

Neonatal Mortality Review:

Data Analysis Supporting Document

This document accompanies the Neonatal Mortality Review: Understanding factors which may have contributed to the national increase in neonatal mortality in Scotland during 2021/22. It provides details of the data sources used in the review, a description of the standard methodology used to explore the increase in neonatal mortality and a full set of data tables reporting the results of any bespoke analysis carried out for this review.

Data sources

National Records for Scotland

National Records for Scotland (NRS) are responsible for recording and publishing information about deaths and births in Scotland. Information about births and stillbirths, neonatal deaths and infant deaths are included in their [NRS Vital Events Publications](#).

Information recorded about each death includes the following:

- sex
- place of death
- place of usual residence (for babies this is based on mother's usual residence), and
- causes of death (recorded using the International Statistical Classification of Diseases and Related Health Problems (Tenth Revision) (ICD-10) classification).

Information recorded about each birth includes the following:

- place of birth.

Public Health Scotland

Public Health Scotland (PHS) Maternity Inpatient and Day Case dataset (SMR02) collects data on antenatal, delivery or postnatal episodes. It covers all obstetric inpatients and daycases from maternity hospitals in Scotland and includes information on:

- gestational age at birth, and
- ethnicity of mother.

[PHS's Births in Scotland](#) is published annually and reports on pregnancy, childbirth and the early care of babies born in Scotland.

Office for National Statistics

The Office for National Statistics (ONS) responsibilities involve collecting, analysing and disseminating official statistics about the UK. ONS's [Child and Infant Mortality in England and Wales](#) publication includes information about stillbirths and neonatal deaths occurring in all four UK nations.

MBRRACE-UK

Mothers and Babies Reducing Risk through Audits and Confidential Enquiries across the UK (MBRRACE-UK) is responsible for looking at information about mothers and babies who die during pregnancy, or soon after, in the UK. NHS boards and trusts report perinatal deaths to MBRRACE-UK directly. Deaths reported to MBRRACE-UK are late fetal losses, stillbirths and neonatal deaths.

The data relating to each death include information about the following:

- gestational age at birth
- mother's place of residence (used for deprivation), and
- cause of death (using [Cause of Death & Associated Conditions \(CODAC\)](#) classification).

MBRRACE-UK publish a [Perinatal Mortality Surveillance](#) report to show trends in mortality rates over time and to enable individual nations to monitor the progress of initiatives to reduce perinatal mortality.

Neonatal Mortality Review data tables

In response to an information request from Healthcare Improvement Scotland, PHS produced a number of data tables on neonatal deaths in the period 2017/18-2021/22. Source information for populating these tables was drawn from data held by PHS including NRS Death Registration records, NRS Birth Registrations, SMR02 records and MBRRACE-UK data. The data included aggregate birth and death data by year and by:

- health board of birth
- Scottish Index of Multiple Deprivation (SIMD) quintile of mother's residence
- whether the birth was from a singleton or multiple birth, and
- gestation at birth.

Numbers of neonatal deaths, for each financial year, were also provided by cause of death, according to the ICD-10 classification and the CODAC classification system, which is used by MBRRACE-UK. For more information, please see page 5.

Differences between PHS, NRS, ONS and MBRRACE-UK published data and definitions

Unless otherwise stated, this review used neonatal mortality figures for financial years based on date of death and including all causes of death and gestational ages. There are a number of key differences in the way neonatal mortality figures are reported by other sources; these differences are outlined below.

- NRS routinely publish data about neonatal deaths and stillbirths which are based on the date when the death was registered. PHS publish data about neonatal deaths and stillbirths based on the date when the death occurred. MBRRACE-UK surveillance reports are based on date of birth.
- ONS England and Wales neonatal mortality figures are based on date of death, whereas Scotland and Northern Ireland rates are based on date of death registration. In Scotland, this would be similar to date of birth figures in each year, because deaths in Scotland should be registered within eight days, although deaths referred to the Procurator Fiscal may be subject to a further slight delay. In Northern Ireland it is acknowledged that infant deaths are likely to be referred to the coroner, and the death may be registered some considerable time later. In England and Wales, deaths being referred to a coroner for investigation can also result in long delays between when an infant dies and when the death is registered. This means the latest neonatal mortality figures for England and Wales, based on data of death, are often incomplete.
- MBRRACE-UK and NRS report their mortality data by calendar year (January to December). PHS births data are reported annually by financial year (March to April).
- Published NRS and PHS neonatal death data do not have any exclusions by cause of death. Deaths following a termination of pregnancy are excluded from the rates calculated by MBRRACE-UK.
- MBRRACE-UK report only neonatal deaths of babies born at 20 completed weeks' gestational age or later who died before 28 completed days after birth. NRS and PHS publications define neonatal deaths as a 'liveborn baby born at *any* gestational age who died before 28 completed days after birth'. This results in a small difference in numbers as a few births under 20 weeks may be registered as live born.
- MBRRACE-UK receive data on pregnancies from 20 weeks' gestation but in their main report neonatal mortality rates exclude births under 24 completed weeks' gestation. This is to reduce differences between organisations and changes over time in the classification of deaths under 24 weeks' gestation. NRS and PHS report mortality rates for neonatal deaths at all gestational ages.
- MBRRACE-UK report neonatal deaths based on mother's NHS board of residence and NHS board of birth. NRS neonatal deaths are reported by NHS board of mother's residence, or if unavailable NHS board where the death occurred. The Neonatal Mortality Review data tables include neonatal deaths based on NHS board of birth.

Mortality rates for organisations

When neonatal mortality is reported by organisation, it can be based on either the place of death, place of birth or place of the mother's usual residence. Neonatal mortality rates based on place of the mother's usual residence are generally more informative about antenatal care, although a proportion of women will receive antenatal and delivery care in an NHS board that is not their NHS board of residence. Neonatal mortality rates based on place of death and place of birth are generally more informative about care in the perinatal and neonatal period. However, some NHS boards and sites will receive more high-risk babies than others. For example, specialist centres will care for a higher proportion of very sick and / or more preterm babies who will unfortunately have a higher mortality rate.

Additionally, unadjusted (crude) mortality rates by NHS board do not account for differences in the population of patients treated in each NHS board. Adjusted analyses undertaken by MBRRACE-UK try to account for these differences by taking account of the mix of patients that they are caring for. A complete explanation of the MBRRACE-UK methodology, including statistical methods, can be found in the [MBRRACE-UK Perinatal Mortality Surveillance Technical Manual](#).

Analysis for this review focused on neonatal mortality rates by place of birth, to understand changes in neonatal mortality rates in different geographical areas and provide some comparison with MBRRACE-UK reported place of birth adjusted rates.

Analysis specifically for this review

Analysis aims

This review undertook descriptive and exploratory analyses to improve our understanding of any contributing factors to the national increase in neonatal mortality during 2021-2022 in Scotland.

Objectives for the analysis were to:

1. assess whether there was a change in the crude neonatal mortality rate in 2021/22 compared with the preceding four years
2. assess whether there were changes in the live birth population between 2021/22 and preceding four years, by NHS board of birth, Scottish Index of Multiple Deprivation, multiple or single birth, or gestation at birth
3. explore whether any changes have occurred in the balance between neonatal mortality and late pregnancy loss or stillbirth
4. assess whether there was any change in the rate of neonatal mortality in 2021/22, compared with the preceding four years, relating to NHS board of birth, Scottish Index of Multiple Deprivation, multiple or single birth, or gestation at birth, and
5. explore whether there were any changes in the rate of neonatal death attributed to specific causes of death in 2021/22 compared with preceding four years.

Methodology

To compare the neonatal mortality rate, the live birth population, and specific cause of death in 2021/22 with the preceding four years, we treated the exposure group as the financial year 2021/22, and the comparison group as the four years between April 2017 and March 2021. This comparison group was chosen on the basis of being a relatively stable period for neonatal mortality in Scotland. Descriptive statistics consisted of:

- neonatal mortality rates (number of neonatal deaths / numbers of live births*1000) by financial year of birth
- neonatal mortality rates, total number of live births and total number of neonatal deaths separately for 2021/22 and the comparison group, overall and by each risk characteristic
- cause-specific neonatal mortality rates (number of neonatal deaths due to cause/number of live births*1000) for 2021/22 and the comparison group, and

- proportion of neonatal deaths, late pregnancy losses or survived past 27 days for pregnancies ending 22 and 23' weeks gestation (number in each group for pregnancies ending at 22 and 23 weeks / total number pregnancies ending at 22 and 23 weeks).

All rates were calculated with 95% confidence intervals and represented in plots.

Statistical analysis to assess differences between the exposure group (April 2011 to March 2022) and comparison group (April 2017 to March 2021) was achieved by comparing an expected number of deaths with the observed number of deaths. The expected number of deaths for each group were calculated by multiplying the neonatal mortality *rate* for that group during the comparison period by the total number of live births in 2021/22. To assess changes in the live birth population, the *proportion* of birth in 2021/22 for each group was multiplied by the total number of births in the comparison period, to get the expected number of births.

We tested for significant differences by calculating confidence intervals for the ratio of observed and expected values. Confidence intervals were calculated using Byar's approximation and 95% confidence intervals that did not span one were considered statistically significant at the 5% level.

Limitations

- Aggregated data meant that we only looked at individual variables one at a time, rather than adjusting for interactions between variables (i.e. it was not possible to look at the association between year and neonatal mortality by gestational week at birth and also account for any changes in maternal deprivation between the time periods).
- There are a small number of births that occur towards the end of the year where the death, if it occurred, may fall into the next financial year.
- We explored changes by NHS board of birth and not by the NHS board where treatment was provided or where neonatal death occurred.
- Small numbers in some groups meant we needed to create broader groupings to achieve greater statistical power.
- We used proportions to measure changes in live birth population meaning a change in one group would have an effect on the proportions of all other groups.

Suppression

We have released data tables to accompany this report, which include data and results of analysis that were specifically generated for this report. In order to release these tables, we have considered the sensitivity of individual groups and data protection requirements associated with these data, in line with [PHS's Disclosure Control Policy](#).

Cause of death classification

NRS code causes of death in accordance with the ICD-10. The classification of the underlying cause of death is based on the information collected on the death certificate, together with any additional information provided by other official sources. Coding is carried out by expert coders following strict rules.

Groupings used for this review were defined so that important causes of neonatal mortality could be analysed independently, whilst balancing the need for groups to be of sufficient size to permit meaningful analysis.

Table 1: Classification of ICD-10 cause of neonatal death

ICD-10 code	ICD-10 cause of death description
P07	Disorders related to short gestation and low birth weight, not elsewhere classified
P36	Bacterial sepsis of the newborn
P02-P03	Fetus and newborn affected by complications of placenta, cord and membranes and Fetus and newborn affected by other complications of labour and delivery
P50-P61	Haemorrhagic and haematological disorders of fetus and newborn
P00-P01, P04, P05, P08, P10-15, P20, P22-P29, P35, P37-P39, P70-74, P75-P78, P80-83, P90-96 (excluding P96.4)	All other conditions originating in the perinatal period
Q20-28	Congenital malformations of the circulatory system
Q00-Q18 and Q30-Q99	All other congenital malformations, deformations and chromosomal abnormalities
P21	Birth asphyxia
P96.4	Termination of pregnancy, affecting fetus and newborn
R95	Sudden infant death syndrome
V01-Y98	External causes of morbidity and mortality
U07	COVID-19
A00-B99	Certain infectious and parasitic diseases
C00-D48	Neoplasms
E00-90	Endocrine, nutritional and metabolic diseases
F00-F99, G00-H95, I00-99, J00-99, K00-93, L00-99, M00-99, N00-29, O00-99, R00-R94, R96-R99	Other (includes Mental and behavioural disorders, Diseases of the nervous system, Diseases of the circulatory system, Diseases of the respiratory system, Diseases of the digestive system, Diseases of skin and subcutaneous system, Diseases of the musculoskeletal system, Diseases of the kidney and ureter, Pregnancy, childbirth and the puerperium, All other Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified)

Causes of death are reported to MBRRACE-UK by local clinical teams directly involved in the individual's care, using the CODAC classification system. The CODAC system has a three-level hierarchical tree for the coding of both the primary cause of death and any associated conditions. To achieve sufficient group sizes for meaningful analysis and also identify important causes of death in neonatal babies, we used level two coding for deaths coded as neonatal at level one and level one coding for all other causes of death.

Table 2: CODAC cause of neonatal death coding

CODAC level 1	CODAC level 2
Neonatal	Neurological
	Extreme prematurity
	Cardio-respiratory
	Gastrointestinal
	Unspecified or other
	Multiorgan failure
	Trauma or suffocation
Congenital anomaly	
Infection	
Unknown	
Fetal	
Placental	
Intrapartum	
Cord	
Maternal	

Neonatal Mortality Review Analysis Data Tables

Table 3: Distribution of live births in 2021/22 compared to 2017/21

	Number of live births in 2017/21 (%)	Number of live births in 2021/22 (%)	Observed / expected ratio of live births in 2021/22 (95% CI)
NHS board of birth			
NHS Ayrshire and Arran	12573 (6.3)	2996 (6.2)	0.98 (0.95, 1.02)
NHS Borders	3703 (1.9)	867 (1.8)	0.97 (0.9, 1.03)
NHS Dumfries and Galloway	4727 (2.4)	1103 (2.3)	0.96 (0.91, 1.02)
NHS Fife	13280 (6.6)	3224 (6.7)	1 (0.97, 1.04)
NHS Forth Valley	10737 (5.4)	2606 (5.4)	1 (0.96, 1.04)
NHS Grampian	22157 (11.1)	5334 (11)	0.99 (0.97, 1.02)
NHS Greater Glasgow and Clyde	45417 (22.7)	10892 (22.5)	0.99 (0.97, 1.01)
NHS Highland	10313 (5.2)	2467 (5.1)	0.99 (0.95, 1.03)
NHS Lanarkshire	25948 (13)	6387 (13.2)	1.01 (0.99, 1.04)
NHS Lothian	34288 (17.2)	8562 (17.7)	1.03 (1.01, 1.05) *
NHS Orkney	725 (0.4)	170 (0.4)	0.97 (0.83, 1.12)
NHS Shetland	818 (0.4)	180 (0.4)	0.91 (0.78, 1.05)
NHS Tayside	14286 (7.2)	3458 (7.1)	1 (0.97, 1.03)
NHS Western Isles	786 (0.4)	202 (0.4)	1.06 (0.92, 1.22)
Other	0 (0)	0 (0)	-
Unknown	0 (0)	0 (0)	-

	Number of live births in 2017/21 (%)	Number of live births in 2021/22 (%)	Observed / expected ratio of live births in 2021/22 (95% CI)	
Deprivation quintile				
1 Most deprived	48831 (24.4)	11255 (23.2)	0.95 (0.93, 0.97)	*
2	41750 (20.9)	9922 (20.5)	0.98 (0.96, 1.00)	
3	36445 (18.2)	8978 (18.5)	1.02 (0.99, 1.04)	
4	39179 (19.6)	9966 (20.6)	1.05 (1.03, 1.07)	*
5 Least deprived	33546 (16.8)	8327 (17.2)	1.02 (1.00, 1.05)	
Unknown	7 (0)	0 (0)	-	
Multiple births				
Singleton	193987 (97.1)	47175 (97.4)	1.00 (0.99, 1.01)	
Multiple birth	5771 (2.9)	1273 (2.6)	0.91 (0.86, 0.96)	*
Gestation at birth				
<24 weeks	134 (0.07)	48 (0.10)	1.48 (1.09, 1.96)	*
24+0 to 27+6	612 (0.3)	180 (0.4)	1.22 (1.04, 1.41)	*
28+0 to 31+6	1573 (0.8)	386 (0.8)	1.01 (0.92, 1.12)	
32+0 to 36+6	14241 (7.2)	3280 (6.8)	0.95 (0.92, 0.98)	*
37+0 to 41+6	178637 (90.1)	43371 (90.4)	1.00 (0.99, 1.01)	
>=42	3095 (1.6)	721 (1.5)	0.96 (0.89, 1.04)	

CI - Confidence interval

* - Significant at 5% level

Source: Neonatal Mortality Review Data Tables

Table 4: Neonatal mortality rates in 2021/22 compared to 2017/21

	2017/21			2021/22			Observed / expected ratio (95% CI)	
	Number of live births	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)	Number of live births	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)		
Scotland	199,758	433	2.17 (1.97, 2.38)	48,448	135	2.79 (2.34, 3.3)	1.29 (1.08, 1.52)	*
NHS board of birth								
NHS Ayrshire and Arran	12,573	23	1.83 (1.16, 2.74)	2,996	6	2 (0.74, 4.35)	1.09 (0.4, 2.38)	
NHS Borders	3,703	6	1.62 (0.59, 3.52)	867	2	2.31 (0.28, 8.31)	1.42 (0.16, 5.14)	
NHS Dumfries and Galloway	4,727	7	1.48 (0.6, 3.05)	1,103	4	3.63 (0.99, 9.26)	2.45 (0.66, 6.27)	
NHS Fife	13,280	49	3.69 (2.73, 4.88)	3,224	13	4.03 (2.15, 6.89)	1.09 (0.58, 1.87)	
NHS Forth Valley	10,737	15	1.4 (0.78, 2.3)	2,606	5	1.92 (0.62, 4.47)	1.37 (0.44, 3.20)	
NHS Grampian	22,157	35	1.58 (1.1, 2.2)	5,334	17	3.19 (1.86, 5.1)	2.02 (1.17, 3.23)	*
NHS Greater Glasgow and Clyde	45,417	95	2.09 (1.69, 2.56)	10,892	27	2.48 (1.63, 3.6)	1.19 (0.78, 1.72)	
NHS Highland	10,313	18	1.75 (1.03, 2.76)	2,467	4	1.62 (0.44, 4.15)	0.93 (0.25, 2.38)	
NHS Lanarkshire	25,948	56	2.16 (1.63, 2.8)	6,387	12	1.88 (0.97, 3.28)	0.87 (0.45, 1.52)	
NHS Lothian	34,288	73	2.13 (1.67, 2.68)	8,562	30	3.5 (2.37, 5)	1.65 (1.11, 2.35)	*
NHS Orkney	725	0	0.00 (0, 5.08)	170	1	5.88 (0.15, 32.34)	-	
NHS Shetland	818	2	2.44 (0.3, 8.8)	180	0	0 (0, 20.29)	-	
NHS Tayside	14,286	47	3.29 (2.42, 4.37)	3,458	11	3.18 (1.59, 5.68)	0.97 (0.48, 1.73)	
NHS Western Isles	786	1	1.27 (0.03, 7.07)	202	1	4.95 (0.13, 27.27)	3.89 (0.05, 21.65)	

	2017/21			2021/22			Observed / expected ratio (95% CI)
	Number of live births	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)	Number of live births	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)	
Deprivation							
1 Most deprived	48,831	154	3.15 (2.68, 3.69)	11,255	43	3.82 (2.77, 5.14)	1.21 (0.88, 1.63)
2	41,750	97	2.32 (1.88, 2.83)	9,922	20	2.02 (1.23, 3.11)	0.87 (0.53, 1.34)
3	36,445	73	2.00 (1.57, 2.52)	8,978	32	3.56 (2.44, 5.03)	1.78 (1.22, 2.51) *
4	39,179	70	1.79 (1.39, 2.26)	9,966	26	2.61 (1.7, 3.82)	1.46 (0.95, 2.14)
5 Least deprived	33,546	38	1.13 (0.8, 1.55)	8,327	14	1.68 (0.92, 2.82)	1.48 (0.81, 2.49)
Multiple births							
Singleton	193,987	378	1.95 (1.76, 2.16)	47,175	113	2.4 (1.97, 2.88)	1.23 (1.01, 1.48) *
Multiple birth	5,771	54	9.36 (7.04, 12.19)	1,273	22	17.28 (10.86, 26.05)	1.85 (1.16, 2.8) *
Gestation at birth							
24+0 to 27+6	612	99	161.8 (133.5, 193.4)	180	36	200 (144.18, 265.97)	1.24 (0.87, 1.71)
28+0 to 31+6	1,573	45	28.61 (20.94, 38.09)	386	8	20.73 (8.99, 40.43)	0.72 (0.31, 1.43)
32+0 to 36+6	14,241	61	4.28 (3.28, 5.5)	3,280	25	7.62 (4.94, 11.23)	1.78 (1.15, 2.63) *
37+0 to 41+6	178,637	96	0.54 (0.44, 0.66)	43,371	25	0.58 (0.37, 0.85)	1.07 (0.69, 1.58)
<24 weeks	134	109	813.4 (737.0, 875.5)	48	36	750 (604.04, 863.63)	0.92 (0.65, 1.28)
>=42	3,095	0	0 (0, 1.19)	721	0	0 (0, 5.1)	-

CI - Confidence interval

* - Significant at 5% level

Source: Neonatal Mortality Review Data Tables

Table 5: Neonatal mortality rates in 2021 compared to 2017 - 2020 by devolved nation and sex, based on date of registration

	2017 - 2020			2021			Observed / expected ratio (95% CI)	
	Number of live births	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)	Number of live births	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)		
Scotland	200,841	432	2.15 (1.95,2.36)	47,786	132	2.76 (2.31, 3.27)	1.28 (1.07, 1.52)	*
England	2,468,145	6790	2.75 (2.69,2.82)	595,948	1633	2.74 (2.61, 2.88)	1.00 (0.95, 1.05)	
Wales	121,792	333	2.73 (2.45,3.04)	28,781	76	2.64 (2.08, 3.3)	0.97 (0.76, 1.21)	
Northern Ireland	89,166	302	3.39 (3.02,3.79)	20,108	83	4.13 (3.29, 5.11)	1.22 (0.97, 1.51)	
Male	103,206	245	2.39 (2.09,2.69)	24,542	63	2.57 (1.97, 3.28)	1.07 (0.82, 1.37)	
Female	97,635	185	1.89 (1.63, 2.19)	23,244	69	2.97 (2.31, 3.76)	1.57 (1.22, 1.52)	*

CI - Confidence interval

* - Significant at 5% level

Source: Office for National Statistics and National Records of Scotland

Table 6: Cause-specific neonatal mortality rates in 2021/22 compared to 2017/21

	2017/21		2021/22		Observed / expected ratio (95% CI)	
	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)		
CODAC						
Neonatal [†]						
<i>Neurological</i>	37	0.19 (0.13, 0.26)	16	0.33 (0.19, 0.54)	1.78 (1.02, 2.9)	*
<i>Extreme prematurity</i>	97	0.49 (0.39, 0.59)	31	0.64 (0.43, 0.91)	1.32 (0.9, 1.87)	
<i>Cardio-respiratory</i>	40	0.2 (0.14, 0.27)	12	0.25 (0.13, 0.43)	1.24 (0.64, 2.16)	
<i>Gastrointestinal</i>	19	0.1 (0.06, 0.15)	7	0.14 (0.06, 0.3)	1.52 (0.61, 3.13)	
<i>Unspecified or other</i>	6	0.03 (0.01, 0.07)	0	0 (0, 0.08)	-	
<i>Multorgan failure</i>	5	0.03 (0.01, 0.06)	5	0.1 (0.03, 0.24)	4.12 (1.33, 9.62)	*
<i>Trauma or suffocation</i>	2	0.01 (0, 0.04)	0	0 (0, 0.08)	-	
Congenital anomaly	76	0.38 (0.3, 0.48)	17	0.35 (0.2, 0.56)	0.92 (0.54, 1.48)	
Infection	5	0.03 (0.01, 0.06)	3	0.06 (0.01, 0.18)	2.47 (0.5, 7.23)	
Fetal	8	0.04 (0.02, 0.08)	2	0.04 (0, 0.15)	1.03 (0.12, 3.72)	
Placental	24	0.12 (0.08, 0.18)	7	0.14 (0.06, 0.3)	1.20 (0.48, 2.48)	
Intrapartum	19	0.1 (0.06, 0.15)	3	0.06 (0.01, 0.18)	0.65 (0.13, 1.9)	
Cord	4	0.02 (0.01, 0.05)	3	0.06 (0.01, 0.18)	3.09 (0.62, 9.04)	
Maternal	10	0.05 (0.02, 0.09)	3	0.06 (0.01, 0.18)	1.24 (0.25, 3.61)	
ICD-10 classification						
Disorders related to short gestation and low birth weight, not elsewhere classified	68	0.34 (0.26, 0.43)	24	0.5 (0.32, 0.74)	1.46 (0.93, 2.17)	

	2017/21		2021/22		Observed / expected ratio (95% CI)
	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)	
Bacterial sepsis of the newborn	27	0.14 (0.09, 0.2)	12	0.25 (0.13, 0.43)	1.83 (0.95, 3.2)
Birth asphyxia	11	0.06 (0.03, 0.1)	4	0.08 (0.02, 0.21)	1.50 (0.40, 3.84)
Fetus and newborn affected by complications of placenta, cord and membranes and Fetus and newborn affected by other complications of labour and delivery	29	0.15 (0.1, 0.21)	14	0.29 (0.16, 0.48)	1.99 (1.09, 3.34) *
Haemorrhagic and haematological disorders of fetus and newborn	19	0.1 (0.06, 0.15)	6	0.12 (0.05, 0.27)	1.3 (0.48, 2.83)
All other conditions originating in the perinatal period	156	0.39 (0.33, 0.46)	41	0.42 (0.3, 0.57)	1.08 (0.78, 1.47)
Congenital malformations of the circulatory system	28	0.14 (0.09, 0.2)	6	0.12 (0.05, 0.27)	0.88 (0.32, 1.92)
All other congenital malformations, deformations and chromosomal abnormalities	68	0.34 (0.26, 0.43)	20	0.41 (0.25, 0.64)	1.21 (0.74, 1.87)
Sudden infant death syndrome	12	0.06 (0.03, 0.1)	4	0.08 (0.02, 0.21)	1.37 (0.37, 3.52)
External causes of morbidity and mortality	7	0.04 (0.01, 0.07)	1	0.02 (0, 0.11)	0.59 (0.01, 3.28)
COVID-19	0	0 (0, 0.02)	0	0 (0, 0.08)	-
Certain infectious and parasitic diseases	2	0.01 (0, 0.04)	0	0 (0, 0.08)	-

	2017/21		2021/22		Observed / expected ratio (95% CI)
	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)	Number of neonatal deaths	Neonatal mortality rate per live 1000 births (95% CI)	
Neoplasms	0	0 (0, 0.02)	0	0 (0, 0.08)	-
Endocrine, nutritional and metabolic diseases	2	0.01 (0, 0.04)	0	0 (0, 0.08)	-
Other [^]	4	0.02 (0.01, 0.05)	3	0.06 (0.01, 0.18)	3.09 (0.62, 9.04)

CI - Confidence interval

* - Significant at 5% level

‡ - Level two coding, highlighted in italics, was used for deaths coded as Neonatal at level one

[^] - Mental and behavioural disorders, Diseases of the nervous system, Diseases of the circulatory system, Diseases of the respiratory system, Diseases of the digestive system, Diseases of skin and subcutaneous system, Diseases of the musculoskeletal system, Diseases of the kidney and ureter, Pregnancy, childbirth and the puerperium, All other Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified

Source: Neonatal Mortality Review Data Tables

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or email contactpublicinvolvement.his@nhs.net

Healthcare Improvement Scotland

Edinburgh Office	Glasgow Office
Gyle Square	Delta House
1 South Gyle Crescent	50 West Nile Street
Edinburgh	Glasgow
EH12 9EB	G1 2NP

0131 623 4300	0141 225 6999
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www.healthcareimprovementscotland.org