africa/country\\_profiles/1063073.stm](http://news.bbc.co.uk/2/hi/africa/country_profiles/1063073.stm)

Niger, [http://news.bbc.co.uk/2/hi/africa/country\\_profiles/1054396.stm](http://news.bbc.co.uk/2/hi/africa/country_profiles/1054396.stm)

Sierra Leone, [http://news.bbc.co.uk/1/hi/world/africa/country\\_profiles/1061561.stm](http://news.bbc.co.uk/1/hi/world/africa/country_profiles/1061561.stm)

Singapore, [http://news.bbc.co.uk/1/hi/world/asia-pacific/country\\_profiles/1143240.stm](http://news.bbc.co.uk/1/hi/world/asia-pacific/country_profiles/1143240.stm)

Sweden, [http://news.bbc.co.uk/2/hi/europe/country\\_profiles/1021823.stm](http://news.bbc.co.uk/2/hi/europe/country_profiles/1021823.stm)

United States, [http://news.bbc.co.uk/2/hi/americas/country\\_profiles/1217752.stm](http://news.bbc.co.uk/2/hi/americas/country_profiles/1217752.stm)

Royal Children's Hospital Melbourne, Clinical practice guidelines, [http://www.rch.org.au/clinicalguide/index.cfm?doc\\_id=5033](http://www.rch.org.au/clinicalguide/index.cfm?doc_id=5033)

UNICEF (search for clinical guidelines or visit the "Statistics" link), <http://www.unicef.org/>

**► Implementing the Lesson****INSTRUCTIONS:**

1. Distribute the student handouts and review them as needed to get the students working independently.
2. Discuss answers as a class to advance the students' understanding of the advantages, disadvantages, and potential feasibility of generating comprehensive "one-size-fits all" children's health emergency guidelines.

**NOTES & HELPFUL HINTS:**

1. Students could conduct research on one of the countries highlighted in Table 1 to learn more about the specific history that resulted in the country's current child death rate.
2. The UNICEF website has more statistics that can be downloaded in an Excel file. Students could run formal correlation tests and graphs to identify the factors that may correlate most strongly to childhood mortality. The *EHP Student Edition* lesson "What's Your Hypothesis?" (May 2005) provides excellent background and an activity on how to conduct a Pearson's r correlation test.
3. This lesson complements the December 2006 *EHP Student Edition* lesson "What's the Plan?" in which students analyze their community's emergency weather plan. Together, the lessons can help students gain perspective on the complexity of managing emergency situations (from support management, to supplies management, to clinical management). The lessons also help students develop critical thinking and analytical skills in the context of life-saving actions.

**► Aligning with Standards****SKILLS USED OR DEVELOPED:**

- Classification
- Communication (note-taking, oral, written—including summarization)
- Comprehension (listening, reading)



- Critical thinking and response
- Research
- Tables and figures (reading)

**SPECIFIC CONTENT ADDRESSED:**

- Clinical guidelines
- Children's health
- International studies

**NATIONAL SCIENCE EDUCATION STANDARDS MET:****Science Content Standards****Unifying Concepts and Processes Standard**

- Systems, order, and organization
- Evidence, models, and explanation
- Change, constancy, and measurement
- Evolution and equilibrium
- Form and function

**Science as Inquiry Standard**

- Abilities necessary to do scientific inquiry

**Life Science Standard**

- Interdependence of organisms

**Science in Personal and Social Perspectives Standard**

- Personal and community health
- Environmental quality
- Natural and human-induced hazards
- Science and technology in local, national, and global challenges

**▶ Assessing the Lesson**

**Step 1:** Refer to Table 1 and answer the following questions.

- a. How many total children died in 2003 in the countries with the highest under-5 mortality rates (the countries ranked 1 through 4)?

720,000

- b. List 2 factors that appear to correlate with high child mortality rates.

Answers can include gross national income, literacy rate/school attendance, war, natural disasters. Students may list life expectancy, but if they do, it is worth discussing as a class the concept of cause and effect, and the idea that correlation does not always mean causation. For example, there is a high correlation between the presence of fire trucks and fires, but does that mean fire trucks cause fires?

This is also a good time to discuss strength of correlation. For example, does a natural disaster alone cause large-scale deaths, or are there other factors—such as poor infrastructure, emergency response, and poverty—that may have even greater effects? Consider Hurricane Katrina hitting the United States versus the tsunami hitting Southeast Asia. Hurricane Katrina killed approximately 1,800 people and the tsunami killed 180,000–230,000. The poor infrastructure, emergency response, poverty, and poor warning/detection systems significantly contributed to the large numbers of people killed by the tsunami.

**Step 2:** Read pages A585 to A589 (up to the section titled "Precedents") of the article "Caring for Children Amidst Chaos: Guidelines to Maintain Health," then answer the following questions.

- a. What percentage of the people who died in a complex emergency situation were children? List the range from the examples in the article. ~50% to 74%



- b. List three examples of clinical guidelines that are missing for emergency situations.

Asphyxia, prematurity, neonatal infection, diagnosis and management of children with HIV, treatment of tuberculosis, pediatric trauma, mental health problems, diagnosing and managing persistent diarrhea, neonatal health such as preventing tetanus or asphyxia, and trauma management.

- c. List the leading causes of children's death in both stable and unstable situations.

Malnutrition, measles, malaria, and diarrheal diseases

- d. List one example of a potential problem or challenge with drafting general clinical emergency guidelines for children's health.

Different countries have different problems (such as drug resistance, pharmaceutical drug laws, health worker skill level) that change on a relatively frequent basis. It may be difficult to get multiple organizations together to create such a document. It will be expensive to create such a document and keep it up to date.

**Step 3:** Carefully review the pages titled "Clinical Practice Guidelines: Diarrhoea and Vomiting" and "Does the Young Infant have Diarrhoea?" Then answer the following questions.

- a. List two similarities and two differences between the guidelines. Provide examples to support your point.

**SIMILARITIES:**

Listing an answer like "they both discuss diarrhea" does not count as a similarity. Student responses will vary; you may need to check an answer against the guidelines. Some answers may include: they both list similar symptoms of dehydration; they provide similar treatment instructions; they both refer the child to the hospital at a certain point.

**DIFFERENCES:**

Student responses will vary; you may need to check an answer against the guidelines. Some answers may include: the UNICEF guidelines have less text and are formatted in "quick read," color-coded tables; the "Clinical Practice Guidelines" use more technical language; some of the dehydration symptoms differ (e.g., the "Young Infant" guidelines do not list "dry mucous membranes"); the "Clinical Practice Guidelines" provide more specifics about do's and don'ts in treatment (e.g., avoid fizzy drinks; hourly rates for rehydration).

**Step 4:** Imagine the following scenario in Afghanistan. War has damaged a village's only well, and the people and their animals (from which they obtain milk) have been forced to drink from a small river contaminated with cattle fecal matter and other chemicals. The people say they have been boiling the water before drinking it. However, there is a severe outbreak of diarrhea and vomiting in most of the village. The children are in particularly poor condition, with three dying in the past two days. With each passing day at least one or two children are very close to death. One day ago, there was a battle that resulted in the complete destruction of the nearest hospital. Several international agencies have sent lay health care workers with supplies, and a physician will arrive in three to four days. Answer the following questions.

- a. Using your problem-solving skills, identify two challenges the health care workers must overcome to treat this epidemic, and describe why these challenges must be overcome in order to save lives.

Student answers may vary. Check for logical answers that demonstrate an understanding of the scenario and cause-effect parameters. For example, the river water is the likely source of the diarrhea. Even if people are boiling their water, diseases may be transmitted through other avenues, such as their milk-bearing animals, transmission onto hands from washing in the water, etc. There could also be a chemical contaminant in the water making the people sick. People cannot continue to drink or use the river water. Thus, the health care team needs to do one or more of the following: figure out how to get support to repair the well, bring in enough potable water to support the village for several days until a solution to the contaminated source is addressed, bring supplies to filter/purify the river water, or move the village to a location with clean water.

- b. Review the "Clinical Practice Guidelines: Diarrhoea and Vomiting" and "Does the Young Infant have Diarrhoea?" guidelines and pick one to work with. Imagine you are a lay health care worker trying to help this Afghan village and



you have only the guidelines you selected available to you. Describe how these guidelines would help you, and describe any limitations of the guidelines given the specific circumstances you are in. What help would you need the guidelines to help you save lives in this emergency situation?

Student answers will vary. Look for clear, detailed, logical answers. For example, one major limitation of these guidelines is that in severe cases of diarrhea and dehydration both guidelines say to refer the child to a hospital. In this situation, the hospital has been destroyed, and the doctor will not arrive for several more days. In normal circumstances (i.e., where there is a hospital or physician available), these guidelines would be sufficient. However, in this emergency situation, the lay health care worker may not know what to do. Some other limitations include a lack of recommendations for tests to determine the source or cause of the diarrhea so treatment could occur beyond preventing dehydration. Neither document mentions chemical contamination as a potential cause of the diarrhea.

### ► Authors and Reviewers

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Table 1. Mortality and Demographic Statistics

Country	Under-5 Mortality Rank	Under-5 Mortality Rate (2003)	Annual Number of Under-5 Deaths (2003)	Gross National Income Per Capita US\$	Life Expectancy at Birth (years)	Total Adult Literacy Rate (%)	Net Primary School Enrollment/Attendance (%)	Notes
Sierra Leone (4,971,000)	1	284	70,000	150	34	36	41	West African civil war lasted from 1991 to 2000
Niger (11,972,000)	2	262	173,000	200	46	16	30	North central Africa suffers from droughts and political instability
Angola (13,625,000)	3	260	185,000	740	40	—	58	Southwestern coastal Africa suffered a 27-year civil war until 2002
Afghanistan (23,897,000)	4	257	292,000	250	43	36	54	Sandwiched between the Middle East, Central Asia, and Indian subcontinent. Numerous wars and political instability
United States (294,043,000)	157	8	34,000	37,610	77	—	93	Leading economic and military power. Democratic government. More than 30 million people live below poverty level
Singapore (4,253,000)	192	3	0	21,230	78	92	93	Located in Southeast Asia. High-tech, wealthy city-state with strict social controls. Most people live in high-rise public housing with one of the world's highest standards of living
Sweden (8,876,000)	192	3	0	28,840	80	—	100	Located in northern Europe. For the past 70 years ruled by Social Democrats. Operates as a very "neutral" country in world affairs. Extremely low unemployment rate, and one of the world's highest standards of living

