

A retrospective case note review of the neonatal death of infants born to women living with HIV in the UK and Ireland 1998-2017

Helen Yan, Helen Peters, Claire Thorne

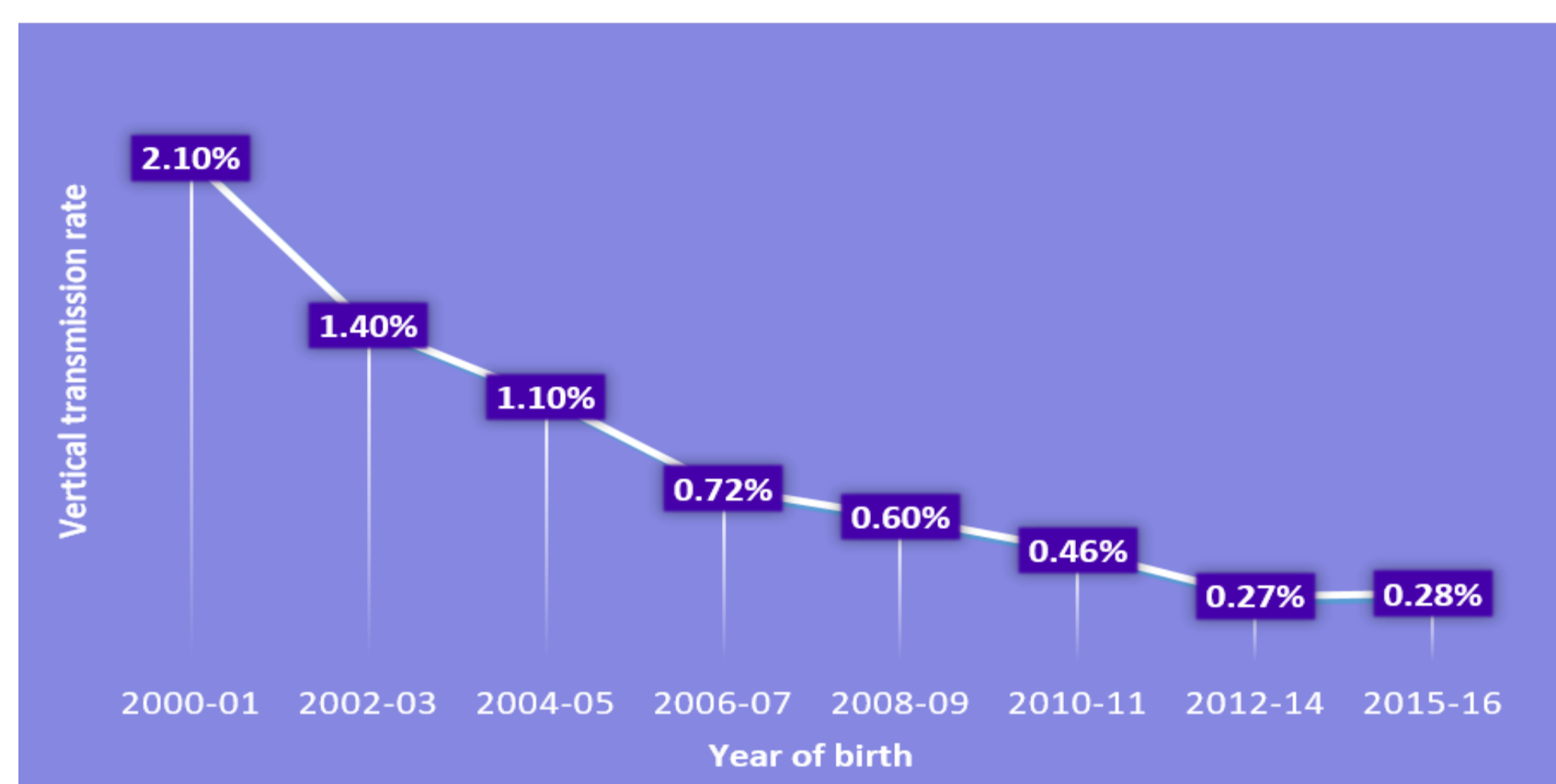
Population, Policy and Practice Research and Teaching Department, UCL Great Ormond Street Institute of Child Health



Background

- Successful prevention strategies have driven the decline of the **vertical transmission (VT) rate** in the UK/Ireland from **2.1% in 2000-2001 to 0.28% in 2015-2016 [Figure 1]**.
- However, HIV-exposed uninfected children have been shown to be at increased risk of other adverse outcomes, particularly in the first few years of life.
- There is need for increased understanding into outcomes such as **neonatal death (NND)** in infants born to women living with HIV (WLWH).

Figure 1: Vertical transmission rates of HIV among diagnosed women 2000-16



Results

- 20,012 live-born infants born to 12,684 WLWH** in 1998-2017.
- Median **maternal age** at delivery was 31 years (IQR 27-35); other **maternal characteristics** are shown in Table 1.
- The overall NND rate was **4.1 per 1000 live-births** (95% CI, 3.2-5.0), compared to an average of 3.24 in the general population (1998-2016).

Table 1: Maternal and pregnancy characteristics

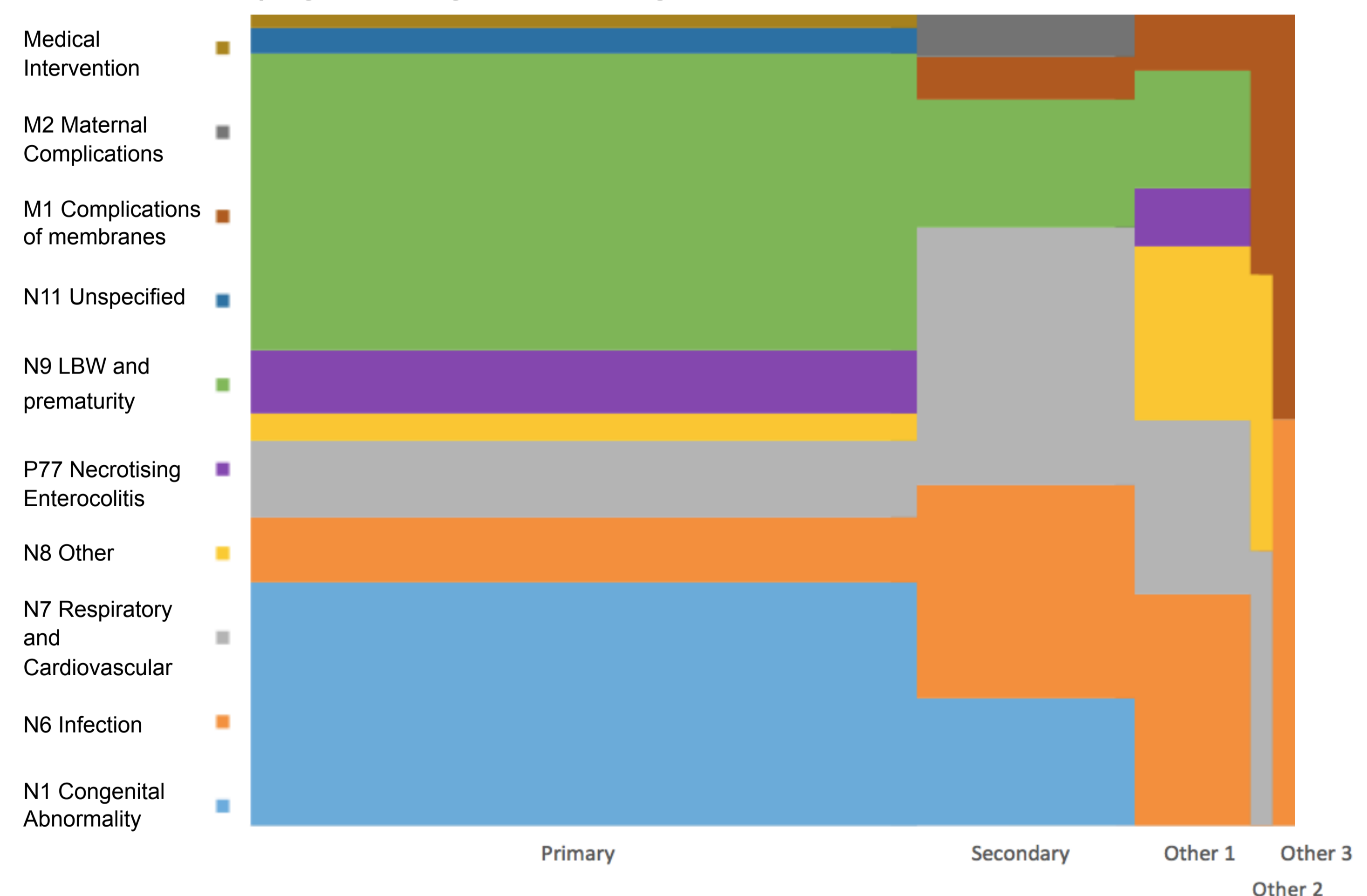
Characteristic	N (%)
Maternal region of origin	<i>n</i> =19385
Africa	14546 (75)
UK/Ireland	2917 (15)
Other	1922 (10)
Timing of diagnosis	<i>n</i> =19601
Before pregnancy	13469 (69)
During pregnancy	6132 (31)
ART at conception	<i>n</i> =18780
Yes	7836 (42)
No	10944 (58)
Viral load (copies/ml) at delivery	<i>n</i> =11352
<50	8663 (76)
≥50	2689 (24)

- 82 NNDs** in total (18 [22%] without reported cause of death).
- 26 (32%) NNDs occurred within the first day of life (day 0).
- 104 individual causes of death** were reported among remaining 64 NND cases [Figure 2].
- Prematurity** was the leading cause of death, reported in 44% (28/64) cases, followed by **congenital abnormality** reported in 22 cases (34%)
 - Most common abnormality was Trisomy 18 (6 cases)

Methods

- National Surveillance of HIV in Pregnancy and Childhood (NSHPC)** is part of Public Health England's Infectious Diseases in Pregnancy Screening Programme.
- All pregnancies to women living with HIV in the UK/Ireland are actively reported**, along with their HIV-exposed infants and any children diagnosed with HIV (<16years).
- Completeness** is estimated at >95%.
- Eligible population:** live-birth deliveries to diagnosed women in 1998-2017.
- Neonatal death was defined as a live-born baby, who died before 28 completed days after birth**
- Estimated **yearly incidence of NND** was reported for 1998-2017 and causes of NND coded using **WHO ICD-PM classification**.
- Risk factor analysis used multivariable logistic regression**, including delivery year, maternal origin, maternal age, delivery CD4 count and viral load, antiretroviral therapy (ART) at conception, injecting drug use (IDU) and infant sex.
- A second analysis restricted to the years 2007-2017 was carried out, reflecting a time of improved reporting of delivery viral load.

Figure 2. Mosaic plot of causes of neonatal death (WHO ICD-PM classification) by primary, secondary and other causes of death#



#Area of each coloured block indicates relative frequency of each observation)

Risk factor analysis 1998-2017

- Only factor significantly associated with NND risk was ART at conception
 - Adjusted odds ratio (AOR) 0.57 (95% CI 0.30-0.99)

Restricted analysis (including delivery viral load 2007-2017)

- Delivery year (AOR 1.18 [95% CI 1.03-1.34] per 1 year increase) and detectable viral load (i.e. >50 copies/ml) (AOR 8.14 [95% CI 3.46-19.17] vs undetectable) were associated with increased NND risk
- Other AORs (all non statistically significant)
 - Maternal age ≥40 vs 24-39 years = 1.40 (95% CI 0.54-3.58)
 - Maternal IDU vs no IDU = 2.97 (95% CI 0.78-11.3)
 - CD4 <350 cells/mm³ vs ≥350 = 1.47 (95% CI 0.96-2.69)

Conclusions

- WLWH had a **higher NND rate than the general population**
- Detectable viral load** and **increasing calendar year** were associated with increased risk and **ART use at conception** with decreased risk of NND
- Main cause of NND was **preterm delivery**

- Limitations included lack of data on maternal substance use and weight, and lack of cause of death in 22% of cases
- Wide 95% CIs observed reflected small numbers of NNDs.
- Promotion of **maternal viral load suppression through effective ART** will not only **improve maternal health and prevent VT**, but may also **reduce NND**. The NSHPC continues to monitor NNDs.