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Evaluation of Cancer Incidence in the Bartlett Street/East Street Neighborhood of South Hadley, MA

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TABLE OF CONTENTS

I. Introduction

In the spring of 2004, a resident of South Hadley contacted the Massachusetts Department of Environmental Protection (MDEP) regarding concerns over a suspected increased incidence of cancer in the Bartlett Street/East Street neighborhood of the town (see Figure 1). Specifically, the resident expressed concerns over a suspected increase in the number of cancer diagnoses among individuals living in this area of South Hadley and whether the pattern of cancer may be atypical or possibly be related to a common environmental factor related to two nearby landfills (Granby Landfill and South Hadley Landfill). The MDEP requested a cancer incidence evaluation from the Center for Environmental Health (CEH) at the Massachusetts Department of Public Health (MDPH). In response to this request, the CEH's Community Assessment Program (CAP) reviewed the most recent available cancer incidence data from the Massachusetts Cancer Registry (MCR) for the Bartlett Street/East 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 the Granby and South Hadley landfills, CAP staff reviewed the MCR data files to both confirm cancer diagnoses reported among residents of the Bartlett Street/East Street neighborhood as well as to determine whether an atypical pattern of cancer may be occurring in this area of South Hadley (see Figure 1).

At the time of these analyses, the 20-year period from 1982-2001 constitutes the time period for which the most complete and recent cancer incidence data are available from the MCR. However, since the MCR is a continual surveillance system for cancer, reports of individuals in South Hadley diagnosed with cancer in 2002 and 2003 were also reviewed.[1] (Case-specific

[1] The data summarized here were drawn from data entered on MCR computer files before March 21, 2005.

information for reports of diagnoses in 2004 and 2005 is not yet available for review.) An evaluation of the geographic pattern of cancer was also conducted to determine whether any specific cancer type appeared to be concentrated within the Bartlett Street/East Street area of South Hadley. 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 or "clustering" 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 Bartlett Street/East Street Neighborhood

For this evaluation, the pattern of cancer diagnoses among residents on Bartlett Street and East Street and nearby streets in the area was reviewed. The study area is bordered to the east by East Street and Bartlett Street, to the south by New Ludlow Road, to the west by Pine Grove Drive, and to the north by Granby Road (see Figure 1). Of note, this area includes two large condominium complexes (Pine Grove Condominiums and Hadley Village Condominiums). For the purposes of this report, the streets within the area identified in Figure 1 shall represent that "Bartlett Street/East Street neighborhood."

Between 1982 and 2003, a total of 98 cancer diagnoses were reported to the MCR for residents of the Bartlett Street/East Street neighborhood. Nineteen different types of cancer were diagnosed among residents, indicating the occurrence of many different diseases. The most commonly reported diagnoses included cancers of the breast, prostate, lung and bronchus, and colon/rectum. Together, these cancer types represented almost half (n = 45) of the cancer diagnoses among residents in this area. These are the four most common types of cancer diagnosed among men and women in Massachusetts and this pattern of cancer appears to be consistent with national and statewide trends in cancer incidence. A number of other cancer types, however, were diagnosed among residents of this area of South Hadley over the 22-year period reviewed, including cancers of the bladder, brain and central nervous system (CNS), cervix, esophagus, kidney, oral cavity and pharynx, ovary, pancreas, stomach, thyroid, and uterus as well as Hodgkin's disease, leukemia, melanoma of skin, and non-Hodgkin's lymphoma

(NHL). In addition, three individuals were reported to the MCR with unknown cancer types. The years of diagnosis for individuals in this area varied throughout the 22 years reviewed. However, a majority of the diagnoses occurred since 1992, suggesting that the overall incidence of cancer among residents of this area has increased over time since 1982 (see Figure 2). There are several factors that are likely to explain this observation. First, improvements in cancer diagnosing and/or reporting over time or increased education and awareness about or access to methods for early detection (e.g., cancer screening) have contributed to a continued increase during the past decade in the incidence of most cancer types. Second, the population may have increased over time in this area. As noted previously, there are two large condominium complexes in this area. The residences at Hadley Village Condominiums were built in 1969; however, Pine Grove Condominiums first opened in 1986 and additional dwellings were built in the 1990s, which may have resulted in a relatively large population increase in this area in more recent years. We would expect to observe more cancer diagnoses in areas of higher population density compared to areas of lower population density. Importantly, since most cancers have relatively long latency (or development) periods ranging from 15-40 years, the development of cancer among new residents in this area is less likely to be related to exposure to environmental factors in this part of South Hadley. Finally, the increase in diagnoses may in part reflect the aging of the population in the neighborhood(s). As discussed below, a person's risk of developing most cancers increases with age. Expected numbers of diagnoses and cancer incidence rates cannot be calculated for small geographic areas such as neighborhoods because accurate age group and gender specific population data are not available. However, as described below, case-specific information, including place of residence and cancer type, for individuals diagnosed with cancer in this area of South Hadley was evaluated to determine whether any other trends exist.

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. There were no apparent spatial patterns at the neighborhood level that could not be attributed to factors such as areas of higher population density (e.g., the presence of multiunit housing complexes or nursing homes). For example, the majority of individuals diagnosed with cancer in this area of South Hadley lived in neighborhoods southeast of Granby Road (i.e., Pine

Grove Condominiums and Hadley Village Condominiums), where population density is greatest. Finally, cancer diagnoses did not appear spatially concentrated or "clustered" in neighborhoods immediately adjacent to the Granby Landfill (i.e., Bartlett Street and East Street). For residents of Bartlett Street and East Street, there have been 14 cancer diagnoses among ten individuals reported to the MCR since 1982. (Some individuals had more than one cancer diagnosis.) Ten different types of cancer were represented among these individuals, indicating no atypical pattern of any one cancer type.

The majority of cancer types diagnosed among residents of the Bartlett Street/East Street area of South Hadley are predominantly associated with non-environmental factors such as family history, smoking, diet, and other lifestyle behaviors. 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 South Hadley. This included a review of age at diagnosis, gender, smoking history, and occupation.

Age is 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. Slightly over half of the individuals diagnosed with cancer in this neighborhood were male (n = 55). The average age of diagnosis for individuals in the Bartlett Street/East Street area was 65 years (median age = 67 years).

As mentioned, cigarette smoking is an important risk factor in the development of several cancer types, including cancers of the oral cavity and pharynx, esophagus, lung and bronchus, stomach, colon/rectum, bladder, kidney, and pancreas. A review of information regarding smoking history for the 42 individuals diagnosed with a smoking-related cancer in this area revealed that 60% (n = 25) reported being current or former smokers at the time of diagnosis, 29% (n = 12) were non-smokers, and smoking history was unknown for 14% (n = 6). Therefore, it is likely that smoking played a role in the development of cancer among some residents of the Bartlett Street/East Street neighborhood.

Finally, some occupational exposures, such as in 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. Review of this information showed that three individuals in this area of South Hadley worked in jobs where exposures that could be related to an increased risk for developing their cancer may have been possible. None of the information available for any other 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 38% of the individuals diagnosed with cancer in this area.

We were not able to confirm the diagnoses of all individuals reported by a South Hadley resident. There may be several reasons for this. First, at the time of these analyses, the MCR data were complete through 2001; 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 South Hadley through 2003, 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 more 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 Bartlett Street/East Street neighborhood at the time of their diagnosis (e.g., a P.O. Box). CAP staff searched the statewide registry for the names of individuals listed in the request; however, if the name listed was incorrect or grossly misspelled, individuals may not have been able to be identified. Finally, some individuals may have actually been diagnosed with non-invasive cancer types (i.e., benign tumors) or other pre-cancerous or non-cancerous medical conditions. These individuals would not be included in the MCR data files.

IV. Discussion and Conclusions

When interpreting the information presented 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 2005). For this reason, it was not surprising to observe that almost half of the individuals diagnosed with cancer who were residents of the Bartlett Street/East 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.

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 98 residents of the Bartlett Street/East Street area were diagnosed with cancer since 1982, a number of different cancer types were diagnosed over the 22-year time period reviewed. This information reviewed shows that nearly half of these residents were diagnosed with one of the four most common types of cancer diagnosed among men and women in Massachusetts and the United States. It is important to note that non-environmental risk factors are most strongly associated with these cancer types. 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 overall occurrence of cancer in this area of South Hadley.

V. Recommendations

Based on the information reviewed in this report, no further evaluation of cancer in the Bartlett Street/East Street neighborhood of South Hadley is recommended at this time. In order to provide a better understanding of some of the more common cancer types diagnosed among residents of the Bartlett Street/East Street neighborhood in South Hadley, additional information related to risk factors for their development is attached (see Attachment A).

VI. References

American Cancer Society. 2005. Cancer Facts & Figures 2005. Atlanta, GA: American Cancer Society, Inc.

ATTACHMENT A

Risk Factor Information for Selected Cancer Types