

**CANCER PATIENTS AND PUBLIC HEALTH PREPAREDNESS: AN ORIGINAL
PROGRAM PROPOSAL**

by

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Disasters and infectious disease emergencies are high stress events for those who experience them. Cancer patients are a particularly vulnerable population that requires special attention during such occasions. Currently, there is a lack of planning in emergency preparedness for special populations, like cancer patients. This essay addresses the need for preparedness initiatives to alleviate some of the negative impacts cancer patients may face during and after an emergency. A program was designed to specifically address the distinct needs of this population through meetings between trained nurses and the cancer patient in treatment. Preparedness strategies and flood related issues are the key informational components of this program. The goal of this program is to increase awareness of the complications that a cancer diagnosis can pose during emergencies, and it engages cancer patients in emergency preparedness planning. The public health significance of this project is to provide a foundation for future program development for special populations in public health preparedness.

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PREFACE

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1.0 INTRODUCTION

In the United States there are well over a million new cases of cancer diagnosed each year (Centers for Disease Control and Prevention, 2012). In Allegheny County, Pennsylvania, close to 8,000 cases of cancer were diagnosed in 2010 (Pennsylvania Cancer Registry Dataset, 2010). During a public health emergency, particularly in the event of a disease outbreak caused by a pandemic illness or act of bioterrorism, cancer patients are a particularly vulnerable population. Vulnerable populations include those with chronic diseases, disabilities or health disorders (Bethel, Foreman, & Burke, 2011). Multiple studies have indicated that households with a vulnerable person are less likely to have a preparedness plan than healthy households (Uscher-Pines, Hausman, Powell, DeMara, Heake, & Hagen, 2009; Bethel, Foreman, & Burke, 2011). This may be due to the lack of preparedness awareness and initiatives for specific vulnerable populations, such as cancer patients, in the United States, including Allegheny County.

The complications caused by cancer treatment can be devastating; infections that pose little to no threat for a healthy person become particularly dangerous for a cancer patient undergoing treatment. Respiratory and gastrointestinal infections occur at much higher rates in patients undergoing cancer treatment than the rest of the population; one in every ten patients who receives chemotherapy develops an infection that requires hospitalization (Centers for Disease Control and Prevention, 2013). As challenging as it is for a patient to avoid infections in

her everyday life; it is even more difficult during an emergency. In the event that a patient must evacuate, the only option may be to seek refuge in a shelter. The confined setting of a shelter makes it much easier for infections to spread. It becomes vital for a patient to understand prevention techniques to reduce her risk of contracting infections.

Disasters like Hurricane Katrina prove the need to have public health preparedness initiatives for special populations like cancer patients. Approximately 23,549 people in disaster counties in Louisiana, Alabama and Mississippi were diagnosed with cancer within the 12 months prior to Hurricane Katrina (Djenaba, et al., 2007). These individuals made up a significant population that was potentially displaced, and their needs went beyond those of their healthy counterparts.

The lack of preparedness initiatives for vulnerable populations creates additional chaos in the lives of patients who are not prepared to be displaced to another treatment facility or to be seen by a physician who is not their own. Because physicians are typically unwilling to treat without a patient's history, it is important for the patient to be informed about his situation and to carry the information with him in the event that an emergency occurs (Ullman, 2011). At the Ochsner Cancer Institute in Baton Rouge, Louisiana, physicians who treated displaced patients during Katrina reported that the majority of the medical records were destroyed or otherwise irretrievable. Additionally, physicians reported that approximately 50% of the patients they treated did not know what treatment they were undergoing prior to being displaced (Lindsey, 2005). Although devastating disasters like hurricanes may be considered infrequent, destructive floods are common occurrences throughout Allegheny County, and they serve as evidence that initiatives for vulnerable populations should become standard practice in preparedness to help prepare for public health emergencies.

There is currently very limited literature on preparedness for cancer patients, and there are no specific programs involving public health preparedness planning specific to cancer patients. Allegheny County currently lacks any form of preparedness program for planning focused on cancer patients. In this essay, the literature review is on the considerations for cancer patients, including the type of treatment they may be receiving and the implications of floods, as Allegheny County experiences over 39 inches of rain each year (USA.com, 2010). Due to the lack of specific initiatives for cancer patients, a program has been designed that takes into account the unique needs of cancer patients. This program utilizes nurse counseling to give the cancer patient who is in treatment the pertinent information related to preparedness through a series of meetings. The patient's treatment session is an opportune chance to discuss preparedness and emphasize the fact that having a cancer diagnosis complicates the emergency preparation process. This essay proposes a program that serves as a method of incorporating planning for special populations into preparedness strategies.

2.0 GENERAL CONSIDERATIONS REGARDING CANCER PATIENTS

A review of current literature involving considerations for cancer patients, population statistics, current preparedness techniques for all individuals and preparedness recommendations for cancer patients was conducted using the University of Pittsburgh Library System's PittCat search. The time frame parameter for the literature search included dates between 2000 and the present. Pertinent search terms used included "chemotherapy," "radiation treatment," "cancer patient office visits" and "preparedness for cancer patients." Additional supporting information was collected from sources such as the American Cancer Society, American Red Cross, Centers for Disease Control and Prevention (CDC) and National Cancer Institute at the National Institutes of Health.

A vital factor to consider when developing a program for cancer patients is the treatment a patient receives; the main methods are chemotherapy or radiation therapy. Cancer treatment is a complex process, and the effects may be complicated. The amount of time a cancer patient spends in care is an additional consideration; the time in care may be utilized as an opportunity to disseminate information. There is a lack in the information available for cancer patients related to public health and emergency preparedness. The techniques suggested by the major sources of information regarding preparedness such as the American Red Cross and CDC can be adapted to the specific needs of cancer patients. Additionally, the treatment a cancer patient receives impacts her immune system's ability to fight disease. There are many infections

associated with flooding, a common occurrence in Allegheny County. Tetanus, mold and foodborne illnesses are common flood related diseases that pose a threat to cancer patients due to their compromised immune systems. These considerations are examined in detail in the following sections.

2.1 CHEMOTHERAPY

Cancer treatment with chemotherapy consists of pharmacological agents that destroy rapidly growing cells in a patient's body. While chemotherapeutic drugs destroy cancer cells, many healthy cells are also destroyed due to the inability of the drugs to exclusively target malignant cells (Nygren, 2001). The effects due to chemotherapy treatment depend on the specific drug type, dose, longevity of treatment and individual medical history (Windebank & Grisold, 2008). Patients receiving chemotherapy experience a reduction of healthy and active immune cells, which are imperative for fighting off infections. Frequent blood panel checkups are necessary to monitor the levels of immune cells, such as white blood cells, red blood cells and platelets, each of which can be severely depleted leading to neutropenia, anemia and thrombocytopenia, respectively. The blood contains multiple types of cells including white cells, red cells and platelets. Neutropenia, the reduction of white or immune cells, causes a patient to be more susceptible to viral and bacterial infections, and requires close attention to maintain health. Anemia is a condition in which there are lower than normal levels of red cells in the blood which can cause a patient to experience dizziness and headaches. A lower than normal amount of platelets in the blood is known as thrombocytopenia, which can prevent blood from clotting (National Institutes of Health, 2012).

Additional side effects of chemotherapeutic drugs include neuropathy (nerve damage), alopecia (hair loss) and gastrointestinal problems, like nausea and vomiting. Neuropathy commonly occurs in patients after a few weeks or months of treatment, and includes sensory symptoms, such as numbness and pain, and motor symptoms, such as loss or weakening of muscle function (Windebank & Grisold, 2008). Hair cells rapidly grow and can therefore be an additional unintended target of chemotherapeutic drugs. Alopecia, or hair loss, can occur a few days to a few weeks after the start of treatment and continues throughout the treatment, with the pattern being dispersed or concentrated (Chon, Champion, Geddes, & Rashid, 2012). Nausea and vomiting are among the most frequently experienced side effects of chemotherapy. These symptoms can occur once or over the range of a treatment, depending on the drug and individual patient characteristics; patients may also experience anticipatory nausea and vomiting which occurs prior to treatment. Chemotherapy-induced nausea and vomiting can occur in two phases; the acute phase starts within a few hours of the first treatment, and the delayed phase occurs after two to three days (Lohr, 2008). Approximately half of patients receiving chemotherapeutic treatment will experience at least one instance of post-treatment vomiting (Roscoe, Morrow, Hickok, & Stern, 2000).

2.2 RADIATION THERAPY

Many types of cancers can be treated with radiation therapy, sometimes in combination with chemotherapy; it is at the discretion of a patient's oncologist to decide what course of action is most suitable. Radiation treatment aims to kill cancerous cells by preventing them from dividing; cells whose DNA has been damaged beyond self-repair stop multiplying and die

(Baskar, Lee, Yeo, & Yeoh, 2012). This type of therapy uses ionizing rays which energize cells through electrically charged particles, typically in conjunction with surgery before or after, to remove cancerous tumors or tissues (Baskar, Lee, Yeo, & Yeoh, 2012). Radiation can be delivered to the location of the cancer in two ways, internally or externally. Internal delivery, or brachytherapy, often involves the placement of an implant into the organ where the cancer is located, while external delivery occurs via a radiation machine aimed directly at the source of the cancerous cells (Baskar, Lee, Yeo, & Yeoh, 2012).

Radiation, like chemotherapy, affects the ability of cells to divide which means healthy cells may be affected, particularly those of the immune system, hair follicles and gastrointestinal tract. Side effects of radiation therapy include generalized fatigue, malnutrition and emotional stress (Capra, Ferguson, & Ried, 2001).

2.3 OFFICE VISITS

In recent years, the numbers of patients who are newly diagnosed with cancer, are in treatment, and are surviving cancer have been consistently increasing due to the development of innovative technology that discovers cancer more efficiently and that leads to more effective treatment. The new technology and treatments have also caused the number of ambulatory visits by cancer patients to reach all-time high levels and have created a large demand for oncologists and primary care physicians (Shulman, et al., 2009). In 2007, the total number of visits to physicians' offices, hospital outpatient and emergency departments by patients with a primary diagnosis of cancer was 28.2 million, one of the most common reasons for an ambulatory care visit (Schappert & Rechtsteiner, 2011). Additionally, cancer was one of the leading causes of

hospitalization in 2010 with 1.2 million patients admitted into and discharged from inpatient care with an average length of stay of 6.2 days (Centers for Disease Control and Prevention, 2013). The routine care a patient must receive, including blood tests, consultative and follow-up appointments and treatment appointments, is an extremely important factor for consideration regarding cancer.

2.4 GENERAL INDIVIDUAL PREPAREDNESS

Preparedness strategies provided by the American Cancer Society and the American Red Cross include only general suggestions regarding natural disasters for cancer patients (American Cancer Society, 2011). No details regarding pandemic illnesses or instances of bioterrorism are included in their preparedness information. The National Cancer Institute offers preparedness recommendations in the event of a general emergency, with no information specific to either pandemic illnesses or bioterrorism (National Cancer Institute at the National Institutes of Health, 2011). The CDC presents general recommendations for natural disasters, pandemic illnesses and instances of bioterrorism, with no specific instructions for cancer patients (Centers for Disease Control and Prevention, 2012). General guidelines for individual preparedness include consulting with a physician to determine how to stay in contact during an emergency, making a disaster plan with family, neighbors or friends and preparing an emergency kit. An emergency kit should include medical items such as a seven-day supply of medication, copy of a medical insurance card, physician contact information and a basic first aid kit. Additional items include food, water, a flashlight, battery powered radio, extra batteries, a multi-purpose tool, extra cash, emergency blanket and a map of the area (American Red Cross, 2013).

2.5 CONCERNS FOR CANCER PATIENTS IN AN EMERGENCY

Many aspects regarding the health of a cancer patient need to be taken into consideration in the event of a disaster. For instance, patients who are going through treatment at the time of an emergency will need to know what type of treatment they are receiving and the schedule of their treatment as well as have access to a facility that gives treatment. Treatment details should be written down by the patient's oncologist so the patient is able to include a copy of that information in her emergency kit along with copies of medical records including pathology reports, lab reports, imaging results, in a secured waterproof freezer Ziploc™ bag.

A patient will need to be able to communicate with available medical staff about specific information regarding treatment. It is recommended that the patient attempt to contact his personal oncologist or primary care physician directly in the event of an emergency. If personal physicians cannot be reached at the time of the emergency, a health care worker, nurse or physician who is available at the nearest health care facility should be informed about his disease and treatment situation should the patient need to seek medical care (American Cancer Society, 2011). In addition to access to a treatment facility, a cancer patient may have one or multiple types of medications that need to take regularly. The medications are often necessary for controlling the side effects of treatment; depending on the type of emergency and during a prolonged emergency, the patient will need to be able to refill his prescription.

Pandemic illness outbreaks and acts of bioterrorism are particularly dangerous for cancer patients; however, natural disasters such as flooding also have health related implications. Cancer patients who are undergoing treatment are more susceptible to bacterial and viral infections, and during an emergency they are at a heightened risk of developing the illness (Centers for Disease Control and Prevention, 2012). In a mass prophylaxis situation, any live

vaccine, like an influenza vaccine, should not be administered to a cancer patient at the risk of the patient developing the disease. A physician should be consulted before the administration of any vaccine to a patient who has cancer and may be undergoing treatment. These concerns are of high importance and should be addressed when developing an emergency preparedness program specifically for a cancer patient.

2.6 CURRENT EMERGENCY PLANNING FOR CANCER PATIENTS

There are no specific protocols or programs for cancer patients regarding public health preparedness other than general planning suggestions made by the American Red Cross, American Cancer Society and the Centers for Disease Control and Prevention (see Individual Preparedness). Additionally, cancer patients in Allegheny County do not receive any support or education regarding preparedness while they are in care. Currently no programs exist at local health facilities involving emergency preparation for cancer patients, and no plans for any type of disaster are discussed and developed with patients for any emergency other than a personal medical issue.

2.7 FLOODING IMPLICATIONS

The threat of flooding is an annual problem that Pittsburgh and surrounding areas within Allegheny County face, particularly during hurricane season (May – November). As evidenced by Hurricane Ivan in 2004, flooding can cause tremendous damage in a short period of time,

making it imperative for individuals to have a plan of action for such an occasion. In the span of one day, Ivan brought between five and eight inches of rain to western Pennsylvania (Toler, 2004). The Allegheny and Monongahela Rivers rose to six feet over flood levels, homes were severely damaged and mudslides posed an additional threat (Toler, 2004). The massive flooding that occurred throughout Allegheny County caused widespread damage in the area and jeopardized the safety of many people.

In August of 2007, three separate severe weather systems traveled across western Pennsylvania, causing flash floods that affected over 900 homes and 200 businesses for a total of 4 million dollars in damage (National Oceanic and Atmospheric Administration, 2010). Flash flooding potential increases after the ground has been saturated with water due to heavy rainfall. More recently, a rainstorm in 2011 that brought two inches of rain caused four individuals to fall victim to a flooded boulevard near Highland Park (Balingit, 2011). It is clear that floods are a common occurrence that can lead to high monetary costs as well as negative health outcomes. Flooding will continue to be hazardous in Allegheny County; it is necessary for individuals to take the proper precautions in the event of a flood.

2.7.1 Tetanus

During floods, it is common for water to become contaminated with sewage or chemical waste and harmful consequences can occur if caution is not taken. Tetanus is one of these; it is caused by bacteria that can be found in flood water and has the potential to cause life-threatening disease. The bacterium *Clostridium tetani* is typically found in soil, manure and dust as spores, in dormant form. The spores infiltrate the body through breaks in the skin (cuts, abrasions, punctures, animal bites, burns or surgical incisions). Symptoms of the disease are caused by

toxins that the bacteria release once they have entered the body. Clinical presentation includes jaw cramping, headache, sudden involuntary muscle tightening (often in the stomach), painful muscle stiffness all over the body, trouble swallowing, jerking or staring (seizures), fever and sweating, high blood pressure and fast heart rate (Centers for Disease Control and Prevention, 2013). There are no laboratory tests to confirm an infection with tetanus; physicians will confirm cases of tetanus through observation and whether the patient has a history of tetanus vaccination. The infection requires immediate hospitalization and treatment with the antitoxin tetanus immune globin (Centers for Disease Control and Prevention, 2013). It is estimated that one in 10 cases of tetanus results in death (Centers for Disease Control and Prevention, 2013).

Wound care is an important method in the prevention of tetanus. Adequate cleaning, using antiseptics and proper dressing of the wound can reduce the risk of developing an infection. However, the most important protection from tetanus is a pre-exposure immunization. Immunity from the vaccination lasts 10 years, which means it is necessary to receive a booster every 10 years. Adults and older children should receive the Tdap, a combined immunization package for tetanus, diphtheria and pertussis if they are unsure of when they last received a tetanus shot or if they have never received one. The Td vaccine, a combination of tetanus and diphtheria, is recommended every 10 years as a booster for patients who have previously had a Tdap vaccine (Centers for Disease Control and Prevention, 2013). Patients who are receiving cancer chemotherapy or radiation are encouraged to consult with their oncologist to discuss when it would be appropriate to receive a tetanus booster vaccination.

No accurate data are available on the number of tetanus vaccinations given each year in Allegheny County. In a survey conducted in 2007 by the CDC, the national tetanus vaccination rates for the last 10 years among 18-49, 50-64 and 65+ were 57.2%, 57.2% and 44.1%,

respectively (Centers for Disease Control and Prevention, 2007). Additionally, only 2.1% of individuals age 18-64 received a vaccine in the last two years as of 2007.

2.7.2 Mold

After a home has been affected by a flood, there is an increased risk of the development of mold if swift action is not taken to clear out the flood water. Mold exposure has more severe consequences in people who have weakened immune systems; cancer patients receiving chemotherapy are among those who have the highest potential risk of developing adverse reactions. Mold is classified as a fungus and thrives in moist environments. Although the ideal condition for mold growth is warmer temperatures, it will grow in any moist environment above freezing and below extreme heat (Brandt, et al., 2006). Exposure to mold may cause health issues through inhalation or direct contact. Inhalation may cause respiratory distress including throat irritation, coughing, sneezing, nasal congestion, or trouble breathing; more serious infections can develop in the lungs (Centers for Disease Control and Prevention, 2009). Direct contact with mold may cause eye or skin irritation.

To determine whether a home has been affected by mold, an assessment should be completed. Visual inspection of the home to assess the extent of the water damage can determine potential mold growth. Mold will grow on porous surfaces, such as carpet, upholstery, wallpaper, sheetrock, floor and ceiling tiles, insulation material and clothing (Centers for Disease Control and Prevention, 2009). To control and prevent the growth of mold in a home after a flood, the home should be cleaned up and dried out quickly (within 24 to 48 hours of flood) by opening doors and windows and using fans. All porous items that have been wet for more than 48 hours and cannot be thoroughly clean and dried should be removed, while wet items and surfaces

should be cleaned with detergent and water (Centers for Disease Control and Prevention, 2009). Cancer patients should avoid contributing to the cleanup process or consult with their physician to discuss personal protective measures they should take prior to cleaning (Brandt, et al., 2006).

2.7.3 Foodborne illnesses

Common foodborne illnesses are caused by the multiple different bacteria and viruses, including *Escherichia coli*, *Listeria monocytogenes* and *Salmonella*. Symptoms caused by each pathogen are similar and include nausea, vomiting, diarrhea, abdominal cramps, muscle aches and fever (Centers for Disease Control and Prevention, 2011). Diagnosis can be confirmed with laboratory testing of stool or blood. The treatment typically consists of home therapy focused on rehydration. Due to the immunosuppression a cancer patient experiences from chemotherapy or radiation, the patient is a particularly vulnerable target for foodborne pathogens.

After a flood, food can become contaminated with bacteria in multiple ways. As previously mentioned, flood water may carry sewage or other harmful material. If food has come in contact with the water, the potential for contamination exists. Additionally, when power is lost and refrigeration is interrupted, pathogens can grow on food if the temperature rises above 40°F in the refrigerator portion. A refrigerator will keep food cold for four hours after power is lost if the appliance is minimally opened and closed, while a freezer will typically keep food frozen for 48 hours (United States Department of Agriculture, 2012).

It is recommended to dispose of any food (such as meat, poultry, fish, soft cheeses, milk, eggs, leftovers and deli items) that have been kept in a refrigerator or freezer above 40° F for two hours or more, that have come in direct contact with flood water, in containers with screw-caps, snap lids, twist caps, flip tops and home canned foods (U.S. Food and Drug Administration,

2013). Not only are cancer patients at risk of developing illness directly from contaminated food, but they are also at heightened risk if a member of their household becomes infected. A cancer patient should be aware of whether or not household members become ill after a flood and take additional preventative measures, such as thorough hand washing and proper food hygiene, to reduce the risk of infection.

3.0 PROGRAM PROPOSAL

Cancer patients spend a significant amount of time with nurses throughout their time in care, leading to the focus of this program on patient education through nurse counseling. The program is centered around meetings between a non-hospitalized cancer patient currently attending treatment appointments and a nurse, who has been given information regarding public health preparedness through training and materials developed specifically for the cancer patient, provided by the Allegheny County Health Department (ACHD). This program requires ACHD preparedness staff to collaborate with local hospital nurses. Nurses will be trained by ACHD to discuss aspects of public health preparedness planning, with an emphasis on the implications of flooding. Training will include information on developing emergency plans that include considerations exclusive to cancer patients and specific information about flooding related health implications.

3.1 PROGRAM CONTENT

Because the cancer patient will be at the hospital or treatment facility regularly during a specified period of time, the meetings with the nurse will occur during three treatment appointments. Before the program begins, patients will be asked if they are willing to complete two written surveys (pre and post program) and one phone interview six months after the

conclusion of the program. These surveys will be utilized as evaluation tools for the program (refer to Section 3.2).

Due to the nature of a cancer diagnosis and the potential difficulties caused by treatment, meetings will be brief and adjusted for the patient's length preference. Meetings will occur during the patient's third, fifth and seventh treatment appointments; this accommodates the differences in treatment regimen for chemotherapy, radiation or other treatment schedules. In the event that a patient does not have that many treatment appointments, a modified schedule will be determined which is best suited to that individual patient. In each meeting description, discussion topics that the nurse should follow and suggested language are defined. The suggested language consists of talking points for the nurse to communicate to the patient. Additionally, details about what topics should be covered and which materials should be distributed during each meeting are discussed.

3.1.1 Program Objectives

1. By the end of the first meeting, the nurse will supply the patient with the "Patient Information Card" and "Guidebook."
2. By the end of the second meeting, the nurse will supply the patient with a family disaster plan form.
3. By the end of the third meeting, the nurse will supply the patient with information on flooding and flood related infections.
4. By the end of the program, the patient will be able to verbally describe the components of emergency kits and first aid kits.

5. By the end of the program, the patient will be able to verbally identify the main components of developing an emergency plan.
6. By the end of the program, the patient will be able to verbally identify three implications of flooding at the end of the first meeting.
7. By the end of the program, the patient will be able to verbally describe three techniques for preventing flood related illnesses.

3.1.2 Nurse Training Curriculum

Nurses will be recruited from the local hospital or treatment facility and will be trained by ACHD preparedness staff. Training should include, but not be limited to motivational interviewing techniques and specific information about disaster planning and preparedness related to flooding. The nurses will be introduced to the materials they will be disseminating to the patients and will become familiar with the timing of the meetings. Nurses will be given a survey before and after the training to determine whether the objectives of the training are met.

The nurse training curriculum will include:

- Aspects of Developing a Disaster Plan
 - In-depth review of the “Guidebook” material (see Appendix B)
- Flooding Safety
 - In-depth review of flood terminology and safety precautions
- Flooding Implications: Tetanus, Mold and Foodborne Illnesses
 - In-depth review of the “Infections Fact Sheet” material (see Appendix D)

Nurses will be responsible for:

- Initiating conversations with patient about preparedness;
- Providing written diagnosis, written explanation of treatment and physician contact information;
- Providing materials from ACHD to patient; and
- Answering all questions regarding any of the information supplied.

3.1.3 Nurse-Patient Meeting 1

During the initial meeting, the nurse should ask the patient whether or not he or she currently has any plan for emergencies or an emergency kit prepared. After determining the familiarity of the patient with preparedness, the nurse should go through the Guidebook (see Appendix B) that will be supplied to the patient. Brief descriptions of each of the likely disasters and an introduction to creating a basic emergency plan will be discussed with the patient. An emergency kit and first aid kit items will also be discussed. The nurse should stress that the patient needs to keep copies of important documents such as medical records including pathology reports, lab reports and imaging results in waterproof plastic bags in the emergency kit. Additionally, if the patient has a central venous or an intravenous catheter for treatment, the nurse should explain the need for additional dressing materials to be included in a first aid kit.

Furthermore, the nurse will explain the importance of the patient knowing his diagnosis and treatment cycle during an emergency and provide a “Patient Information Card” (see Appendix B) on which the nurse has filled in the patient’s primary diagnosis, treatment regimen and medication regimen. The nurse should articulate that this is necessary information for the

patient in the event that he is forced to seek care in an area he is unfamiliar with or if his personal oncologist or primary care physician is unavailable during an emergency.

Original patient files and information may be destroyed during a disaster and it may take days or weeks for the information to be located. If the patient's personal oncologist or primary care physician cannot be reached during an emergency, treatment will be delayed by physicians who are unfamiliar with a patient's history if the patient cannot communicate his diagnosis, treatment and medication regimens. However, if the patient knows his personal information, available physicians will be able to continue treatment in a timely manner and prevent additional anxiety or stress for the patient.

Suggested Language:

- “Do you have enough necessary supplies and items, such as canned and unrefrigerated food, bottled water and first aid supplies, at home to last you a week in the event of an emergency?”
- “Would you know your diagnosis and treatment regimen if you had to seek care from an unfamiliar physician or treatment facility?”
 - “You will need to be able to communicate with available medical staff about specific information regarding your treatment. The card will provide that information to medical staff; keep a copy in your emergency kit and on your personal at all times.”

3.1.4 Nurse-Patient Meeting 2

During the second meeting the nurse will thoroughly discuss the family disaster plan form (refer to Appendix C). The nurse will explain that the development of a plan for natural disasters or public health emergencies includes meeting with family members and friends, choosing emergency contacts, identifying escape routes from the home, locating meeting places within and outside the neighborhood, planning for pets and preparing a kit with important documents. The nurse should ask whether the patient has adequate insurance coverage for natural disasters and if each family member knows what to do during an emergency such as turning off the water, gas and electricity, if necessary.

The patient will be advised to discuss the form with family members to determine the best plan that suits each person's needs. Emergency contact forms for the patient to fill in will also be provided (refer to Appendix C); the nurse will point out that the patient should include at least one out-of-state contact on the list. The nurse should stress the importance of staying informed during an emergency event via television, radio announcements or phoning the Allegheny County Health Department.

Suggested Language:

- “Is there a location within your neighborhood that each member of your family is familiar with and could get to in the event of an emergency?”
 - “Select a location right outside your home in case of a sudden emergency, like a fire. Select another location outside your neighborhood in case you cannot return home.”

- “Do you know who you would contact in the event of an emergency?”
 - “Be sure to include one out of state contact. Update your list every six months to make sure you have the correct information. Keep a copy of your contact list near your home phone and in your disaster kit.”

3.1.5 Nurse-Patient Meeting 3

The third meeting will be dedicated to discussing the risks associated with flooding. Flooding is a threat that Allegheny County faces each year, and as noted above, there can be devastating consequences if preparation is not taken. The nurse will discuss flooding terminology, safety tips and infectious diseases associated with flooding (refer to Appendix D). Diseases discussed will include tetanus, mold and foodborne infections. It should be stressed that the patient needs to take extra measures to avoid disease by washing his hands frequently, avoiding ill individuals, monitoring food after a flood in his home and taking proper precautions around mold. The nurse will also advise the patient to discuss with the treating physician if he should receive any immunizations, such as the tetanus vaccine.

At the end of this meeting, the nurse will ask whether the patient discussed emergency planning with his family, if a plan was developed and if a disaster kit has been constructed. Additionally, the nurse will inform the patient of and refer him to mental health services available in response to catastrophic events (County Crisis Outreach).

Suggested Language:

- “Are you aware of the difference between a flood watch versus a flood warning?”
 - “A watch is when flooding or flash flooding is possible in your area. Warning is when flooding or flash flooding is already occurring in your area.”
- “Do you know the major health risks associated with flooding and the best prevention strategies?”
 - “Wound care is an important method in the prevention of tetanus, while the immunization is the most important. To control and prevent the growth of mold in a home after a flood, the home should be cleaned up and dried out quickly; it is crucial that you not inhale any mold particles. It is recommended that you do not take part in cleaning, as you may not know you are inhaling particles. Proper food handling and hand washing are the most important factors in preventing foodborne illness.”

3.1.6 Post Program Meeting

In the event that a patient is in treatment an additional month after the initial meeting, the nurse will conduct a brief check in meeting. During this meeting, the nurse will inquire about the patient’s disaster plan, if the patient feels more prepared than before the initial meeting and whether he has made a habit of carrying the “Patient Information Card” with him at all times. The goal of the check in meeting is to urge the patient to continue to think about preparedness in the future.

3.2 PROGRAM EVALUATION

The goal of this program is to increase awareness of emergency preparedness for cancer patients who are in treatment. There are two components for the program evaluation: process and outcome.

Process:

To measure objectives one through three (refer to section 3.1.1), the nurses will document which materials they provide to the patients during each meeting. The nurses will meet quarterly with an ACHD staff member who has been assigned to assessing this program. At these meetings, the time and date on which the nurse-patient meetings occurred should be reported and logged, as well as what materials were supplied to the patients. During the quarterly meeting, the nurses will be asked:

1. How they feel the program is going;
2. What are some of the challenges and successes they are experiencing; and
3. How many visits they have conducted.

Outcome:

A pre-program survey should be administered by the nurse during the initial meeting to determine the level of preparedness of each patient. The survey will be completed orally with the nurse documenting the patient's answers. Questions to include are:

1. On a scale of 1 (lowest) to 10 (highest), to what degree do you feel prepared for an emergency?

2. Do you currently have a plan in place for a disaster or emergency? If yes, what type of plan? (Fire in home, home evacuation, etc.)
3. Do you have a disaster kit or a first aid kit at home?
4. Can you name three infections that are associated with floods?

A post-program survey should be administered by the nurse during the final meeting to determine if patients have created a disaster plan and kit by the end of the program. The post-program survey will determine whether objectives four through seven were successfully met (refer to section 3.1.1). The same questions from the pre-survey should be asked again in the post survey. If the patient did not create a plan or prepare a kit, the post-survey should inquire as to why he did not do so. The percentages of patients with disaster plans and emergency kits pre- and post-program can be compared and the responses on the surveys can be used to determine whether the program should be restructured and re-evaluated. Additional questions for the post-survey should include:

1. To what degree did speaking with the nurse motivate you to prepare for emergencies?
2. Which aspect of the program did you find the most helpful?
3. Which aspect of the program did you find the least helpful?

4.0 CONCLUSION

There is a multitude of reasons why cancer patients are a unique population, and special attention should be paid when developing a program to satisfy their needs. Disasters like Hurricane Katrina and any of the other major hurricanes that have occurred in the recent years should serve as a lesson that public health preparedness is an area that is lacking, particularly for cancer patients. Conducting a thorough review of current literature and of websites related to preparedness shows there is a lack of focus on special populations, like cancer patients. Cancer patients are a distinctive group with many special considerations, and it is likely that it would take an emergency for a person in cancer treatment to realize the importance of preparedness. However, waiting for a disaster to occur to highlight the fact that preparedness is highly important is not an effective method to prevent common issues that arise during an emergency.

Recognizing the need, a program has been proposed emphasizing how cancer treatment complicates an already stressful situation. This program involves intervening during treatment with nurse counseling; it is an advantageous strategy due to the amount of time patients spend getting their treatments. Program content includes teaching patients how to plan for a disaster, how to build a disaster kit and the importance of knowing exact diagnoses and treatment. The most important aspect of this program is the Patient Treatment card that will be supplied to the patients; carrying this card at all times will decrease confusion for physicians caring for the patient and increase efficiency of continued treatment for the patient in the event of an

emergency. Furthermore, social support is targeted by having patients consult with their friends and family to develop a disaster plan.

When considering a program for implementation in Allegheny County, the implications of flooding and flood preparedness are highly relevant areas and need to be focused on. One meeting between the nurse and patient has been dedicated to these areas, which are addressed through materials with concise information. Because a cancer patient in treatment is highly susceptible to infections, it is vital to highlight which infections are prominent during floods. The cardinal symptoms and prevention techniques for three prominent infections are focused on in the materials developed for the program. Although this program was developed specifically for cancer patients, it can be used as a template for patients with other chronic diseases for future planning.

The benefits of preparedness are very clear; though until preparedness strategies are put to test, it is difficult for individuals to realize how important they truly are. Despite this, targeting cancer patients while they are in treatment and engaging them in preparedness planning will help reduce stress levels during an emergency. This program draws upon the resources of the Allegheny County Health Department and local hospitals in order to assist in emergency planning for special populations. It is important to plan for different populations because each population is diverse and has specific needs, and it is very important that future preparedness planning takes these different populations into consideration.

APPENDIX A: Program Logic Model

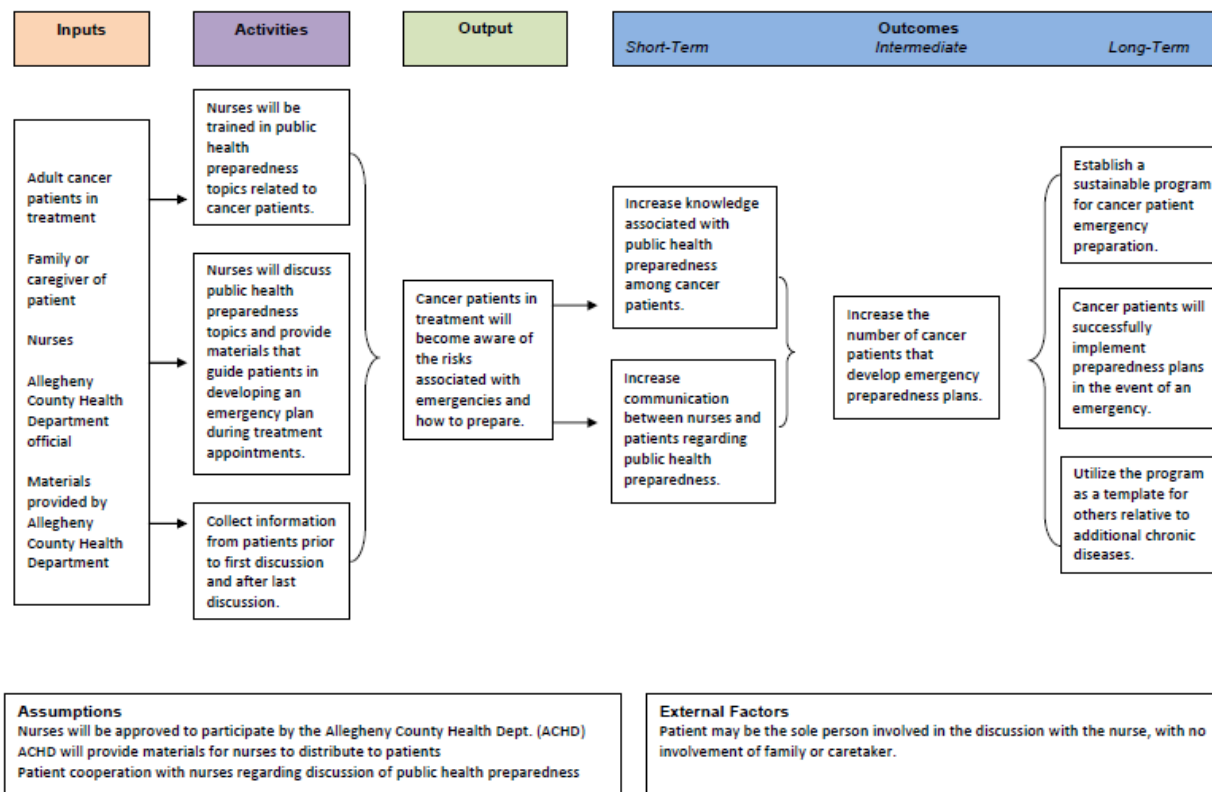


Figure 1: Program logic model

APPENDIX B: Meeting 1 Materials

Patient Information Card
Primary Diagnosis: _____
Date of First Treatment: __/__/__
Treatment Regimen: _____
Treating Physician: _____
Medications: _____

Figure 2: Patient Information Card

<p>Creating an Emergency Plan</p> <p>I. Information (Phone numbers & addresses)</p> <ul style="list-style-type: none"> <input type="checkbox"/> Family members <input type="checkbox"/> Friends who are willing to help during an emergency <input type="checkbox"/> One out of state friend or family member <input type="checkbox"/> Primary care physician and oncologist <input type="checkbox"/> Your treatment facility <input type="checkbox"/> Pharmacy <input type="checkbox"/> Utility information: electric, gas, water companies <input type="checkbox"/> Allegheny County Health Department <input type="checkbox"/> 1-800-4-CANCER (can be used to find access to care during a disaster) <input type="checkbox"/> 1-800-REDCROSS (Red Cross provides shelter, food and emotional support for those affected by disasters) <input type="checkbox"/> For pets: registration number, type of animal and color <p>II. Important Documents & Medical Information</p> <ul style="list-style-type: none"> <input type="checkbox"/> Copies of birth certificates, in a secured waterproof freezer Ziploc bag <input type="checkbox"/> Copies of immunization cards, in a secured waterproof freezer Ziploc bag <input type="checkbox"/> Copies of medical records including pathology reports, lab reports, imaging results, in a secured waterproof freezer Ziploc bag <input type="checkbox"/> Know your exact diagnosis, cancer stage, and any medications you take. If you are receiving chemotherapy or radiation, know where you are in your treatment cycle. <input type="checkbox"/> If you have a central venous or an intravenous catheter that you receive treatment through, you will need to ensure that you have extra dressings and supplies in case of emergency, along with a basic first aid kit. <p style="text-align: right;">5</p>	<p>III. Plan of Action</p> <ul style="list-style-type: none"> <input type="checkbox"/> Develop an escape route from your home. <input type="checkbox"/> Find the safe spots in your home for each type of disaster. <input type="checkbox"/> Determine two meeting locations: one close to your home and one outside of your neighborhood. <input type="checkbox"/> Post emergency telephone numbers by phones (fire, police, ambulance, physicians, family and friends). <input type="checkbox"/> Teach children how and when to call 911 or your local Emergency Medical Services number for help. <input type="checkbox"/> Show each family member how and when to turn off the water, gas and electricity at the main switches. <input type="checkbox"/> Check if you have adequate insurance coverage. <input type="checkbox"/> Stock emergency supplies and assemble a disaster supplies kit. <input type="checkbox"/> If you have pets, plan what you will do with them. <p>IV. Review Your Plan</p> <ul style="list-style-type: none"> <input type="checkbox"/> Practice your plan with your family to make sure everyone can complete the tasks they have been assigned. <input type="checkbox"/> Get in touch with your emergency contacts every 6 months to make sure you have up to date information. <input type="checkbox"/> Make sure your emergency kit is up to date and check food expiration dates. <input type="checkbox"/> Change smoke detector batteries once a year. <input type="checkbox"/> Quiz family members every 6 months to make sure they remember your emergency plan. <input type="checkbox"/> Consult with your physician to be sure you have the correct list of medications and treatment you are currently receiving. <p style="text-align: right;">6</p>
---	---

Figure 3: Guidebook excerpt – Creating an Emergency Plan

Basic Emergency Item Checklist

The following are simple items you should keep in your home in a waterproof container or bag. You should plan to have enough items for at least three days, in case you are unable to leave your home. Also consider keeping an emergency kit in your vehicle. If you have pets, you will need to remember to take their needs into consideration as well.

- ✓ 7 day supply of medications
- ✓ First aid kit
- ✓ Nonperishable foods (granola bars, cereal, canned food, peanut butter, jelly, nuts and seeds)
- ✓ Can opener (non-electric)
- ✓ Bottled water (minimum of one gallon per person)
- ✓ Copies of important documents (see page 5)
- ✓ Flashlight
- ✓ Matches and lighters
- ✓ Battery powered radio
- ✓ Extra batteries
- ✓ Multipurpose tool
- ✓ Whistle
- ✓ Duct tape
- ✓ Extra cash
- ✓ Extra set of house keys and car keys
- ✓ Emergency blanket
- ✓ Personal Hygiene items
- ✓ Special items (extra pair of reading glasses, denture needs, hearing supplies)
- ✓ Tissues (toilet paper)
- ✓ Map of the area



7

What Goes in a First Aid Kit?

During an emergency, you or a family member may be cut, burned or suffer from another kind of injury. It is important to keep a first aid kit handy in the event of an emergency. The American Red Cross recommends that it contains the following items.



- ✓ 2 absorbent compress dressings (5 x 9 inches)
- ✓ 25 adhesive bandages (assorted sizes)
- ✓ 1 adhesive cloth tape (10 yards x 1 inch)
- ✓ 5 antibiotic ointment packets (approximately 1 gram)
- ✓ 5 antiseptic wipe packets
- ✓ 2 packets of aspirin
- ✓ 1 blanket (space blanket)
- ✓ 1 breathing barrier (with one-way valve)
- ✓ 1 instant cold compress
- ✓ 2 pair of disposable gloves
- ✓ 2 hydrocortisone ointment packets
- ✓ Eye wash solution
- ✓ Scissors
- ✓ 1 roller bandage (3 inches wide)
- ✓ 1 roller bandage (4 inches wide)
- ✓ 5 sterile gauze pads (3 x 3 inches)
- ✓ 5 sterile gauze pads (4 x 4 inches)
- ✓ Oral thermometer
- ✓ 2 triangular bandages
- ✓ Tweezers
- ✓ First aid instruction booklet

8

Figure 4: Guidebook excerpt – Emergency Item Checklist and First Aid Kit Contents

APPENDIX C: Meeting 2 Materials


Medical Emergency Information	
Physician:	_____
Treatment Center:	_____
Pharmacy:	_____
National Cancer Institute:	<u>1-800-4-CANCER</u>
Health Department:	_____
Fire Department:	_____
Police:	_____
Red Cross:	<u>1-800-REDCROSS</u>

Figure 5: Medical Emergency Information card

EMERGENCY CONTACTS LIST

1. Name: _____ Relationship to you: _____ Home Phone: _____ Cell Phone: _____ Address: _____ _____ Email: _____	5. Name: _____ Relationship to you: _____ Home Phone: _____ Cell Phone: _____ Address: _____ _____ Email: _____
2. Name: _____ Relationship to you: _____ Home Phone: _____ Cell Phone: _____ Address: _____ _____ Email: _____	6. Name: _____ Relationship to you: _____ Home Phone: _____ Cell Phone: _____ Address: _____ _____ Email: _____
3. Name: _____ Relationship to you: _____ Home Phone: _____ Cell Phone: _____ Address: _____ _____ Email: _____	7. Name: _____ Relationship to you: _____ Home Phone: _____ Cell Phone: _____ Address: _____ _____ Email: _____
4. Name: _____ Relationship to you: _____ Home Phone: _____ Cell Phone: _____ Address: _____ _____ Email: _____	8. Name: _____ Relationship to you: _____ Home Phone: _____ Cell Phone: _____ Address: _____ _____ Email: _____

Figure 6: Emergency Contact Information sheet



Family Disaster Plan

Family Last Name(s) or Household Address: _____ Date: _____

Family Member/Household Contact Info (If needed, additional space is provided in #10 below):

Name	Home Phone	Cell Phone	Email
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Pet(s) Info:

Name	Type	Color	Registration #
_____	_____	_____	_____
_____	_____	_____	_____

Plan of Action

1. The disasters most likely to affect our household are:

2. What are the escape routes from our home?

3. If separated during an emergency, what is our meeting place near our home?

1

4. If we cannot return home or are asked to evacuate, what is our meeting place outside of our neighborhood?

What is our route to get there and an alternate route, if the first route is impossible?

5. In the event our household is separated or unable to communicate with each other, our emergency contact outside of our immediate area is:

Name	Home Phone	Cell Phone	Email
_____	_____	_____	_____

After a disaster, let your friends and family know you are okay by registering at "Safe and Well" at <https://safeandwell.com/unhcr.org/cma/>, or by calling 1-800-733-2767. You can also give them a call, send a quick text or update your status on social networking sites.

6. If at school/daycare, our child(ren) will be evacuated to:

Child's Name	Evacuation Site (address and contact info)
_____	_____
_____	_____
_____	_____

7. Our plan for people in our household with a disability or special need is:

Person's Name	Plan
_____	_____
_____	_____

8. During certain emergencies local authorities may direct us to "shelter in place" in our home. An accessible, safe room where we can go, seal windows, vents and doors and listen to emergency broadcasts for instructions, is:

2

Figure 7: Disaster Planning Form, as offered on the American Red Cross website.

APPENDIX D: Meeting 3 Materials

Common Flood Related Infections

Tetanus	Mold	Foodborne Illnesses
<p>What is Tetanus? Infection caused by the bacterium <i>Clostridium tetani</i>.</p> <p>Bacteria are found in the soil, manure, dust and in the water after a flood.</p> <p>Bacteria enter the body through breaks in the skin, like cuts, abrasions or puncture wounds.</p> <p>Tetanus Symptoms include:</p> <ul style="list-style-type: none">• Headache• Jaw cramping• Sudden, involuntary muscle tightening – often in the stomach (muscle spasms)• Painful muscle stiffness all over the body• Trouble swallowing• Jerking or staring (seizures)• Fever and sweating• High blood pressure and fast heart rate <p>Prevention Strategies: Receiving the immunization is the best way to prevent tetanus.</p> <p>You need a booster of the tetanus vaccine every 10 years.</p> <p>You may wish to consult your physician to determine when and if you should be vaccinated.</p> <p>Cleaning wounds and maintaining clean wounds can also prevent infection.</p>	<p>Important Facts about Mold: It is impossible to remove mold from porous surfaces.</p> <p>Porous surfaces include carpet, upholstery, wallpaper, sheetrock, floor/ceiling tiles, insulation material, some clothing.</p> <p>How do I know if my home has mold growing in it? Sight: are the walls and ceiling discolored, or do they show signs of mold growth or water damage? Smell: do you smell a bad odor, such as a musty, earthy smell or foul smell?</p> <p>Mold Infection Symptoms include:</p> <ul style="list-style-type: none">• Stuffy nose• Irritated eyes• Wheezing• Skin irritation• Coughing• Infection may develop in lungs <p>Prevention Strategies: Clean up and dry out the building quickly (within 24 to 48 hours of flood) by opening doors and windows and using fans.</p> <p>Remove all porous items that have been wet for more than 48 hours and that cannot be thoroughly cleaned and dried.</p>	<p>How does food become unsafe after a flood? Flood water may carry silt, sewage or chemical waste and if food comes into contact with flood water, it may become contaminated.</p> <p>If perishable food has been unrefrigerated, bacteria like <i>E. coli</i> or <i>Salmonella</i> may grow in it.</p> <p>Foodborne illness symptoms include:</p> <ul style="list-style-type: none">• Nausea• Vomiting• Diarrhea• Abdominal cramps• Muscle aches• Fever <p>Prevention Strategies: Discard food: – That has come in direct contact with flood water – In permeable containers or wrapped in paper, plastic cloth, or cardboard – That is home-canned in glass containers or cans that are damaged (bulging, swollen, leaking, dented, punctured) – Porous items that may come in contact with food or with a person's mouth (baby bottle tops, pacifiers, wooden utensils)</p> <p>Disinfect all areas and non-permeable equipment affected by flood water. (utensils/silverware, cookware, dishware, food contact surfaces, and food preparation equipment)</p>

Figure 8: Common flood related infections fact sheet

Flood Safety

Floods are among the most frequent and costly natural disasters

Know the Difference Between:

- Flood/Flash Flood **Watch**: Flooding or flash flooding is possible in your area.
- Flood/Flash Flood **Warning**: Flooding or flash flooding is already occurring or will occur soon in your area.

Respond:

- **Listen** to area radio and television stations and NOAA Weather Radio for possible warnings, reports or other critical information from the National Weather Service.
- **Be prepared** to evacuate at a moment's notice (keep your emergency bag ready to go in an easy to access place).
- **Stay away** from floodwaters. If you come upon a flowing stream where water is above your ankles, stop, turn around and go another way. Six inches of swiftly moving water can sweep you off of your feet.
- If you come upon a flooded road while driving, **turn around and go another way**. If you are caught on a flooded road and waters are rising rapidly around you, get out of the car quickly and move to higher ground. Most cars can be swept away by less than two feet of moving water.

Recovery:

- Let your family know you're safe.
- Return home only after officials have the area safe.
- Before entering your home, look for loose power lines, damaged gas lines or other damage. If you smell natural gas or propane gas, leave your home immediately and contact the fire department.
- Make sure your food and water are safe. Discard items that have come in contact with floodwater, including canned goods, water bottles, plastic utensils and baby bottle nipples. When in doubt, throw it out!
- Contact your local or state public health department to see if your water supply might be contaminated. You may need to boil or treat it before use
- During cleanup, wear protective clothing, including rubber gloves and rubber boots.

Figure 9: Flood safety information

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