

Maternal mortality of women with opioid-use during pregnancy in England: investigating bias in a cohort of linked mother-baby hospital records

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Introduction

Opioid-addiction is a major public health threat, with rates of drug misuse related deaths increasing in North America and England. Linkage within and between administrative data datasets is important for capturing determinants and outcomes but this vulnerable population is highly susceptible to linkage error, which can result in inaccurate estimates.

Objectives and Approach

We investigated neonatal abstinence syndrome (NAS) as a marker of opioid-use in pregnancy, using linked mother-baby records to identify maternal opioid-use based on NAS in the baby's record. Maternal all-cause mortality was compared for mothers with and without a NAS-pregnancy. Bias was assessed through comparison of linked and unlinked NAS baby characteristics. De-identified national hospital inpatient data – including postcode-district and GP surgery-code – were used for deterministic and probabilistic linkage of mothers and babies born in England 2002-2013. Linked national mortality data captured maternal deaths

Results

Linkage between maternal and baby records was possible for 96% of all live births in England, but for only 88% of study/cohort babies with NAS (n=18,087). NAS babies with unlinked records represented a more vulnerable population with longer hospital stay (median 12 versus 7 days, $p<0.001$), low birthweight (44% <2500g versus 27%, $p<0.001$) and discharge to social services (13% versus 8%, $p<0.001$) than NAS babies who could be linked to maternal records. Non-linkage may plausibly be driven by mismatching or missing identifiers reflecting adoption and out-of-home care arrangements for the baby, potentially also indicating greater maternal adversity. Within the linked cohort (comparing 13,581 women with a NAS baby and 4,205,941 women without a NAS baby), the crude hazard ratio for all-cause mortality was 12.1 (11.1-13.2).

Conclusion/Implications

Review of unlinked records suggests evidence of linkage bias, with the implication that our results may underestimate the risk of death among women with opioid-use. Complementary linkages, drawing on other data - such as birth records where the mother is named - could help address non-linkage driven by out-of-home care.

