Background General population exposure to asbestos from residential insulation and from environmental sources during childhood have recently been associated with prostate cancer. While asbestos fibers can be found in the prostate of workplace-exposed men at autopsy, few occupational studies have reported on asbestos exposure and prostate cancer incidence. We examined the association between lifetime occupational exposure to chrysotile asbestos and prostate cancer risk in a large population-based case-control study. Methods Cases were 1933 men with histologically-confirmed incident prostate cancer, aged ≤75 years, diagnosed in 2005–2009 in Montreal. Concurrently, 1994 population controls from the same residential area and age distribution were randomly selected from electoral lists. In-person interviews elicited detailed socio-demographics, lifestyle and work histories. Industrial hygienists used job-specific information to provide semi-quantitative evaluations of intensity and frequency of exposure to 345 chemical agents, including asbestos, and a measure of confidence in the evaluation. Logistic regression was used to estimate odds ratios (OR) and 95% confidence intervals (CI) for prostate cancer risk associated with exposure to chrysotile asbestos. Results After restriction to probable and definite exposure, and application of a 5 year lag, 12.5% of cases and 11.8% of controls were ever exposed to asbestos (OR=1.1, 95% CI 0.9–1.3). For duration of exposure, there was no increase in risk of overall prostate cancer in the lower tertiles of exposure but risk was elevated in the upper tertile (OR=1.6, 95% CI 1.2–2.2). Similarly, for cumulative exposure, risk was elevated in the upper tertile only (OR=1.5, 95% CI 1.1–2.1). Analyses considering tumor grades also showed a higher risk in the upper tertile of cumulative exposure for non-aggressive (OR=1.5, 95% CI 1.1–2.2) and especially aggressive (OR=1.9, 95% CI 1.2–3.0) cancers. Conclusion Our findings are consistent with an increased risk of prostate cancer with prolonged and high cumulative exposure to chrysotile asbestos, and particularly for the aggressive form of the disease.