COVER SHEET

TITLE: Photo Voice: Application of a Novel Assessment Tool to Identify the Need to Improve Water Safety in Mountain Communities in the Dominican Republic

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YEAR: 2012

ABSTRACT

Photo Voice: Application of a Novel Assessment Tool to Identify the Need to Improve Water Safety in Mountain Communities in the Dominican Republic

The mountain communities in the Elias Piña province of the Dominican Republic have the highest prevalence rates of diarrheal disease in the country. Using the participatory method of Photo Voice, the researcher partnered with a local NGO to collect preliminary information that will assist with the process of improving water safety in these mountain communities. The three goals of the project were to: 1) learn where the communities collected their drinking and cooking water, 2) assess their understanding of safe water, and 3) empower the communities to find practical solutions to accessing safe water. Upon evaluation, the researcher recommended that education be provided on the attributes of safe water, the benefits of water purification and the proper chlorine-water ratio, and the characteristics of waterborne diseases.

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Photo Voice: Application of a Novel Assessment Tool to Identify the Need to Improve Water Safety in Mountain Communities in the Dominican Republic

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December 2011

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I. Executive Summary

Dr. Angel Valdez is the only doctor at a small clinic in El Llano, which is run by Marian Foundation of Saint Isidore the Laborer (FUMSIL), a local non-profit organization. FUMSIL is the primary health care provider for twenty-three mountain communities (approximately 20,000 people) along the Haitian border in the Elias Piña province of the Dominican Republic. The province already suffers from a high prevalence of diarrheal disease, but after the Haitian cholera outbreak in November, 2010, Dr. Valdez reported seeing an even greater increase in cases in the communities.

This project collected preliminary information that is useful to the effort of aiding the communities and FUMSIL in improving the current water safety situation. The project had three goals: 1) to learn where villagers in the communities collected their drinking and cooking water, 2) to assess their understanding of safe water, and 3) to empower the communities to find practical solutions to getting safe water. The Photo Voice method was chosen to be the survey strategy to obtain the above goals because it is a participatory method that asks participants to answer questions through photographs. Those photographs are then used to facilitate discussions about solutions to community issues. Originally, the Participatory Photo Mapping (PPM) method was selected as the survey strategy, but due to complications with the GPS units, the method was replaced.

The project comprised two sections; personal interviews with community members and community discussion groups. Nine of the twenty-three communities were chosen by Dr. Valdez and within each of those communities three villagers were asked to participate in the project. After receiving consent from the participants, they were asked to show the researcher an example of a safe and unsafe water source. Participants were also asked to explain challenges to accessing safe water, and treatment and storage methods before consumption. The participants' examples and answers were photographed and recorded for use in the community discussions. Each community discussion involved three neighboring communities due to the likelihood of them working together to finding solutions to accessing safe water. During the group discussions the community members were asked to select photographs from the individual interviews that they believed represented examples of safe water sources and then to explain their understanding of why those sources were perceived to be safe. In the second segment of the discussion, participants were then asked to describe the solutions they thought would improve their communities' access to safe water.

All the participants indicated in the personal interviews that they used a spring as their primary source for safe water, even if they had access to a faucet or aqueduct. This was a result of the unreliability of the faucet or aqueduct. When the participants were asked to explain why they believed their water source was safe the two most common responses were because "it came from the ground" or "no one has gotten sick" (Table 3). The researcher occasionally observed a ring of rock surrounding a "safe" water source. The reasoning given by participants was that it separated the "unsafe" water (water outside the ring) from the "safe" water (water inside the ring). Distance was the most common response from participants regarding what inhibited them from accessing safe water, which could be an influence from the belief that water from the ground is already safe.

Two questions were addressed in the group discussions; 1) How is water understood to be clean and 2) what can communities do improve access to safe water? The community members gave simple answers in the beginning as they described their perception of clean water, but were required to elaborate after the facilitators asked them to explain their understanding more completely. Eventually the community members acknowledged they could not be absolutely certain of the safety of their water. All of the communities expressed that they believed an aqueduct and faucets were necessary to provide their villages with access to clean water. This may have been influenced by earlier suggestions and promises made by outside organizations. Some of the sustainable solutions that were suggested by the communities involved the formation of committees to take care of the already existing water sources and to continue discussing ways in which the communities can increase their access to safe water.

After analyzing the data from the personal interviews and the community discussions, it's recommended that the villagers receive education on 1) the attributes and sources of safe water and 2) the benefits of water purification and the proper chlorine to water ratio, and 3) the relationship between waterborne diseases and the onset of illnesses. It is also suggested that FUMSIL follow up on the educational lessons and the commitments made by the communities in the discussions to form water quality committees.

II. Introduction

An estimated 1.5 million children around the world under the age of five die each year from diarrheal disease[1]. Despite the ability to easily treat and prevent this disease, it is the leading cause of death for this age group in Latin America[2]. According to UNICEF, Elias Piña, a province along the Haitian border of the Dominican Republic, has one of the highest rates of diarrheal disease in the country. More than twenty percent of children under the age of five suffer from diarrheal disease and six percent have acute symptoms of malnutrition, which is often a result of diarrheal disease[3].

Scattered amongst the mountains of Elias Piña are twenty-three tiny farming communities with populations between seventy-five to a few hundred people. The majority of people in these communities live without electricity and running water, in humble shelters with dirt floors. A small clinic in the nearby town of El Llano is the sole provider of primary health care to the villagers, which is run by Marian Foundation of Saint Isidore the Laborer (FUMSIL), a non-profit organization working in the area.

Dr. Angel Valdez, the only doctor at the clinic in El Llano, commonly sees diarrheal disease and worms in these rural communities. Given that Haiti lies only a few miles away and was still in the midst of a cholera epidemic, it is not surprising that Dr. Valdez also reported a dramatic increase in the number of cases of cholera between November 2010 and when the initial conversations about the project began in February 2011. The occurrence of these water borne diseases could be diminished with improved access to safe water. Without wells in the communities, women and children, who are usually responsible for this chore, must walk up to four miles with containers, several times a day to collect water for cooking and drinking.

Dr Valdez agreed that access to a clean, reliable water source and education on water sanitation and hygiene nutrition will have the greatest impact on the health of the communities. This is in perfect alignment with Goals 4 and 7 of the United Nations' Millennium Development Goals, which focuses on "revitalizing efforts against ... diarrhea" in children under the age of five and "bring[ing] drinking water to all rural households" by 2015[4].

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[1] UNICEF & WHO. (2009). Diarrhoea: Why children are still dying and what can be done. Geneva: WHO Press,1-3.

[2]Centro de EstudiosSociales y Demograficos (CESDEM) & Macro International Inc, (2007).Demographic and Health Survey 2007. Santo Domingo: CESDEM & Macro International Inc, 178.

[3] UNICEF. *Childhood Malnutrition*, Retrieved December 6, 2011, from http://www.unicef.org/republicadominicana/english/survival_development_12567.htm.

[4] United Nations. *Millennium Development Goals*. Retrieved December 6, 2011, from http://www.un.org/millenniumgoals/.

III. Methodology

The researcher received funding from the Wisconsin Idea Fellowship to work in partnership with FUMSIL. The project was granted IRB approval from the University of Wisconsin-Madison on August 1, 2011. The goals of the project were to 1) learn where villagers in the served communities collected their drinking and cooking water, 2) assess how they understood the water to be safe, and 3) empower the communities to find practical solutions to getting safe water.

The project was originally designed to use the Participatory Photo Mapping (PPM) method, which is a tool that uses photographs, maps, and the perceptions of participants to explain the relationship between people and their environment. The PPM method "is built upon successful techniques developed to facilitate public participation in researching, planning and implementing strategies to improve well-being."[5] For this project the PPM method would be used to physically locate water sources used by the communities that FUMSIL serves and to understand the community members' perception of how water was safe. The survey tool was field tested before the project began, but the results from the GPS unit were inconsistent and inaccurate. The survey tool was then adjusted to the Photo Voice method, which "enables people to record and reflect their community's strengths and problems [and] promote dialog about important issues through group discussion and photographs."[6]Normally with the Photo Voice method the participants would be given their own cameras to photograph their environment. Due to budget and time constraints the researcher accompanied them and photographed their answers.

The project consisted of two sections; 1) individual interviews with community participants and 2) community discussions. A local driver was hired to travel to the communities and provide introductions between the researcher and participants. The data in part 1 was collected over an eight-day period from 27 participants in nine communities (Table 1). Participants were chosen by location to increase the likelihood of visiting as many different water sources as possible that were used by the community. After receiving consent from the participant the researcher asked the participant to show an example of a safe and unsafe water source and explain why they thought each source was safe or unsafe, and describe treatment and storage methods before consumption. Participants were also asked to describe challenges to accessing safe water and possible solutions to those challenges. The answers were recorded and the water sources and surrounding environment was photographed. Before the community discussions the participants' answers were categorized into general themes for organization.

Dr. Angel Valdez was asked to assist in facilitating the community discussion. Three communities were represented in each discussion. The discussion focused on two topics: 1) How water was understood to be safe and 2) What can the communities do to have access to safe water. For the first topic community members were ask to use the photos taken from the

[5]Dennis, S.F., Gaulocher, S., Carpiano, R.M., Brown, D. (2009) Participatory photo mapping (PPM): Exploring an integrated method for health and place research with young people. *Health & Place*, 15(2), 466-473.
[6]Flum, M.R., Siqueira, C.E., DeCaro, A., Redway, S. (2010). Photovoice in the workplace: A participatory method to give voice to workers to identify health and safety hazards and promote workplace change—a study of university custodians. *American Journal of Industrial Medicine*, 53(11), 1150-1158.

interviews to show a clean source of water and explain how they understood that the source was safe. For the second topic villagers were ask what they thought was preventing the communities from having access to clean water and to discuss what solutions were within the capability of the communities.

The challenges experienced during the project included locating the community boundaries and communicating with the participants. During the personal interviews the researcher intended to have three participants from each community to have a reasonable sample size. It was not until the community discussion that the researcher realized that two of the participants from La Tinaja were actually from the Sobacon community. Also the researcher only had a limited skill of Spanish, which resulted in complications during conversation with participants. Based upon some of the participants' responses to what they thought would help them improve access to clean water (Table 7) it became clear that they did not understand the purpose of the project. The challenges with communication required the researcher to adapt the questions during the interviews. The original methodology intended for the participants to be alone with only the researcher when answering questions to limit outside influence. This did not always happen and occasionally a village leader was present during the personal interview. It appeared to be assumed that if a project about a community was occurring any and all community members should be able to participate at any time. It is also possible that because the researcher was taking the photographs and not the participant the pictures that were taken may not represent the participants' answers completely. When the researcher took the photograph he was taking a picture of what he understood the participant to be explaining, which adds a degree of separation to the participant's response.

Table 1. Communities and Number of Participants in the Project

Communities	**Number of Participants**
La Tinaja	1
Las Lagunas	3
Sobacon	5
Matedero	3
Blanco	3
Sabaneta	3
Margarita	3
Lamadero	3
Hato Nuevo	3

IV. Results and Analysis

a. Photo Voice Part 1 – Personal Interviews

Personal interviews began with the question "show me a safe water source" (Table 2). Participants reported that a spring was the primary source for collecting drinking and cooking water. Faucets, aqueducts, and rain water were reported as secondary sources and were unreliable for a variety of reasons. A woman in Las Lagunas stated that their faucet worked for fifteen days and then would stop for fifteen days. In Margarita the researcher was shown a broken pipe for the aqueduct, which had been broken for twenty days as of August 13, 2011. Also it was explained that only 45 of the 96 families in Margarita had a faucet; the remaining families could not afford to purchase a faucet. Lamadero had an aqueduct as well, but it was not functioning because the community did not have a contract with the electric company (EDSUR). It is also interesting to note that the participants of Hato Nuevo described their current sources for water as springs, but actually were holes dug in a riverbed several feet away from the river.

Table 2. Number and Type of Unduplicated Water Sources by Community

Communities	Spring	Faucet	Other
La Tinaja	2		
Las Lagunas	3	2	
Sobacon	5		1 (Aqueduct)
Matedero	4		
Blanco	2		
Sabaneta	3		
Margarita	1	3	1 (Rain Water)
Lamadero	4		
Hato Nuevo	2*		

* Refers to holes dug in ground, but described as "springs" by participants

Table 3 identifies responses to "how do you know the water is safe?" The two most common responses were because the water "came from the ground" and that "no one has gotten sick". It seemed that people thought water that came from the ground was safe because either the ground filtered out the pollutants or that nothing in the ground could contaminate the source. The belief that water is safe because "no one has gotten sick" implies the participants believe certain illnesses can be attributed to just water. Only four of the 27 participants responded that water is safe after the use of chlorine suggests that chlorine purification is not understood as necessary. A participant from Hato Nuevo stated that the water source was safe "because there [was] nothing else", which demonstrates the desperation of the people in some of the communities.

Table 3. Explanations to Determining a Safe Water Source

Reasons	Number of Participants (%) n = 27
From Ground	8 (29.6)
Nothing Near/Before It	3 (11.1)
No One Has Gotten Sick	8 (29.6)
If Chlorine/Filter Is Used	4 (14.8)
When It Hasn't Rained	2 (7.4)
Outside Source	3 (11.1)
Other	2 (7.4)

A large portion of participants explained that they perceived a water source to be unsafe when "people bath there" and if "animals passed through it" (Table 4). Respondents considered the water source above or before the contamination as safe, which demonstrates an understanding that pollutants will run downstream. A semi-circle of rocks surrounding a water source that was considered to have safe water was seen on several occasions. It was explained that anything outside the ring was unsafe and everything inside was safe. This may suggest a lack of understanding what is necessary to properly protect a water source from contamination.

Table 4. Explanations to Determining an Unsafe Water Source

Reasons	Number of Participants (%) n = 27
Water Is Moving/Running	4 (14.8)
Things Are In It/Fall In It	6 (22.2)
No Chlorine/Filter	1 (3.7)
People Bath There	9 (33.3)
Animal Feces/Walk Through It	7 (25.9)
When It Rains	4 (14.8)
Taste	1 (3.7)
When Someone Gets Sick	1 (3.7)

Almost fifty percent of participants answered that distance was a barrier to having safe water (Table 5). Based on this response convenience was the most important factor to access to safe water, which could be influenced by the belief that water from a spring is already safe (Table 3). Other problems to accessing safe water were related to the unreliability of aqueducts and faucets, as explained in the discussion of Table 2.

Table 5. Challenges to Having Access to a Clean Water Source

Reasons	Number of Participants (%) n = 27
Far Away	13 (48.1)
Inconvenient/Uncomfortable	2 (7.4)
No Animal/Go By Foot	4 (14.8)
Terrain	3 (11.1)
Temporary/Unreliable	2 (7.4)
Problems with Current Faucet/Aqueduct	4 (14.8)

The majority of participants did not answer that water could be determined to be safe after purification with chlorine, which may suggest the number of people not using chlorine before consumption could be higher (Table 3). When the participants were asked what amount of chlorine was need for purification more people responded with an incorrect amount compared to those who knew the correct proportion, eight drops chlorine per gallon of water and then wait thirty minutes before consumption[7] (Table 6). According to the interviews the participants have been receiving education on chlorine use from a variety of sources and the information has not been consistent (Appendix A, Table 8).

Table 6. Treatment Methods of Water Before Consumption

Reasons	**Number of Participants (%) n = 27**
Filter	5 (18.5)
Correct Chlorine Amount	11 (40.7)
Incorrect Chlorine Amount	13 (48.1)
Didn't Purify	5 (18.5)

When asked what was needed to have clean water in the communities the most common proposed solution was having a aqueduct in the community and faucets in the houses. Some of the responses that suggested an aqueduct or faucet as a solution may be due to another organization promising the construction of these in certain communities. Only two suggestions implied the need for a cleaner water source, demonstrating that convenience is the most important aspect to having water. This again might be from the perception that the water is already safe.

Table 7. Proposed Solutions to Having Access to a Clean Water Source

Reasons	**Number of Participants (%) n = 27**
Cistern/Aqueduct	9 (33.3)
Faucet	10 (37.0)
Closer to Home	5 (18.5)
Well	2 (7.4)
Purification	1 (3.7)
Secure (Physically) the Spring	1 (3.7)
Fix Current Faucet/Aqueduct	4 (14.8)
This Project	2 (7.4)

b. Photo Voice Part 2 – Community Discussions

In the community discussion villagers were asked questions on two topics that were presented in the personal interviews: 1) How water is understood to be clean and 2) What can the communities do to have access to clean water. The discussions were intended to include only those who participated in the interview section of the project along with community leaders, but other villagers came to the discussion as well. Some of the participants from the personal

[7] United States Environmental Protection Agency. (2011). Emergency Disinfection of Drinking Water. Retrieved December 12, 2011, from http://water.epa.gov/drink/emerprep/emergencydisinfection.cfm.

interviews explained that more community members needed to be presented to decide what was best for the community. Community members were prompted to think critically about their definitions of indicators to clean or safe water. Each community was also encouraged to develop their own solutions, but how solutions were developed was affected by the facilitation process. The facilitators improved in the way they led the discussions and were better able to encourage sustainability and community empowerment with each successive discussion, which was seen in community responses.

Margarita Community Discussion

During the community discussion in Margarita, five participants from the personal interview section of the project were present: three from Margarita, two from Lamadero. In total twenty-three villagers from the three communities (Margarita, Lamadero, and Hato Nuevo) came to the discussion.

When the question "How do you know when water is safe?" was asked to the entire group a common response was "because no one has gotten sick", which is consistent with answers given by participants during the interviews. Additional answers included "because it came from the ground" and based upon smell and taste. The initial responses given by the villagers were basic, but the facilitators continued to ask follow up questions. This was an attempt to have the community members explain their responses in more detail and think more critically about how they perceived water to be safe. Dr. Valdez gave examples of other villages that had their water sources contaminated by animals without anyone knowing. The discussion and Dr. Valdez' examples helped the villagers realized that they couldn't be certain of the safety of their water source. Some villagers pointed out that their sources "were not covered" and "an animal might drink from it at night."

Once the community members understood that they could not be completely confident that their water source was safe, the facilitators guided the discussion into the second part.
In the second section of the community discussion the villagers were asked "what is most important to them? To have water that is clean, convenient, or reliable?" One villager responded with "it is nothing to have a lot and convenient, if it is not clean." They were then asked "what they thought they needed to achieve this?" Most responded by saying an aqueduct. After the facilitators pointed out that only half of the homes had faucets and they were currently broken, the villagers began to understand an alternative solution might be needed as well. It was suggested by a participant that it is the responsibility of the community to keep the area around the spring clean and someone just needs to begin. To maintain the aqueduct it was suggested that three people would watch the system and call the community together when it needs to be fixed. It was explained that there was a man in San Juan who could help with the repairs. The benefits and limitations of using chlorine and a filter, and boiling water were discussed. The community members agreed that purification with chlorine was best because it was faster, cheaper, and easier than boiling water.

Sobacon Community Discussion

Thirteen community members from La Tinaja, Sobacon, and Las Lagunas were present during the discussion. Four were participants from Sobacon, and one from Las Lagunas.

Community members explained that they believed their water is always clean because it comes from the ground and "the land filters it" and "there is no water before it." It was also explained that what was most important was to have clean and reliable water. This seems to contradict their answers to part two when they were asked what they thought was needed to achieve this. The first answers included faucets, pipes, and an aqueduct. It was then explained that to ensure the sustainability of an aqueduct a group of men would be chosen and made responsible for the repairs, which would be paid for by the communities. It was also said that they knew someone outside the community who could assist in the maintenance. Dr. Valdez explained to the villagers that an aqueduct doesn't guarantee safe water because the tank still needs to be chlorinated.

At the end of the discussion, members from Las Lagunas and La Tinaja said that what they wanted for their communities was an aqueduct with a chlorinated tank. Members from Sobacon wanted the same thing along with a filtration system. It was also proposed to create a credit system for the villagers who could not afford to buy a faucet. Those present from Sobacon and La Tinaja pledged to meet every last Saturday of the month to discuss what their community needed to have safe water and how it could be achieved. Representatives from Las Lagunas said they would meet every fifteen days to do the same.

Sabaneta Community Discussion

In total twenty-three villagers were present for the discussion from the three neighboring communities; Sabaneta, Blanco, Matedero. From the personal interview section of the project, all three participants from Matedero attended the discussion along with two of the participants from Blanco. The three communities share water sources and are located in a very close proximity of each other, which may explain their active relationship and willingness to work together in finding solutions to problems.

The members from Matedero explained that they thought the community would benefit from an aqueduct and purification system, which would include the boiling and the use of chlorine and filters. It was also suggested to plant trees because it would increase the amount of water surrounding the source. They went on to describe that a group should be formed with one person handling the money to discuss problems and implement solutions regarding their water sources.

The representatives from Sabaneta stated that they thought holding community meetings and continuing to present ideas to organizations would be the best solution for the problems with their water supply. In the meantime they explained that using chlorine and a filter would improve their water from drinking and cooking and also explained the community needs to clean the spring and possibly build a fence around it to prevent "animals" from walking through it.

The participants from Blanco stated that they wanted to plant trees and build a fence around the springs to improve the quality and increase the amount of water in the sources. A member explained that the trees could be donated from a particular department in the government. The community members are indicated that the use of chlorine and building faucets in or near the homes would improve the safety and their access of drinking and cooking water.

The discussion was concluded with the three communities agreeing that two aqueducts should be built, one for the Matedero community and one to be shared between Sabaneta and Blanco.

V. Implications and Recommendations

The personal interviews and the first part of the community discussions have shown two areas of opportunity for education: 1) attributes and sources of safe water, and 2) affordable methods of water purification. A series of charlas (lessons) discussing the attributes and sources of safe water could address

- the perceptions of safe and unsafe water (Table 3 and Table 4)
- the benefits of water purification (Appendix B, Table 9)
- the proper chlorine to water ratio necessary for effective purification[7]
- the relationship between water borne diseases and the onset of illness (Appendix C, Table 10)

This would help to dispel the belief that they can trust the safety of a water source based on the justification that "no one has gotten sick". Follow-up conversations after the education lessons are also suggested to ensure the retention of the information.

In the past the communities have frequently received outside assistance in the form of donations (aqueducts, faucets, etc.). Even though the help was well intentioned it has contributed to an expectation that aid will be provided. At the end of the discussions, the communities began to take steps to becoming more active in finding solutions to their problems that were within their own abilities. Community members taking ownership of their problems and acquiring the confidence that they can be independent is a result of the participatory approach. It is recommended that FUMSIL follow up on the communities' commitments to forming water quality committees and discussing the needs and solutions for having access to safe water.

VI. Appendix A

Table 8. Reported Sources of Education on Chlorine Purification

Reasons	Number of Responses (%) n = 10
Dr Angel Valdez	3 (30.0)
Ministry of Health (Radio or Poster)	3 (30.0)
Charla	1 (10.0)
Neighbor	1 (10.0)
Other Doctor	1 (10.0)
Teacher in Local School	1 (10.0)

VII. Appendix B

Table 9. Advantages and Disadvantages of Water Purification with Chlorine

Advantages
- Low cost[8]
- Effective against most pathogens[8]
- Can remove soluble iron and manganese by oxidizing them to an insoluble form[9]
Disadvantages
- Purification not effective against Cryptosporidum and Giardia[9]
- Can create Trihalomethanes (THMs) – Chlorine can react with humic compounds (found in leaves, wood, animal waste) to create THMs, which may increase the risk of cancer (water containing >80ppb is considered carcinogenic by EPA)[10]
- Can cause an unfavorable smell or taste[8]

[8]Sobsey, M.D. *Managing water in the home: accelerated health gains from improved water supply.* Retrieved December 6, 2011, from http://www.who.int/water_sanitation_health/dwq/wsh0207/en/index.html.

[9]Washington State Department of Health. (n.d.). *Using Disinfectants other than Chlorine.* Retrieved December 6, 2011, from http://www.doh.wa.gov/ehp/dw/publications/alternate_disinfectants.htm.

[10]New Hampshire Department of Environmental Services. (2006). Trihalomethanes: Health Information Summary. Retrieved December 6, 2011, from http://des.nh.gov/organization/commissioner/pip/factsheets/ard/documents/ard-ehp-13.pdf.

VIII. Appendix C

Table 10. Typical Water Borne Illnesses in Latin America and Onset Time &Symptoms

Illness	Onset Time	Symptoms
Cholera (caused by Vibrio cholerae)	2-3 days[11]	Profuse watery stools, occasional vomiting, rapid dehydration, circulatory collapse.[11]
Dysentery (caused by Shigella or amoeba)	Variable, 1-3 days (Shigella), 2-4 weeks (amoebic)[11]	Fever, chills, bloody diarrhea.[11]
Hepatitis A (caused by hepatitis A virus)	Usually 28-30 days[11]	Abrupt fever, malaise, loss of appetite, nausea, abdominal pain, and within a few days jaundice.[11]
Hepatitis E (caused by hepatitis E virus)	28-40 days[12]	Jaundice, malaise, loss of appetite, fever, abdominal pain.[12]
Typhoid Fever (caused by Salmonella Typhi)	1-3 weeks[11]	Sustained fever, headache, malaise, loss of appetite.[11]
Giardiasis (caused by Giardia)	Usually 7-10 days[11]	Chronic diarrhea, abdominal cramps, bloating, fatigue, weight loss.[11]
Cryptosporidium Infection (caused by Cryptosporidium)	1-12 days[11]	Profuse and watery diarrhea, loss of appetite, cramps and abdominal pain.[11]

[11](2002). *IMPORTANT WATER AND FOOD BORNE DISEASES.* Retrieved December 8, 2011, from http://courses.washington.edu/envh311/Readings/Food_Diseases.pdf.

[12]Louisiana Department of Health & Hospitals. (2004). *Hepatitis E.* Retrieved December 8, 2011, from http://www.dhh.state.la.us/offices/miscdocs/docs-249/Manual/HepatitisEManual.pdf.