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# Linkage of birth and infant death registration data to NHS Numbers for Babies and hospital records on maternity for England and Wales, 2005-07

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# Background

- Birth registration

country of birth of mother and father, marital status of mother, father's socio-economic status

- NHS Numbers for Babies (NN4B)

delivery time, gestational age for live births, ethnic category of the baby

- Maternity Hospital Episode Statistics (HES) for England and National Community Child Health database and Patient Episode Database for Wales (PEDW)

parity, ethnic category of mother, method of delivery, complications in pregnancy

- Death registration for infants

age at death, cause

# Introduction

- Linkage of birth and infant death records from 2005 to 2007 in England and Wales
- Phase 1 involving linkage of birth registration data to NN4B data
- Phase 2 involving linkage of registration/NN4B data to maternity HES for England and Child Health/PEDW databases for Wales
- Phase 3 involving linkage to infant death records

# Method (1)

## Linkage algorithm for Phase 1

1. NHS Number
2. Date of birth, mother's date of birth and birthweight
3. Date of birth, postcode and birthweight
4. Date of birth, mother's year of birth and birthweight
5. Date of birth, first 4 characters of postcode, birthweight
6. Date of birth, mother's date of birth and postcode
7. Date of birth, mother's year of birth and postcode
8. Date of birth, mother's date of birth and first 4 characters of postcode
9. Date of birth, mother's year of birth and first 4 characters of postcode
10. Date of birth and mother's date of birth
11. Date of birth and postcode
12. Date of birth and birthweight

# Method (2)

Linkage algorithm for Phase 2:

1. NHS Number and partial date of birth of mother
2. Mother's date of birth and postcode
3. Postcode and mother's month and year of birth
4. Baby's date of birth, sex and postcode
5. Baby's month and year of birth and postcode
6. Baby's date of birth and first four characters of postcode

# Results (1)

## Linkage rate for phase 1

- 99 per cent of the records were linked using NHS Number
- Stages 2- 12 of the algorithm used for linking remaining records
- Overall, 99.9 per cent of registration and 99.8 per cent of NN4B records were linked

# Results (2)

## Phase 2

91 % for maternity HES and 92% for the Child Health and PEDW databases

## Phase 3

99 % linkage to death registration records

# Linked records for singleton births with missing data items in common data fields, 2005

	NN4B		Registration		Maternity HES	
	Number	Percent	Number	Percent	Number	Percent
Mother NHS No	164,458	30.0	NA	NA	16,685	3.0
Mother's DOB	960	0.2	0	0	0	0.0
Ethnicity	59,865	10.9	NA	NA	77,771	14.2
Gestation	3,829	1.8	NA	NA	264,877	48.3
Birth-weight	2,721	0.5	874	0.2	135,144	24.6
Birth status	615	0.1	0	0	176,455	32.2
Sex baby	1,098	0.2	0	0	144,115	26.3



# Comparison of live/still birth status in the linked records for singletons, 2005

Maternity HES	Birth registration			
	Live birth	Still birth	Total	% of all records
Live	370,939	99	371,038	67.6
Still birth	71	1,293	1,364	0.2
Not known	175,578	877	176,455	32.2
Total	546,588	2,269	548,857	100.0

# Concordance in data items between NN4B and maternity HES, 2005

	Stated	Missing	Concordance where stated
	Percentage		
Birthweight*	75	25	99
Gestational age	52	48	89
Ethnicity	81	19	87

\* using birth registration rather than NN4B

# Conclusion

- Good linkage rate was obtained
- To gain maximum benefit, data quality and completeness needs to improve in maternity HES

# Analysis of the linked data

- Country of birth of mother and outcomes of births in England and Wales of babies of African and Caribbean ethnicity
- Growth charts for babies of Pakistani and Bangladeshi ethnicity and all babies
- Preterm birth and infant mortality rates among births to Black African and Caribbean women in England and the US
- Fetal and infant survival analysis by social and biological factors