



PHR Summary

Navy & Marine Corps Public Health Center (NMCPHC) completed a Public Health Review (PHR) which included an environmental and occupational exposure pathway investigation and an epidemiologic investigation. The PHR included a review of documents from:

- ◆ Laurel Bay Military Housing (LBMH)
- ◆ Marine Corps Air Station Beaufort (MCAS Beaufort)
- ◆ Marine Corps Recruit Depot Parris Island (MCRD Parris Island)
- ◆ Naval Hospital Beaufort Housing (NHBH)



Summary

In 2015, at the request of the U.S. Marine Corps (USMC), the NMCPHC investigated the incidence of pediatric cancers in current and former residents of LBMH, which residents believe may be associated with environmental exposures. NMCPHC was asked to identify and validate all pediatric cancers in children who lived or were conceived in the Beaufort area to determine if the observed cancer rates exceeded the rates that which would be expected in this population. This fact sheet summarizes the results of the PHR.

What We Did

NMCPHC followed the U.S. Centers for Disease Control and Prevention’s (CDC’s) process for conducting investigations of suspected cancer clusters to conduct the PHR. This process is comprised of two steps: (1) an epidemiologic investigation and (2) an environmental and occupational (workplace) exposure pathway investigation. The results of these two investigations were integrated in the final PHR. Subject matter experts (SMEs) in industrial hygiene, drinking water, toxicology, environmental restoration, risk assessment, radon assessment and mitigation, radiation health, occupational and environmental medicine, and epidemiology conducted the PHR. Numerous environmental documents and medical records data associated with LBMH, MCAS Beaufort, MCRD Parris Island, and NHBH were reviewed to evaluate the potential relationship, if any, between exposures to environmental risk factors and pediatric cancers in the population.

Cancer Cluster Investigations – We Follow the Centers for Disease Control’s Process



Environmental and Occupational Investigations

A review of all available documents and reports pertaining to both occupational and environmental sites at LBMH, MCAS Beaufort, MCRD Parris Island, and NHBH was performed as part of the PHR to determine if a potential public health hazard exists as a result of environmental releases from past disposal, handling practices, and workplace exposures.

Reports and other documents identified and reviewed for the PHR were primarily produced under the U.S. Navy Environmental Restoration Program (ER Program) which began in the early 1980s in response to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), or under the U.S. Navy Safety and Occupational Health Program (NAVOSH Program) which began in the 1970s in response to the Occupational Safety and Health Act (OSHA Act).

Process: Documents and reports associated with each environmental or occupational site were reviewed to determine the relevance of each in answering the question: “Is there a complete exposure pathway for air, water, soil, or soil gas by ingestion, inhalation, or dermal

Quick Summary

Based on the types and number of pediatric cancers observed, and the evaluation of the recognized risk factors, it is unlikely that an environmental or occupational exposure is associated with these cancers. The term unlikely means that the evidence is insufficient to connect the environmental and occupational conditions to the observed cancers.



Key Elements of a Cancer Cluster:

- ◆ More than the expected number of valid cancer cases.
- ◆ Occurrence of the same or etiologically-related cancer types.
- ◆ Valid cancer cases located in the same geographic area.
- ◆ Cancer cases occurred over a defined period of time.
- ◆ Latency (the time from first exposure to diagnosis) must be consistent with the cancer type.

Valid Cancer Case – A diagnosis consistent with cancer and associated treatment records (e.g., chemotherapy, radiation, etc.).

Questions? Contact us at:

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contact which could have contributed to the incidence of pediatric cancer?” The review was an iterative process. In some instances, the findings and/or recommendations in one report led to looking for a follow-up report or resulted in the identification of a data gap. As we identified data gaps, we requested additional information to fill the data gaps and reduce the uncertainty.

Environmental Investigation Summary:

- ◆ Documents were reviewed to determine potential health risks related to occupational (workplace) and environmental releases from past disposal/handling practices at

Location	Number of Documents Reviewed
LBMH	275
MCAS Beaufort	269
MCRD Parris Island	~ 1,000
NHBH	10

- ◆ houses, solid waste management units, underground storage tanks, etc.
- ◆ Ionizing radiation was one of the two potential environmental risk factors for three of the five types of pediatric cancers identified in the Epidemiologic Investigation. Based on the results of the Radiation Safety and Radon Programs, and radiation surveys and measurements, it is not likely that an individual would be exposed to any additional radiation (above normal background radiation) in the occupied areas at LBMH, MCAS Beaufort, MCRD Parris Island, or NHBH.
- ◆ Benzene was one of the two potential environmental risk factors for one of the five types of pediatric cancers identified in the Epidemiologic Investigation. Based on the results of the documents reviewed to-date as part of the environmental investigation, there is not a complete exposure pathway of concern for benzene in the occupied areas at LBMH, MCAS Beaufort, MCRD Parris Island, or NHBH.

Epidemiologic Investigation

NMCPHC was asked to identify and validate all pediatric cancers in children who lived or were conceived in the Beaufort area from January 2002 to December 2016 to determine if the observed cancer rates exceeded what would be expected in this population.

Process: The epidemiologic investigation followed the CDC’s Guidelines for Investigating Suspected Cancer Clusters.

Epidemiologic Investigation Summary:

- ◆ The study area included children (including those conceived) of active duty Marine Corps and Navy service members assigned to work at MCAS Beaufort and MCRD Parris Island from January 2002 to December 2016. The study was based on sponsors’ zip codes within a 30-mile radius of LBMH and MCRD Parris Island. The population scope was expanded to include air squadrons that deployed through MCAS Beaufort with zip codes outside the study area.
- ◆ Fifteen (15) cases were validated through the review of electronic health records.
- ◆ Five (5) types of cancers were validated to date: acute lymphocytic leukemia (ALL), acute myeloid leukemia (AML), neuroblastoma, soft tissue sarcoma (e.g., infantile rhabdomyosarcoma) and Wilms tumor.
- ◆ Three (3) of the five (5) validated cancer types have known environmental risk factors (ionizing radiation [therapeutic x-rays] and benzene).
- ◆ All cancer cases were consistent with normal pediatric cancer type distribution for the same types of cancers in the general pediatric population.

CDC defines a cancer cluster as a greater-than-expected number of cancer cases that occurs within a group of people in a geographic area over a defined period of time. Multiple factors affect the likelihood of developing cancer, including age, genetic factors, and lifestyle behaviors such as diet and smoking.