

Appendix 3 Overview of the Health Status Study

Purpose:

The Health Status study was conducted to help answer the question: “Did South Riverdale and The Beaches communities experience greater rates of illness or death than would be expected in comparable neighbourhoods in the City of Toronto?”

Study Approach:

Toronto Public Health (TPH) recommended, that a health status study was the most reasonable and useful approach after considering the community needs, feasibility and limitations of various study designs. It was understood from the outset, however, that this study design would not allow for definitive conclusions about the causes of any observed health differences from the past. Nor does the study design allow for determining whether environmental exposures are more or less important than other direct or indirect influences on health, such as smoking, nutritional factors or income levels in any observed health differences. Although ambient air monitoring data, where available, can provide some indication of neighbourhood air quality, there are in fact no permanent monitoring stations within the boundaries of these two communities. Even if air-monitoring data were available, such data do not provide an indication of total exposure, that is, how long or to how much of the different airborne pollutants any residents in the study areas were exposed in the past.

Health Outcomes Studied:

The Health Status study looked at the following health outcomes that may be at least partly related to exposure to air pollution: mortality (for circulatory and respiratory causes); hospitalization (for circulatory and respiratory causes); and cancer mortality and incidence (for lung, brain and blood-related cancers). For comparison (as is standard practice in such epidemiological studies) total non-accidental mortality, all cause hospitalizations, and mortality and incidence for all cancers were analysed as well. Data limitations and availability restricted the neighbourhood level analyses to the following time periods: 1979 through 1990 for mortality data, 1985 to 1999 for cancer incidence data and 1985 to 1998 for hospitalization data. Therefore, the health profiles presented in the study for these neighbourhoods reflect conditions in the past.

Choosing Comparison Neighbourhoods:

Since health is known to be related to social and economic factors, particularly to income level, rates of hospitalization, cancer incidence and mortality for South Riverdale and The Beaches were compared to those for other Toronto neighbourhoods where the demographic, social and economic profiles were as similar as possible. Neighbourhood matching reduces the possibility that any observed differences in community health status

are linked mainly to demographic, social and economic factors rather than to geographic location.

South Riverdale and The Beaches, though geographically close communities, are very different socio-economically. The Beaches has higher median income than South Riverdale, as well as lower proportions of recent immigrants, unemployed persons and persons with less than a Grade 9 education. Because these communities differ substantially in their demographic, social and economic profiles, it was necessary to choose separate communities against which to compare rates of illness or mortality. Two comparison communities were chosen for The Beaches. In the case of South Riverdale it was more difficult to match communities. In the end, there were three comparison communities for South Riverdale, two geographically close neighbourhoods and one distant neighbourhood. For both communities it was not possible to find comparison communities that matched exactly for income, education or unemployment levels. The TPH project team was consulted to determine the best available comparisons. Therefore, it was expected that the study would reveal some differences in health status due to imperfectly matched communities. Because mortality data that could be used for the analysis were limited to those from the former City of Toronto, it was only possible to choose comparison neighbourhoods from within the former City boundaries. The comparison communities were chosen by the consultant and are not identified.

Results of Health Outcome Analyses:

The Health Status study results indicated that overall mortality rates (other than cancer-related death rates) were higher in South Riverdale and The Beaches than in their respective comparison communities. Specifically, mortality from circulatory diseases was consistently higher in both study communities compared to their comparison neighbourhoods. Mortality from respiratory disease was consistently higher in The Beaches compared to its comparison communities and was higher (but not consistently) in South Riverdale relative to its comparison neighbourhoods.

The study also found that hospital admission rates were consistently higher in The Beaches than in its comparison neighbourhoods. Hospitalization rates in South Riverdale differed from those of its comparison neighbourhoods. South Riverdale's hospital admission rates were only consistently higher than those for its distant comparison neighbourhood. Hospitalization rates for circulatory diseases in South Riverdale were either similar to or lower than its near neighbours. Hospitalization rates for respiratory diseases were either similar to or higher in South Riverdale than in its near neighbour comparisons. South Riverdale asthma hospitalization rates were similar to those for both of its near neighbours.

There were no differences for cancer incidence and cancer mortality rates between the study communities and their respective comparison communities. The one exception was the single distant comparison community for South Riverdale which had lower than expected mortality from cancer and lower cancer incidence rates. On the whole, because

of small numbers of cancer cases and deaths, it is not appropriate to make definitive conclusions with respect to cancer rates.

Rates for mortality and hospitalization were highest in the South Riverdale group (specifically, South Riverdale and its two near neighbours). Mortality rates were also higher in South Riverdale compared to the former City of Toronto, whereas in The Beaches, there was lower mortality compared to data for the former City. For example, between 1979 and 1983, the age-standardized (or weighted average across all ages) mortality rate for males in the former City was just above ten deaths per 1000 men whereas for the same time period, it was just under thirteen deaths per 1000 men in South Riverdale and just above nine deaths per 1000 men in The Beaches.

Comparison of the standardized mortality rates and standardized hospitalization rates indicates that health status may have been improving in the study communities. These trends fit with what has been observed in Toronto and elsewhere in Canada in recent decades.

Interpretation:

Socio-Economic Factors and Health Outcomes:

The rates of mortality and hospital admissions were generally higher in the study neighbourhoods than in their comparison neighbourhoods in this retrospective study. Although choosing comparison neighbourhoods was done so as to match for socio-economic characteristics the matching was not perfect. The question remained then whether some of these past health differences might be attributed to remaining socio-economic differences. Therefore, the study explored further the relationship between socio-economic factors and health events and found that, especially for The Beaches and its two comparison communities, those neighbourhoods with higher income, education and employment levels generally have lower mortality and lower rates of hospital admission. This confirms the correlation generally observed in other studies in Canada and elsewhere, that there is a graded relationship between socio-economic characteristics and health that, while most pronounced at the low end of the scale, does extend into the range of incomes described as “middle class” (O’Neill et al, 2003). Since socio-economic factors, particularly income levels, are closely linked to health, the observed variation in mortality and hospitalization rates might at least partly be “explained” by these neighbourhood characteristics. Mortality in The Beaches was better than the average for the former City. As well, Neighbourhood 19, the reference neighbourhood against which The Beaches health outcomes were compared in the regressions analyses, had a 27% higher median income level than that for The Beaches (based on 1991 Census data). Neighbourhood 19 in fact had the highest income levels of all seven communities studied here. The analysis shows that wealthier people are generally healthier and the higher mortality and hospitalization rates in The Beaches were within the range of what would be expected given the differences in income levels. Therefore, socio-economic factors are possibly the main explanation for differences in mortality and hospitalization in The Beaches compared to its comparison communities, which both have higher socio-

economic profiles. While this does not necessarily mean that environmental pollution can be ruled out as a factor in these differences, it is unlikely to have been a strong determinant of the differences observed when one considers the income level differences.

For South Riverdale, the interpretation is somewhat more complex. The group of four neighbourhoods including South Riverdale and its two near and one distant comparison neighbourhoods, did not show the same “expected” pattern of higher income, education and employment levels being associated with lower rates of mortality or hospitalization. Of note, the distant comparison community for South Riverdale had a lower socio-economic profile (according to summary information for income, education and unemployment rates) yet it had substantially lower rates of mortality and hospitalization and lower cancer incidence than South Riverdale, indeed lower than would be expected according to its socio-economic profile. Even between South Riverdale and each of its two near comparison neighbourhoods, there were differences in health status that did not fit with the expectation based on socio-economic characteristics. While differences in socio-economic factors might partly explain the differences in health status, the relationship is not consistent in this South Riverdale comparison group.

Socio-Economic Factors and Environmental Exposures:

It is likely that socio-economic factors and exposure to pollutants overlap in Toronto as has been found in studies conducted elsewhere (O’Neill et al, 2003; Lee, 2002). For example, studies of the relationship between air pollution and mortality in Hamilton show that people living in lower income neighbourhoods typically have greater exposure to air pollutants from all sources, including from industrial emissions and traffic pollution (Jerrett et al, 2001; Finkelstein et al, 2003). As well, some researchers suggest that socio-economic factors should be considered both a confounder and an effect modifier in epidemiological studies examining exposure and impacts from air pollutants (O’Neill et al, 2003). That is, research suggests that lower socio-economic position predisposes to greater susceptibility to health effects from air pollution because of already compromised health status (O’Neill et al, 2003). Because of this complex relationship, it is very difficult to clearly determine how much of the impact on health in the study neighbourhoods, South Riverdale in particular, relates to greater influence of socio-economic factors and associated health risk factors as opposed to exposure to environmental pollution.

Conclusion:

This is a “descriptive” study, the purpose of which was to compare rates of illness and mortality in the past among the study communities and the best possible (though not perfectly) matched comparison communities. It is not possible here to provide definitive explanations for the differences in rates between neighbourhoods. The focus of interest is on environmental contaminants, but the study found that some of the variation in mortality and hospitalization rates, particularly in The Beaches group might be “explained” by neighbourhood socio-economic characteristics, including income, education, and unemployment levels. Nonetheless, the accumulated exposure to pollution

from multiple, historical industrial emissions (including lead in soil from a different local point source) and from other sources such as traffic, may have contributed to a portion of the past differences in mortality and hospitalization in these communities, particularly for South Riverdale. However, the current study cannot determine to what degree. It is in fact unlikely that any study could provide a precise answer to the question of how much environmental exposures, let alone emissions specifically from the ABTP, contributed to the health status differences observed in this study.

References:

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