



Ashland Nyanza Health Study

Executive Summary

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**Massachusetts Department of Public Health
Center for Environmental Health**

EXECUTIVE SUMMARY

Background

The Town of Ashland, Massachusetts is located 22 miles west of Boston with a population of approximately 14,674 people. Although Ashland is predominantly a residential community, historically it was also home to the Nyanza Company, which operated a dye manufacturing facility in the town from 1965 to 1978. The Nyanza Inc. Company was one of the first and largest dye manufacturers in the United States. The site has a lengthy history in the Ashland community; prior to 1965 a number of other companies also operated at the Nyanza site location. During the early 1980s several environmental studies at the Nyanza property documented widespread chemical contamination at and around the site. Consequently, in 1983 the U.S. Environmental Protection Agency placed the Nyanza property on the National Priority List as the Nyanza Chemical Waste Dump. Historically, liquid wastes were discharged from the Nyanza site into the environment in several ways including into an underground vault, unlined lagoons, and nearby brooks and wetlands. More than 100 different chemicals including volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), dye manufacturing compounds, and metals were detected on the approximately 35-acre site.

The Massachusetts Department of Public Health (MDPH) completed a Public Health Assessment for the Nyanza Chemical Waste Dump in 1994 and identified a number of exposure pathways from the Nyanza site. This assessment demonstrated that opportunity for human exposure to Nyanza site contaminants in the past was high and included exposures to children playing in the soils and lagoons on-site as well as in the Chemical Brook located at the northern perimeter of the site and near adjacent residential properties. Although this assessment determined that exposures to Ashland residents likely occurred in the past, information regarding the community's health status was not available at the time to determine if exposure could be related to adverse health effects among Ashland residents.

Two health studies examining the incidence of bladder and kidney cancer were also completed as part of the Public Health Assessment for the Nyanza Chemical site. Both studies targeted bladder and kidney cancer because these cancers types are associated with occupational exposure to azo dye manufacture and the use of two contaminants detected at the Nyanza site. An Expert Panel convened by the MDPH reviewed the findings of the two health studies along with environmental data for the Nyanza site and concluded that the number and distribution of bladder and kidney cancers in Ashland during the study period 1982 to 1986 was not atypical. However, the panel also concluded that potential past exposures to environmental contaminants from the Nyanza site could have contributed to a variety of disease outcomes, including cancer, among Ashland residents. The panel believed the 1960s to be the critical time period of interest based on possible population changes in the town and the latency period of diseases that could potentially be associated with exposures. Further, given site accessibility and the types of activities that

occurred at the Nyanza property during the 1960s through the 1980s, the opportunity for exposure was greatest to children and young adults who frequented the property.

Introduction to Ashland Nyanza Health Study

In 1998, residents of Ashland reported to the MDPH that young adults who had lived in the town and played on the Nyanza Chemical site as children had recently developed similar types of rare cancers. The concern focused on a suspected cluster of five young men of similar age that developed various types of soft tissue sarcomas and the possibility that past exposure from the Nyanza Chemical Site may be causing an increase in cancer diagnoses among current and former Ashland residents. This suspected cluster was reported to have occurred among the population of Ashland residents previously identified by the MDPH in the Public Health Assessment as having the greatest potential for exposure to contaminants at the Nyanza site. Based on this information, the MDPH initiated the Ashland Nyanza Health Study to further investigate whether historical exposures to contaminants at the Nyanza site could be related to increased cancer diagnoses among children and young adults who lived in Ashland at the time the site was operational.

Study Design and Methodology

The Ashland Nyanza Health Study was a retrospective cohort study which attempted to recreate the population of children between the ages of 10 and 18 who resided in Ashland during the years 1965 to 1985. The objective of the study was to determine and compare the incidence of cancer among exposed and non-exposed individuals of the study cohort (i.e., individuals who reported contact with the Nyanza site versus individuals who reported no contact with the site). The cohort was restricted by age based on opportunity for past exposure. That is, the target study population consisted of Ashland children and young adults thought to have the most frequent contact with the Nyanza site and therefore the most opportunity for potential exposure to site contaminants. Children younger than age ten were thought to not come in contact with the site as frequently as older children. By restricting the study to individuals who were aged 10 to 18 during the time period of interest (i.e., 1965 to 1985); the study targets those Ashland residents that had the greatest opportunities for exposure to the site.

Results

A total of 1,387 individuals participated in the study, yielding a response rate of 67.5%. The mean age of study participants was 39.8 years. Seventy-three individuals reported a cancer diagnosis at the time of interview. These individuals comprise the case group. The MDPH was able to medically confirm the diagnosis for 55% (N=40) of the 73 individuals who self-reported a cancer diagnosis. Thirty-four percent of the case group was

diagnosed with a cancer type categorized as a rare cancer type. Analyses were conducted with all individuals who self-reported a cancer diagnosis (N=73) as well as those individuals with a confirmed cancer diagnosis (N=40) and rare cancer (N=25).

Initial analyses involving the entire case group showed that three areas of the Nyanza site were associated with an increased risk of cancer. These areas included the Eastern Wetlands (Area B), the Sudbury River near High Street (Area F), and the Sudbury and Mill Pond area (Area G). The associations were observed among study participants who reported any contact in these areas and a positive family history of cancer. When the analyses focused on specific types of activities at the Nyanza site that could potentially be associated with an increased risk of cancer, the study found that activities involving water contact at two areas of the site were associated with an increased risk of cancer. These areas included Area D (Megunko Hill) and Area H (the Sudbury River near Myrtle Street). Study participants who reported activities related to any type of water contact, specifically swimming or wading, at these two areas showed a statistically significantly increased risk of cancer diagnoses. The increased risk of cancer was two to three times greater than the risk of cancer for study participants who reported no contact with these areas of the Nyanza site. Further, for individuals who reported water contact in Areas D or H and a positive family history of cancer, the risk of cancer increased to nearly four times the risk of study participants who reported no family history of cancer. These results were statistically significant and were observed when the analyses included the entire case group of participants who self-reported a cancer diagnosis as well as those with a medically confirmed cancer diagnosis.

In addition, evaluation of specific locations depicted within the defined exposure areas of the Nyanza site showed statistically significant associations between overall water contact at Chemical Brook and the two waste lagoons located on Megunko Hill. These results were statistically significant when the analyses included individuals who had a confirmed cancer diagnosis as the case group as well as only those individuals who had a rare cancer diagnosis. Again, the results were confirmed and remained statistically significant when a family history of cancer was considered in the analyses.

Discussion and Conclusions

The findings indicate that the relative risk of cancer was greater among study participants who reported water contact with specific areas of the Nyanza Chemical site. Increased risks of cancer were consistently observed when study participants reported water contact exposures in one on-site area (Area D - Megunko Hill) and one off-site location (Area H – Sudbury River at Myrtle Street) associated with chemical contamination. The risks were typically increased three to four fold among study participants who reported a family history of cancer. Although analyses restricting the case group to only those with a confirmed cancer diagnosis did not consistently confirm the associations initially observed for contact with Nyanza site Areas B, F and G, the results demonstrate a consistent pattern in the direction of an increased risk of cancer for individuals in this study

population who reported water contact exposures in specific locations both on and off the Nyanza site property. The MDPH concludes that as a result of this information about reported exposure activities at the site from study participants, the findings suggest that a gene-environment interaction may exist among individuals who reported water contact in certain areas of the Nyanza site in the past.