

Contemporary Occupational Bladder Cancer: A Systematic Review and Meta-Analysis of Recently Reported Exposures that Increase Risk

Introduction and Objectives: Bladder cancer (BC) is a common disease that may arise following occupational exposure to carcinogens. Whilst improved workplace hygiene has controlled or substituted the use of known bladder carcinogens, currently between 5 and 25% of tumors still arise following workplace carcinogen exposure.

Materials and Methods: We conducted a systematic review using electronic databases and references from selected reports. Limits were applied to control for study design, sample size and publication since 1989. We analyzed data via a meta-analysis of odds ratios using fixed/random effects model.

Results: There were 82 manuscripts selected reporting 155,003 BC patients and 32.6 Million controls. We identified 29 occupations with a significantly increased risk of BC (Odds ratio (OR) >1.0, Confidence Interval (CI) excluding 1.0) and 10 with a trend towards increased risk (elevated OR but 95% CI included 1.0). Occupations with significantly raised ORs included: Armed services (OR 1.12, CI 1.05 to 1.19), Automobile workers (OR 1.14, CI 1.12 to 1.17), Chemical workers (OR 1.10, CI 1.06 to 1.13), Cleaners/Janitors (OR 1.06 CI 1.0 to 1.12), Clerical workers (OR 1.08 CI 1.07 to 1.10), Drivers (OR 1.08 CI 1.06 to 1.10), Electrical workers (OR 1.09 CI 1.06 to 1.12), Firefighters (OR 1.27 CI 1.0 to 1.54), Fishermen (OR 1.14 CI 1.08 to 1.20), Food workers (OR 1.13 CI 1.09 to 1.18), Gas/Coal workers (OR 1.99 CI 1.07 to 2.91), Machinists (OR 1.59 CI 1.02 to 2.15), Mechanics (OR 1.1 CI 1.08 to 1.12), Metal workers (OR 1.11 CI 1.07 to 1.16), Nurses (OR 1.14 CI 1.08 to 1.20), Painters (OR 1.12 CI 1.08 to 1.15), Petroleum workers (OR 1.27 CI 1.09 to 1.45), Plumbers (OR 1.21 CI 1.14 to 1.26), Railway workers (OR 1.56 CI 1.0 to 2.13), Recreational and Bar workers (OR 1.39 CI 1.29 to 1.48), and Sales workers (OR 1.11 CI 1.08 to 1.13).

Conclusions: Occupational exposure remains an important public health problem that should be understood and incorporated into patient management. Alterations in disease demographics suggest various carcinogens. We offer some explanations for these unexpected risk associations, and make a case for screening certain at-risk occupations.