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Calculating estimates of drowning morbidity and mortality adjusted for exposure to risk

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Background

The calculation of drowning mortality and morbidity rates has often been hampered by the lack of appropriate denominators that reflect exposure to water, resulting in poor estimates of the risk of drowning. For example, calculations of the drowning rate for adults typically use the total adult population as the denominator. This underestimates the risk of drowning as it includes adults who are never or very rarely exposed to water and consequently are not at risk for drowning. Ideally, only the number of adults who are exposed to bodies of water to the extent that drowning is a risk should be used to calculate the rate of adult drowning.

Population-risk (proportion of population exposed to potential hazard) and person-time risk (amount of time a person is exposed to potential hazard) have been taken into account in the calculation of injury risk in some settings, such as using per million hours worked to estimate the risk of occupational injury. However, this type of exposure information has not been available for drowning mortality or morbidity in Australia.

Aims

To estimate and compare the rate of unintentional drowning mortality and hospitalised morbidity using population-based, population-risk and person-time risk estimates and then compare exposure-based rates for drowning with road traffic fatality rates.

Method

Retrospective analysis of unintentional drowning mortality and hospitalised morbidity of New South Wales (NSW, Australia) residents during 1 January to 31 December 2005. Information on water-related population-risk and person-time risk exposure was obtained from the 2005 NSW Population Health Survey. Road traffic mortality data was obtained from the NSW Roads and Traffic Authority (RTA) and population- and person-time risk estimates from the Australian Bureau of Statistics Survey of Vehicle Use, NSW Transport Data Centre Household Travel Surveys and RTA Speed Surveys in 2005.

Results

The estimated drowning mortality and hospitalised morbidity rates were consistently higher using population-risk and person-time risk exposures compared to population-based exposure. Population-based estimates of road traffic mortality were four times higher than drowning mortality rates, but exposure adjusted person-time estimates for drowning were 200 times higher than equivalent exposure-adjusted rates for road traffic fatalities.

Conclusions

Drowning risk is strikingly higher than previously thought based on population-based estimates. This research shows that the risk of drowning is underestimated when the total age-specific population is used to calculate the drowning rate instead of actual population-risk or person-time exposure. This research highlights the importance of establishing an appropriate denominator for the population-at-risk.

Drowning is less frequent than road traffic fatalities as fewer people are exposed to water hazards, but when water exposure occurs, the risk of death is much higher compared to exposure to the road environment. This information is important for decision-making and policy development as it provides a basis for comparing the inherent risk in exposure to hazards with potential to cause injury.

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