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Linking the Australian Childhood Immunisation Register to population-based perinatal datasets to assess coverage in at-risk groups

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Objective

Immunisation remains one of the most important public health interventions. However, linkage of population-based immunisation registers to perinatal and health outcome datasets to evaluate immunisation programs is limited. We have conducted the first-ever linkages of immunisation records from Australia's Childhood Immunisation Register (ACIR) for the purposes of evaluating Australia's unique national immunisation program. As an initial outcome of our linkage study we present estimates of pneumococcal conjugate vaccine (PCV) coverage for the 3rd dose assessed at 12 months of age in extremely preterm children (gestational age <28 weeks), in whom a funded vaccination program was established in 2001 prior to a universal funded program for all children in 2005.

Approach

Individual immunisation records from ACIR, hospital admissions, deaths and infectious diseases notifications were linked to perinatal records for a cohort of births from 1996 to 2012 in two Australian states. Three separate data linkage units were involved in the process with varying procedures for linkage. The perinatal datasets were used to identify extremely preterm children.

Results

The birth cohort for the study included 1,958,537 live births in New South Wales (1,492,399) and Western Australia (461,620). Linkage weights based on sensitivity and positive predictive value of >99% were used to identify immunisation records from ACIR

to link to the birth cohort. A unique scrambled pin on ACIR was used to link immunisation records to birth cohort datasets. The final cohort consisted of 1,954,019 children with 95.5% linking to at least 1 ACIR record from a total of >26.6 million ACIR records. In 2001, coverage of the 3rd dose of PCV in extremely preterm children was 0.9% and increased to 69.1% in 2004 (overall coverage 2001-2004: 25.3%). From 2005 to 2012, coverage increased to an average of 89.7%.

Conclusion

These are the first results of cross-jurisdictional linkages of immunisation records to state-based administrative datasets in Australia. This process has identified some improvements that are needed to streamline future linkage projects of this scale. Linkage of perinatal datasets to ACIR has enabled us to assess the first-ever coverage estimates in specific medically at-risk population subgroups. Future analyses will focus on the predictors and timeliness of vaccination coverage and population based estimates of vaccine effectiveness.

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