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## Preparing linked population data for research: cohort study of prisoner perinatal health outcomes

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### Objectives

This paper assessed linkage quality and describes the generation of population representative samples of perinatally exposed and non-exposed mothers for cohort analysis and “own-control” analysis from the linked data.

### Approach

A study of pregnancy outcomes related to pregnancy in prison in New South Wales, Australia, used record linkage to add information about incarceration and serious mental health morbidity (MHM) to birth data. MHM data were oversampled and all available prisoner alias identities were requested for the linkage. Data custodians applied restrictions limiting the control group to a sample of unlinked records and required that year and person age in days be used instead of dates for all events. Linkage was performed by a dedicated state-wide data linkage authority.

Multiple-matched identities were counted. Linked data was assessed to quantify duplicated births; excessive births; non-chronological progression of year of birth and to maternal age; concurrent pregnancies; concurrent incarcerations; and conception during incarceration. Exposure status was determined by interrogation of the temporal relationships of all incarceration periods with each to identify prisoner maternities. Maternities with incarceration status for each mother distinguished prisoner mothers from prisoner controls. The subset of prisoner mothers with both types maternity were “own controls”. Standard descriptive statistics are used to provide population prevalence of exposures and compare data quality across study stratified population sub-groups.

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### Results

Linked records for 3,260 prisoners and 3087 women who had given birth were resolved to 3085 unique person records. Linked person records inconsistent with a singular identity based on maternity factors only were within the predicted limit of the false positive rate set by the linkage authority (<0.5%) for non-prisoners with no mental health morbidity, but were twice as high for women with MHM (RR 2.2; 95%CI 1.9, 2.6) and tenfold higher among prisoners (RR 9.9; 95%CI 8.2, 11.9). The 2,589 prisoners not excluded comprised 558 prisoners (238 “own controls”) pregnant while in prison and 2,031 prisoner controls. The population estimated from study data represents 99.7% of the 404,144 women who actually birthed in NSW, of whom <1% were prisoners (68% with MHM) and 7% had serious mental health morbidity.

### Conclusion

Although not set up to test use of alias identities for record linkage, these results suggest that the expected improved linkage sensitivity from including aliases was offset by reduced linkage specificity. The capacity to report results for prisoners against the whole population increased their utility.

