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Evaluation of Cancer Incidence in the North Warren Avenue/Richmond Street Neighborhood of Brockton, MA

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Richmond Street Neighborhood of Brockton, MA

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I. Introduction

In the spring of 2002, a resident of Brockton contacted the Massachusetts Department of Public Health (MDPH), Center for Environmental Health (CEH) regarding concerns over a suspected increased incidence of cancer in the North Warren Avenue/Richmond Street neighborhood of the city (see Figure 1). Specifically, the resident expressed concerns over a suspected high number of cancer diagnoses among individuals living in this area of Brockton and whether this may represent an atypical pattern or possibly be related to a common environmental factor related to Vacuum Tube Industries, Inc. (now known as East Coast Induction, Inc.) located at 506 North Warren Avenue in Brockton, Massachusetts. In response to these concerns, the CEH's Community Assessment Program (CAP) reviewed the most recent available cancer incidence data from the Massachusetts Cancer Registry (MCR) for the North Warren Avenue/Richmond Street neighborhood.

II. Methods

The MCR, a division within the MDPH Center for Health Information, Statistics, Research and Evaluation, is a population based surveillance system that has been monitoring cancer incidence in the Commonwealth since 1982. All new diagnoses of cancer among Massachusetts residents are required by law to be reported to the MCR within six months of the date of diagnosis (M.G.L. c.111. s 111b). This information is kept in a confidential database. To address concerns regarding cancer and potential associations with exposure opportunities related to Vacuum Tube Industries, Inc., CAP staff reviewed the MCR data files to both confirm cancer diagnoses reported among residents of the North Warren Avenue/Richmond Street neighborhood as well as to determine whether an atypical pattern of cancer may be occurring in this area of Brockton (see Figure 1).

At the time of our analyses, the 18-year period from 1982-1999 constituted the time period for which the most complete and recent cancer incidence data were available from the MCR. However, since the MCR is a continual surveillance system for cancer, reports of individuals in

Brockton diagnosed since 1999 to the present time were also reviewed.[1] An evaluation of the geographic pattern of cancer was also conducted to determine whether any specific cancer type appeared to be concentrated within the North Warren Avenue/Richmond Street area of Brockton. Place of residence at the time of diagnosis was mapped for all individuals diagnosed with cancer in this area to assess any possible geographic concentration of cases. Because cancer is one word that describes many different diseases, the geographic distribution of each individual cancer type was evaluated separately to determine whether an atypical pattern of any one type was occurring. (For confidentiality reasons, maps of the location of individuals diagnosed with cancer cannot be provided in this report.)

III. Cancer Incidence in the North Warren Avenue/Richmond Street Neighborhood

For this evaluation, we reviewed the pattern of cancer diagnoses among residents on North Warren Avenue and adjacent streets in the area including Richmond Street, Olive Street, Hawthorne Street, Lowell Street, Ford Street, and Cherry Street (see Figure 1). Since 1982, a total of 24 cancer diagnoses have been reported to the MCR for residents of the North Warren Avenue/Richmond Street neighborhood. Ten different types of cancer were diagnosed among these individuals, indicating the occurrence of a number of different diseases. The most commonly reported diagnoses included cancers of the breast, prostate, lung and bronchus, and colon/rectum. Together, these cancer types represented two-thirds (n=16) of the cancer diagnoses among residents in this area and are the four most common types of cancer diagnosed among men and women in Massachusetts. This pattern of cancer appears to be consistent with national and statewide trends in cancer incidence. There were also several other cancer types diagnosed among residents of this area of Brockton over the 20-year period reviewed, including melanoma and cancers of the bone, oral cavity and pharynx, testes, and uterus. In addition, one individual was diagnosed with an unknown cancer type. Based on our review of place of residence for individuals diagnosed with cancer, there were no specific patterns or geographic concentrations of any one cancer type within this neighborhood that would suggest a common factor (environmental or non-environmental) is related to these diagnoses. Also, the years of

[1] The data summarized here were drawn from data entered on MCR computer files before May 8, 2003.

diagnosis for individuals in this area varied throughout the 20 years reviewed, indicating no apparent trend or pattern in the time of diagnoses.

The majority of cancer types diagnosed among residents of the North Warren Avenue/Richmond Street neighborhood are predominantly associated with non-environmental factors such as family history, smoking, diet, and other lifestyle behaviors. While environmental factors have been clearly associated with some cancer types (e.g., exposure to asbestos and lung cancer), research suggests that non-environmental factors such as cigarette smoking play the most important role. Because the MCR collects some information related to risk factors (e.g., smoking history) for individuals diagnosed with cancer, these data were reviewed to better characterize the incidence patterns of cancer in this area of Brockton. This included a review of age at diagnosis, gender, smoking history, and occupation.

Age is also an important risk factor for many cancers. Different cancers occur with different frequencies among the various age groups. However, most cancer types are diagnosed more frequently in populations age 50 and older. Review of information regarding age and gender indicates that the incidence of cancer in this area is consistent with established prevalence patterns of disease in the general population. The average age of diagnosis for individuals in the North Warren Avenue/Richmond Street area was 57 years. Sixty percent (n = 15) of those diagnosed with cancer were greater than or equal to age 50 at the time of diagnosis.

As mentioned, cigarette smoking is an important risk factor in the development of several cancer types, including cancers of the lung and bronchus and oral cavity and pharynx. A review of information regarding smoking history revealed that all four individuals diagnosed with a smoking-related cancer in this area reported being current or former smokers at the time of diagnosis. Therefore, it is likely that smoking played a role in the development of cancer among some residents of the North Warren Avenue/Richmond Street neighborhood. Finally, some occupational exposures, such as jobs involving contact with chemicals, have also been associated with an increased risk for developing certain types of cancer. While the MCR data available for occupation are limited (i.e., the occupation is often listed too generally as the name of a business or, worse, as retired), a review of occupation as reported to the MCR was conducted. None of the information available for residents diagnosed with cancer suggested that exposures at work

may have been related to their development of cancer. It is probably also important to mention that the information reported to the MCR is based on occupation at the time of diagnosis and therefore potential exposures associated with past occupations cannot be determined. Occupation was reported as retired, at home, or unknown for 50% of the individuals diagnosed with cancer in this area.

We were not able to confirm the diagnoses of all individuals reported to the CEH by a Brockton resident. There may be several reasons for this. First, at the time of these analyses, the MCR data were complete through 1999, however, this is an on-going surveillance system that collects reports on a daily basis. Although we reviewed the MCR data for cancer diagnoses in this area of Brockton through the present time, it is possible that some residents of this neighborhood with cancer may not be included in the MCR files. For example, some of these individuals may have been diagnosed before 1982 when the MCR began collecting information on individuals in the state diagnosed with cancer. Similarly, some individuals with recent cancer diagnoses may not have been reported to the MCR yet. This would be particularly true for any 2004 diagnoses. It is also possible that some individuals resided at or reported an address other than the North Warren Avenue/Richmond Street neighborhood at the time of their diagnosis (e.g., a P.O. Box). In addition, individuals were not reported by name. Therefore, if the house number or cancer type reported was incorrect, we may not have been able to identify some individuals. If the cancer type listed was the result of a metastasis (i.e., spread of cancer from the primary site to another organ), that individual may not have been identified because the MCR only collects reports of primary site (i.e., original location in the body) cancer diagnoses. Finally, some individuals may have actually been diagnosed with non-invasive cancer types (i.e., benign tumors) or other pre-cancerous or non-cancerous conditions. These individuals would not be included in the MCR data files.

IV. Community Environmental Concerns

In an effort to address concerns about possible environmental exposures associated with Vacuum Tube Industries, Inc. (now known as East Coast Induction, Inc.) and former businesses located at 506 North Warren Avenue, we contacted the Massachusetts Department of Environmental Protection (MDEP). According to the MDEP, a release of diesel fuel from an underground

storage tank was reported at Vacuum Tube Industries, Inc. in 1986 under Chapter 21E of Massachusetts General Laws (M.G.L c21E, 310 CRM 40.0000), the statewide hazardous waste site cleanup program (MDEP 2003). Information regarding the amount of material released and the geographic extent of contamination was not readily available. The current compliance status of this release indicates that response actions for this release were sufficient to achieve a level of "no significant risk" or at least ensure that all substantial hazards were eliminated (MDEP 2003). East Coast Induction, Inc. also has a permit to generate a small amount of hazardous waste. The most recent site inspection by MDEP was conducted in January 2000. At that time, the company was in compliance with state regulations for production, storage, and disposal of hazardous wastes (MDEP 2004a). It is also worthwhile to note that according to information from the MDEP, neither this company nor any former businesses located at this address have reported any other hazardous material or oil releases (MDEP 2004b).

V. Discussion and Conclusions

When interpreting the information contained in this report, it is important to keep in mind that cancer is a common disease. The American Cancer Society (ACS) estimates that one out of every three Americans will develop cancer during his or her lifetime. Over the past forty years, the rise in the number of cancer cases generally reflects the increase in the population, particularly in the older age groups. The most commonly diagnosed cancers for adult males include prostate cancer, lung and bronchus cancer, and colorectal cancer. Breast, lung and bronchus, and colorectal cancers are the most common cancer types diagnosed among women (ACS 2003). For this reason, it was not surprising to observe that two-thirds of individuals diagnosed with cancer who were residents of the North Warren Avenue/Richmond Street neighborhood were diagnosed with the cancer types that are frequently diagnosed in the U.S. population.

Understanding that cancer is not one disease, but a group of diseases is also very important. Research has shown that there are more than 100 different types of cancer, each with different causative (or risk) factors. In addition, cancers of a certain tissue type in one organ may have a number of causes. Cancer may also be caused by one or several factors acting over time. For example, tobacco use has been linked to lung, bladder, and kidney cancers. Other factors related

to cancer may include lack of crude fiber in the diet, high fat consumption, alcohol abuse, and reproductive history. Heredity, or family history, is an important risk factor for several cancers. To a lesser extent, some occupational exposures, such as jobs involving contact with asbestos, have been shown to be carcinogenic (cancer causing). Environmental contaminants have also been associated with certain types of cancer. It is important to remember, however, that the presence of contaminants at a site alone does not necessarily represent a health threat. In order for a compound to impact one's health, it must not only be present in a certain environmental media (i.e., air, soil, or water), but one must also come into contact with the compound via the contaminated media through ingestion, inhalation, or skin absorption. It is not possible to determine whether residents of the North Warren Avenue/Richmond Street area were actually exposed to contaminants related to the 1986 diesel fuel oil release. Exposure to diesel fuel and/or other types of fuel oils in the environment may cause health effects such as headache, nausea, eye irritation, and kidney damage in some individuals, and it is unknown whether nearby residents have experienced such symptoms. Exposure to some fuel oils can also cause cancer in animals (i.e., skin and liver cancer in mice) and it has been determined that fuel oil exposure may possibly cause cancer in humans (ATSDR 1995). However, based on the available information regarding the incidence of cancer and the available environmental information from the MDEP, it is unlikely that historical exposure to contamination associated with this release played a role in the pattern of cancer observed among residents of this neighborhood given that no pattern was observed with respect to the types of cancer associated with exposure to fuel contaminants.

According to the American Cancer Society statistics, cancer is the second leading cause of death in Massachusetts and the United States. Not only will one out of three people develop cancer in their lifetime, but also this tragedy will affect three out of every four families. For this reason, cancers often appear to occur in "clusters," and it is understandable that someone may perceive that there are an unusually high number of cancer cases in their surrounding neighborhoods or towns. Upon close examination, many of these "clusters" are not unusual increases, as first thought, but are related to such factors as local population density, variations in reporting or chance fluctuations in occurrence. In other instances, the "cluster" in question includes a high concentration of individuals who possess related behaviors or risk factors for cancer. Some, however, are unusual; that is, they represent a true excess of cancer in a workplace, a

community, or among a subgroup of people. A suspected cluster is more likely to be a true cancer cluster if it involves a large number of cases of one type of cancer diagnosed in a relatively short time period rather than several different types diagnosed over a long period of time (i.e., 20 years), a rare type of cancer rather than common types, and/or a large number of cases diagnosed among individuals in age groups not usually affected by that cancer. These types of clusters may warrant further public health investigation.

Although some residents of the North Warren Avenue/Richmond Street area were diagnosed with cancer since 1982, a number of different cancer types were diagnosed over the last 20 years. This information does not suggest an atypical pattern of cancer is occurring in this area. Most cancers diagnosed among these residents were very common types of cancer diagnosed among men and women in Massachusetts and the United States. In addition, no atypical patterns with respect to place of residence or diagnoses over time emerged that would suggest a common factor (either environmental or non-environmental) is related to the occurrence of cancer in this area of Brockton.

In order to provide a better understanding of some of the more common cancer types diagnosed among residents of the North Warren Avenue/Richmond Street neighborhood in Brockton, additional information related to risk factors for their development is attached (see Attachment A).

VI. Recommendations

Based upon the information reviewed in this report no further evaluation of cancer in the North Warren Avenue/Richmond Street section of Brockton is recommended at this time.

VII. References

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. Toxicological profile for fuel oils. Atlanta, GA: U.S. Department of Health and Human Services.

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