A Million Person Study Innovation: Evaluating Cognitive Impairment and other Morbidity Outcomes from Chronic Radiation Exposure Through Linkages with the Centers for Medicaid and Medicare Services Assessment and Claims Data

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The study of One Million U.S. Radiation Workers and Veterans, the Million Person Study (MPS), examines the health consequences, both cancer and non-cancer, of exposure to ionizing radiation received gradually over time. Recently the MPS has focused on mortality patterns from neurological and behavioral conditions, e.g., Parkinson's disease, Alzheimer's disease, dementia, and motor neuron disease such as amyotrophic lateral sclerosis. A fuller picture of radiation-related late effects comes from studying both mortality and the occurrence (incidence) of conditions not leading to death. Accordingly, the MPS is identifying neurocognitive diagnoses from fee-for-service insurance claims from the Centers for Medicare and Medicaid Services (CMS), among Medicare beneficiaries beginning in 1999 (the earliest date claims data are available). Linkages to date have identified ~540,000 workers with available health information. Such linkages provide individual information on important co-factor and confounding variables such as smoking, alcohol consumption, blood pressure, obesity, diabetes and many other health and demographic characteristics. The total person-level set of time-dependent variables, outcomes, organ-specific dose measures, co-factors, and demographics will be massive and much too large to be evaluated with standard software. Thus, development of specialized open-source software designed for large datasets (Colossus) is nearly complete. The wealth of information available from CMS claims data, coupled with individual dose reconstructions, will thus greatly enhance the quality and precision of health evaluations for this new field of low-dose radiation and neurocognitive effects.

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