Perinatal deaths in South Africa, 2011–2013

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Statistical release

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Preface

This statistical release presents information on perinatal deaths in South Africa, based on data from the South African civil registration system maintained by the Department of Home Affairs. The main focus of this release is on perinatal deaths that occurred in the years 2011, 2012 and 2013. Perinatal deaths for the years 1997–2010 have also been included to provide information on trends in perinatal deaths.

PJ Lehohla
Statistician-General

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1. Introduction

1.1 Background

Statistics South Africa (Stats SA) has identified a need to publish statistics on perinatal deaths. This information is based on administrative records captured on death notification forms collected from the South African civil registration system maintained by the Department of Home Affairs (DHA). The registration of stillbirths and deaths in South Africa is governed by the Births and Deaths Registration Act of 1992 (Act No.51 of 1992). The act was amended in 2010 as part of a strategy to improve the registration of births and reduce fraud (Act No.18 of 2010). A statistical release on mortality and causes of death is published annually by Stats SA, and is available from 1997 to 2013. Information on perinatal deaths is also available for the same period, but has not been analysed nor published in the recent past. Initially, information on stillbirths used to be published with recorded live births, but the organisation took a decision to separate stillbirths as they are foetal deaths and not live births. This release aims to shed some light on the current levels and causes of perinatal deaths as well as to consolidate information about the changes that have occurred over the years.

Perinatal deaths are a combination of foetuses that are born dead (stillbirths) and babies that die in the first week after birth (early neonatal deaths) (Oti and Odimegwu, 2011; WHO, 2006). The perinatal period age of viability as defined by the World Health Organization (WHO) begins at 22 weeks of pregnancy for stillbirths and ends within the first seven days of life for early neonatal deaths (WHO, 2006). Stillbirths and early neonatal deaths are grouped into a single category of perinatal deaths on the hypothesis that the deaths have similar causes, in particular obstetric causes (Barfield, 2011; WHO, 2006). The more inclusive recommendation from WHO calls for a definition of perinatal deaths that includes stillbirths with a mass of 500 grams or at 22 complete weeks of pregnancy. However, for international comparisons, WHO also has a more conservative definition that restricts perinatal deaths to stillbirths weighing 1 000 grams or if the pregnancy was terminated at 28 weeks (WHO, 2006). MacDorman et al. (2012) suggest that the more inclusive criteria comprising stillbirths and infants of 500 grams and less than 28 weeks of pregnancy allow for the inclusion of meaningful data, reduction of under-reporting of perinatal deaths and tracking of stillbirths, because most stillbirths occur before 28 complete weeks of pregnancy.

In South Africa, the Births and Deaths Registration Act (Act No. 51 of 1992) states that '*A stillborn in relation to a child, means that it has at least 26 weeks of intra-uterine existence but showed no sign of life after complete birth* (Republic of South Africa, 1992). Further, in terms of the Regulations on the Registration of Births and Deaths, *'after a death occurs due to natural causes, informants shall give, within 72 hours, notice of death'*. If there is any doubt whether the death was due to natural causes, such a death has to be reported to a police officer (Republic of South Africa, 2014).

Perinatal deaths are an indicator of the quality of prenatal, obstetric and neonatal care. They provide the information needed to improve care for pregnant women, newborn babies and new mothers (Onwudiegwu and Awowole, 2012). Specifically, recent evidence indicates that globally, deaths during the perinatal phase are responsible for almost 40 percent of all infant deaths (Ezechi and David, 2012). Perinatal deaths are an important index for monitoring population health care status with as much as 75 percent of all neonatal deaths (deaths within the first month of life) occurring within the first week of life (WHO, 2006). Consequently, the reduction of perinatal deaths is an essential step towards reducing infant and child mortality as well as improving maternal health status. A significant proportion of perinatal deaths are preventable because they occur as a result of the type of place of delivery and the quality of care received during delivery. Accordingly, the prevention of these perinatal deaths is largely reliant on ascertaining the underlying causes. In order to monitor and evaluate progress towards achieving national goals of reducing child mortality and improving maternal health, information on the magnitude of perinatal mortality is required.

Another benefit conferred by data on perinatal deaths is that not only do they give information on stillbirths and early neonatal deaths but they also reflect the state of health of pregnant women, women delivering stillbirths and newborns that die (Onwudiegwu and Awowole, 2012).

Stillbirths and neonatal deaths affect the public who need to be empowered to prevent pregnancy problems and to prevent delays in accessing health care services when problems do occur. Globally, declines have been observed in infant and child mortality as a result of public health interventions such as immunisation and treatment for infectious diseases. However, progress towards reducing perinatal deaths has been slow and negligible. The World Health Organization (WHO) estimated the number of perinatal deaths worldwide to be around 6,3 million, with 3,3 million of these deaths being stillbirths and three million being early neonatal deaths (WHO, 2006). There is a high disparity between developing and developed countries, with approximately 98 percent of perinatal deaths occurring in developing countries. However, in developing countries where perinatal deaths are rampant, there is inadequate information on both the numbers and causes of perinatal deaths (Berhan and Berhan, 2014). The *Opportunities for Africa's newborns* report indicated that over 1,1 million newborns die within one month of life in sub-Saharan Africa; and about half a million of these deaths occur on the first day of life. The report found that two-thirds of these newborn deaths could be saved if 90 percent of women and babies received low-cost health interventions such as immunisation, assisted by a skilled birth attendant, received prompt treatment of newborn infections and education on hygiene. In addition, these interventions will benefit the one million stillborns of whom at least a third die during delivery and 250 000 mothers who also die each year (Lawn and Kerber, 2006).

It is clear that infant and child mortality reduction goals cannot be achieved without a reduction in perinatal deaths. An important cornerstone for progress is to make better use of the available data on perinatal deaths and make the information available to policymakers, researchers, health care workers, civil society organisations as well as families and communities who need to be aware of the size of the problem and advocate for more action towards prevention of perinatal deaths.

1.2 Purpose of the statistical release

The aim of this release is to establish a foundation of knowledge and understanding of perinatal deaths. The general objective of this release is to present statistics on perinatal deaths and discuss the causes of perinatal deaths for the year 2011 to 2013. Specific aims are to:

- Analyse registered perinatal deaths by selected background characteristics; provide levels and trends of registered deaths from 2011 to 2013; and
- Present statistics on the causes of perinatal deaths that occurred in the period 2011 to 2013, focusing on the underlying causes of death.

1.3 Scope of the statistical release

This release is based on all death notification forms that were received by Stats SA, mainly deaths that occurred in the period 2011 to 2013. Statistics for deaths that occurred between 1997 and 2013 are also provided to show trends in mortality and causes of death.

The number of deaths discussed in this release includes both individual deaths (death after a live birth) and stillbirths collected through the civil registration system using the same death notification form.

This is a pilot release and there shall be more information on perinatal deaths in the forthcoming issues. Analysis on geography is limited to provincial information as there has been no estimation of completeness in perinatal deaths at district level.

2. Data and methods

2.1 Data source

The release is based on data from the mortality and causes of death captured in the civil registration system. Detailed information on the data sources and data processing methodology is available in the Mortality and causes of death in South Africa, 2013: Findings from death notification release (Stats SA, 2014). The mortality and causes of death annual files were merged to obtain a dataset for 1997 to 2013. Additionally, a subset of these files was drawn for deaths occurring to stillbirths and those that occurred to individuals within seven days.

2.2 Data analysis

The data analysis used in this release is descriptive in nature. It includes differentials by sex, age, population group, and province of death occurrence. Additionally, estimates on the stillbirth rate, early neonatal mortality and perinatal mortality are provided.

3. Registered perinatal deaths

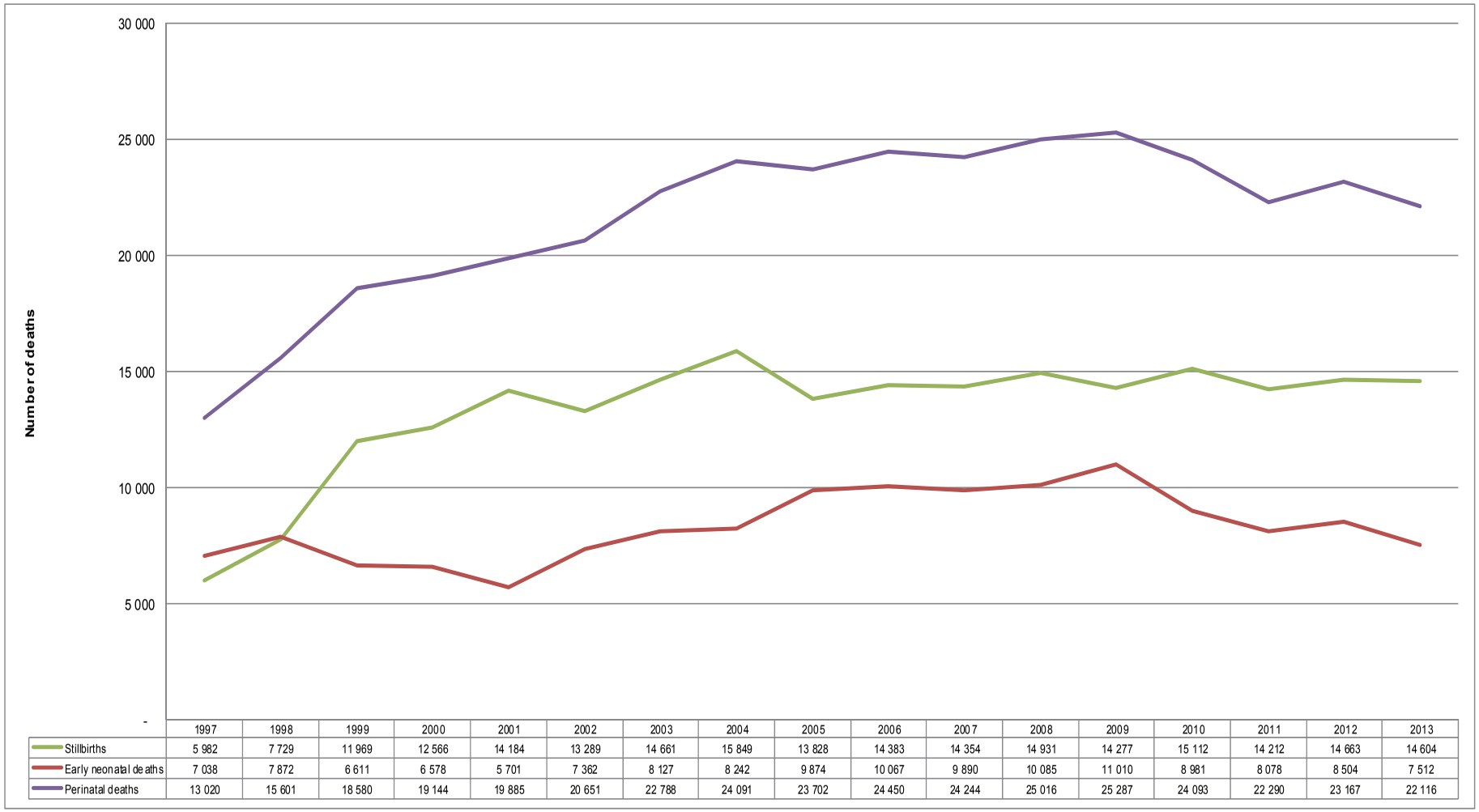
This section shows recent trends in perinatal mortality for the period 1997–2013 by death type (stillbirth and early neonatal deaths) and sex. Additionally, the distribution of deaths that occurred between 2011 and 2013 is presented by age in days and hours, month of death occurrence, population group and province of death occurrence. Lastly, estimates on stillbirth rate, early neonatal mortality and perinatal mortality are also shown.

3.1 Levels and trends of registered deaths

Figure 3.1 shows the number of registered perinatal deaths processed by Stats SA for the period 1997–2013. Overall, the number of perinatal deaths have been constantly increasing from 13 020 in 1997 to as high as 25 287 in 2009; thereafter there was no consistent pattern. In 2013, there were 22 116 perinatal deaths.

The distribution of stillbirths over time shows no noticeable pattern. However, the number of stillbirths was higher than the number of early neonatal deaths, with the exception of 1997 and 1998 (albeit marginally so), where the number of early neonatal deaths was higher than the number of stillbirths. The number of early neonatal deaths declined steadily between 1999 and 2001, then started to increase from 7 362 in 2002 to11 010 in 2009. The number of early neonatal deaths was 7 512 in 2013.

Figure 3.1: Number of registered perinatal deaths by year of death, 1997–2013



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Stillbirths	5 982	7 729	11 969	12 566	14 184	13 289	14 661	15 849	13 828	14 383	14 354	14 931	14 277	15 112	14 212	14 663	14 604
Early neonatal deaths	7 038	7 872	6 611	6 578	5 701	7 362	8 127	8 242	9 874	10 067	9 890	10 085	11 010	8 981	8 078	8 504	7 512
Perinatal deaths	13 020	15 601	18 580	19 144	19 885	20 651	22 788	24 091	23 702	24 450	24 244	25 016	25 287	24 093	22 290	23 167	22 116

3.2 Sex differentials

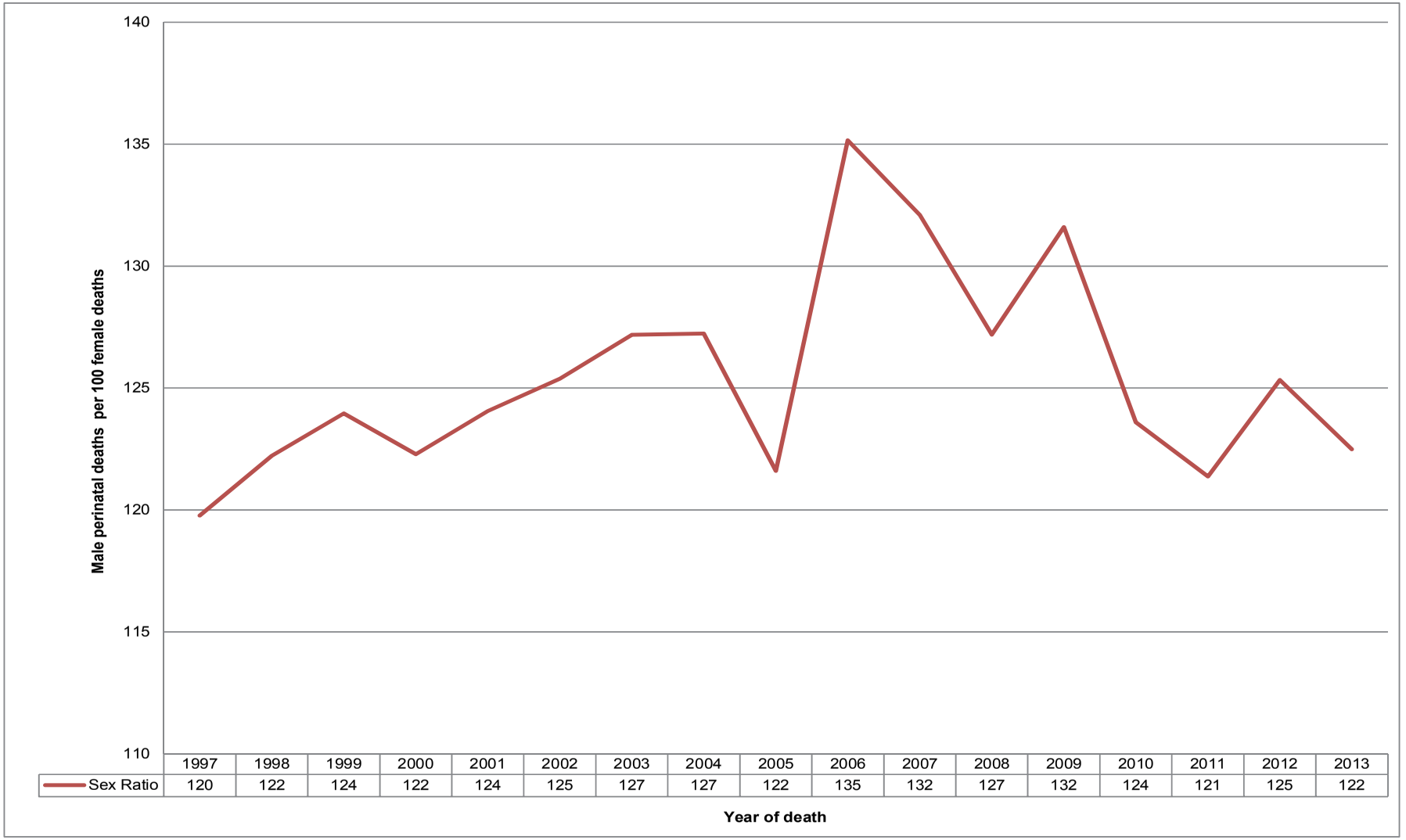
Figure 3.3 shows the sex distribution of perinatal deaths for the period 1997 to 2013. Largely, the number of male deaths has always been higher than that of females since 1997. However, the gap in 1997 was narrower, becoming wider over the subsequent years.

The sex ratio at death (the number of male deaths per 100 female deaths) is another measure that shows the relative number of male deaths to female deaths. A ratio of 100 indicates an equal number of male and female deaths, a number less than 100 indicates more female death occurrences; and a number more than 100 indicates more male death occurrences. Throughout the 17-year period, the sex ratio at death for perinatal deaths has always been above 100 (Figure 3.3). However, sex ratio at death was highest in 2006 (135) and in 2013 it was 122 male deaths per 100 female deaths.

Figure 3.2: Number of perinatal deaths by sex, 1997–2013

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Males	7 003	8 419	10 103	10 365	10 851	11 310	12 553	13 199	12 783	13 616	13 554	13 817	14 053	12 968	11 732	12 276	11 638
Females	5 847	6 888	8 150	8 476	8 747	9 020	9 870	10 374	10 512	10 074	10 261	10 863	10 679	10 492	9 666	9 795	9 501

Figure 3.3: Sex ratio at death by year of death, 1997–2013



	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Sex Ratio	120	122	124	122	124	125	127	127	122	135	132	127	132	124	121	125	122

3.3 Age differentials

3.3.1 Age differentials in perinatal deaths

Table 3.1 below shows the distribution of perinatal deaths by age in days and year of death. Age 0 is inclusive of stillbirths. In the three-year period (2011–2013), the number of perinatal deaths decreased with age. This gives an indication that the possibility of a perinatal death occurring decreases as age increases. The proportions of infants dying at different ages (in days) were more or less the same for all the years.

Table 3.1: Number and percentage distribution of perinatal deaths by age and year of death, 2011−2013

Age in days	Year of death					
	Number			Percentage		
	2011	2012	2013	2011	2012	2013
0	17 572	18 384	17 401	78,8	79,4	78,7
1	1 591	1 529	1 514	7,2	6,6	6,8
2	1 102	1 133	1 063	4,9	4,9	4,8
3	669	651	672	3,0	2,8	3,1
4	429	491	490	1,9	2,1	2,2
5	354	372	384	1,6	1,6	1,7
6	311	309	333	1,4	1,3	1,5
7	262	298	259	1,2	1,3	1,2
Total	**22 290**	**23 167**	**22 116**	**100**	**100**	**100**

3.3.2 Age differentials in early neonatal deaths

The distribution of early neonatal deaths is shown in Table 3.2. For each of the three years, more than 50% of the early neonatal deaths occurred between 24 hours to 167 hours after birth. This is followed by neonates who were aged between one and twenty-three hours. The least number of early neonatal deaths occurred to neonates aged less than an hour.

Table 3.2: Number and percentage distribution of early neonatal deaths by age in hours and year of death, 2011−2013

Age (hours)	Year of death					
	Number			Percentage		
	2011	2012	2013	2011	2012	2013
Under 1 hour	1 783	1 139	196	22,1	13,4	2,6
1–23 hours	1 577	2 582	2 601	19,5	30,4	34,6
24–167 hours	4 718	4 783	4 715	58,4	56,2	62,8
Total	**8 078**	**8 504**	**7 512**	**100,0**	**100,0**	**100,0**

3.4 Distribution of deaths by month and year of death

Table 3.3 shows the distribution of perinatal deaths by month of death and year of death. There was no noticeable pattern in the distribution of deaths by month of death for all three years, except for March and September where the proportions remained constant in the three years despite changes in absolute numbers.

Deaths were more or less fairly distributed over the twelve months of the year between 7% and 9% each month. However, the month of March had on average the highest proportion of perinatal deaths (9,0%) and September had on average the lowest proportion of perinatal deaths (7,7%) over the three-year period.

Table 3.3: Number and percentage distribution of perinatal deaths by month of death and year of death, 2011−2013

Month of death	Year of death					
	Number			Percentage		
	2011	2012	2013	2011	2012	2013
January	1 884	2 044	1 992	8,5	8,8	9,0
February	1 704	2 026	1 813	7,6	8,7	8,2
March	2 000	2 076	1 986	9,0	9,0	9,0
April	1 884	1 903	1 877	8,5	8,2	8,5
May	2 019	2 065	1 885	9,1	8,9	8,5
June	1 859	1 855	1 814	8,3	8,0	8,2
July	1 826	1 934	1 800	8,2	8,3	8,1
August	1 772	1 939	1 829	7,9	8,4	8,3
September	1 722	1 779	1 696	7,7	7,7	7,7
October	1 808	1 828	1 847	8,1	7,9	8,4
November	1 874	1 804	1 798	8,4	7,8	8,1
December	1 938	1 914	1 779	8,7	8,3	8,0
Total	**22 290**	**23 167**	**22 116**	**100,0**	**100,0**	**100,0**

3.5 Population group differences in perinatal deaths

The distribution of deaths by population group is shown in Table 3.4. It is observed that black Africans contributed the highest percentage of registered perinatal deaths throughout the three-year period. In each of the three years, black Africans had approximately 75% perinatal deaths registered, followed by the coloured population group and then the white population group. About 81,1% of the perinatal deaths occurred in the black African population group and 5,4% in the coloured population group in 2013.

Information on population group has to be treated with caution due to high percentages of records with unspecified population group. The results show that the proportion of registered perinatal deaths with missing information on population group was 17,0% each, for both 2011 and 2012, after which it reduced to 11,1% in 2013.

Table 3.4: Number and percentage distribution of perinatal deaths by population group and year of death, 2011−2013

Population group	Number			Percentage		
	2011	2012	2013	2011	2012	2013
Black African	16 678	17 297	17 936	74,8	74,7	81,1
White	393	339	342	1,8	1,5	1,5
Indian or Asian	160	186	149	0,7	0,8	0,7
Coloured	1 196	1 341	1 187	5,4	5,8	5,4
Other	56	48	41	0,3	0,2	0,2
Unspecified/unknown	3 807	3 956	2 461	17,0	17,0	11,1
Total	**22 290**	**23 167**	**22 116**	**100,0**	**100,0**	**100,0**

3.6 Differentials in perinatal deaths by province

The distribution of deaths by province of death occurrence is presented in Table 3.5. It is important to note that the percentage distribution of deaths by province of occurrence is largely similar to the distribution of the South African population by province. The distribution of perinatal deaths by province showed wide disparities by province. In the three-year period, KwaZulu-Natal and Gauteng provinces had the highest proportions of perinatal deaths. In 2011, the proportion of perinatal deaths for both provinces was 23,5%. However, on the one hand in 2012, the percentage decreased to 23,2% for KwaZulu-Natal, while it increased to 24,1% for Gauteng. On the other hand in 2013, KwaZulu-Natal had the highest proportion (24,3%) of perinatal deaths, followed by Gauteng province at 23,4%, then Western Cape at 9,9%. Between 2011 and 2013, Northern Cape remained the province with the lowest proportions of perinatal deaths at less than 5% in the three-year period. Eastern Cape was the only province where proportions did not fluctuate in the three years, with proportions remaining at 5,4%.

Table 3.5: Number and percentage distribution of perinatal deaths by province of death occurrence and year of death, 2011−2013

Province of death	Year of death					
	Number			Percentage		
	2011	2012	2013	2011	2012	2013
Western Cape	2 161	2 267	2 186	9,7	9,8	9,9
Eastern Cape	1 196	1 240	1 185	5,4	5,4	5,4
Northern Cape	622	689	680	2,8	3,0	3,1
Free State	2 128	1 883	1 719	9,5	8,1	7,8
KwaZulu-Natal	5 231	5 377	5 377	23,5	23,2	24,3
North West	1 862	2 038	1 952	8,4	8,8	8,8
Gauteng	5 233	5 581	5 181	23,5	24,1	23,4
Mpumalanga	1 629	1 794	1 544	7,3	7,7	7,0
Limpopo	1 841	2 091	2 116	8,3	9,0	9,6
Unspecified/unknown	384	204	176	1,6	0,9	0,7
Outside South Africa	3	3	0	0,0	0,0	0,0
Total	**22 290**	**23 167**	**22 116**	**100,0**	**100,0**	**100,0**

3.7 Estimates by year of death

Table 3.6 shows estimates of stillbirths, early neonatal and perinatal mortality rates and numbers by year of death. The stillbirth rate was at its lowest in 1998 (8 stillbirths per 1 000 total births), and between 1999 and 2013 it remained between 13 and 17 stillbirths per 1 000 total births. The highest stillbirth rate was in 2013 with 17 stillbirths per 1 000 total births which can be attributed to the sharp decline in the number of total births in 2013.

Throughout the 16-year period, the early neonatal rate has been less than 10 with the exception of 2011 when the early neonatal rate was 11 early neonatal deaths per 1 000 total births.

The perinatal mortality rate was lowest in 1998 with 17 perinatal deaths per 1 000 total births while for the subsequent years it was consistently 20 or above perinatal deaths per 1000 total births. It reached a high of 25 perinatal deaths per 1 000 total deaths for the years 2009 and 2013.

Table 3.6: Estimates of stillbirths, early neonatal and perinatal mortality rates, 2011–2013

Year	No. of stillbirths	Live births	Total births	Stillbirth rate	No. of early neonatal mortality	Early neonatal mortality rate	No. of Perinatal death	Perinatal mortality rate
1998	7 729	903 333	911 062	8	7 872	9	15 601	17
1999	11 969	933 105	945 074	13	6 611	7	18 580	20
2000	12 566	930 952	943 518	13	6 578	7	19 144	20
2001	14 184	925 579	939 763	15	5 701	6	19 885	21
2002	13 289	913 784	927 073	14	7 362	8	20 651	22
2003	14 661	921 341	936 002	16	8 127	9	22 788	24
2004	15 849	1 008 778	1 024 627	15	8 242	8	24 091	24
2005	13 828	1 054 873	1 068 701	13	9 874	9	23 702	22
2006	14 383	1 082 424	1 096 807	13	10 067	9	24 450	22
2007	14 354	1 067 656	1 082 010	13	9 890	9	24 244	22
2008	14 931	1 083 674	1 098 605	14	10 085	9	25 016	23
2009	14 277	1 017 747	1 032 024	14	11 010	11	25 287	25
2010	15 112	1 004 838	1 019 950	15	8 981	9	24 093	24
2011	14 212	1 009 729	1 023 941	14	8 078	8	22 290	22
2012	14 663	1 073 886	1 088 549	13	8 504	8	23 167	21
2013	14 604	860 393	874 997	17	7 512	9	22 116	25

4. Causes of perinatal deaths

4.1 Introduction

This section presents information on causes of death for all perinatal deaths that occurred between 2011 and 2013. Causes of death data in this publication are classified using the 10th revision of the International Classification of Diseases (ICD-10). The ICD, which is recommended by the World Health Organization (WHO), is mainly intended for the classification of diseases and injuries with a formal diagnosis. The information on causes of death provided is as recorded on death notification forms completed by medical practitioners and other certifying officials. The information on causes of death is based mainly on the underlying causes of death. It is provided according to the 19 main groups (chapters) of the classification of death.

For information on how Statistics South Africa derives the underlying cause of death, please refer to Mortality and Causes of Death in South Africa, 2013: Findings form death notification (Stats SA, 2014).

4.2 Method of ascertaining cause of death

The Births and Deaths Registration Act, 1992 (Act No. 51 of 1992) requires that all deaths be certified by a medical practitioner or professional nurse (for stillbirths) who must issue a prescribed certificate stating the cause of death. The Department of Home Affairs (DHA) uses a death notification form that makes provision for a certifying official to indicate the method that was used to ascertain the cause of death. The BI-1663 form has five options to choose for method used to ascertain cause of death with the sixth option being ‘other’. When the form was revised in 2009 as DHA-1663, ‘post mortem examination’ was added to the form. In the case of perinatal deaths, there are three options in the DHA-1663 form for method used to ascertain death that were not on the BI-1663 (used before 2010). The resulting categories after combining comparable information in forms BI-1663 and DHA-1663 are provided in Table 4.1.

According to Table 4.1, there still needs to be concerted efforts in improving the method of ascertaining perinatal deaths as more than half of the perinatal deaths had unspecified method of ascertainment indicated on the death notification forms. In 2011, amongst those where the method of ascertainment was mentioned, most were ascertained through the opinion of the attending medical practitioner (14,9%), followed by opinion of attending medical practitioner on duty (11,0%). In 2013, 71,1% of perinatal deaths had no method of ascertainment specified and 19,1% had 'autopsy not performed'.

There has been a steady decline in the number of perinatal deaths ascertained through the opinion of an attending medical practitioner, from 14,9% in 2011 to 4,4% in 2013, and the same pattern was observed for perinatal deaths ascertained through the opinion of the attending medical practitioner on duty which declined from 11,0% in 2011 to 2,3% in 2013. The number of perinatal deaths where an autopsy was not performed increased from 12,0% in 2011 to 19,1% in 2013.

Table 4.1: Number and percentage distribution of perinatal deaths by method used to ascertain the cause of death, 2011−2013

Method of ascertainment of cause of death	Year of death					
	Number			Percentage		
	2011	2012	2013	2011	2012	2013
Autopsy	311	205	155	1,4	0,9	0,7
Post-mortem examination	93	134	57	0,4	0,6	0,3
Opinion of attending medical practitioner	3 330	1 671	971	14,9	7,2	4,4
Opinion of attending medical practitioner on duty	2 442	1 016	517	11,0	4,4	2,3
Opinion of registered professional nurse	538	297	215	2,4	1,3	1,0
Interview of family member	332	150	72	1,5	0,6	0,3
Other	77	30	21	0,3	0,1	0,1
Autopsy results may be available later	136	166	174	0,6	0,8	0,7
Autopsy not performed	2 669	3 992	4 218	12,0	17,2	19,1
Unspecified /unknown	12 362	15 506	15 716	55,5	66,9	71,1
Total	**22 290**	**23 167**	**22 116**	**100,0**	**100,0**	**100,0**

4.3 Place of death

The institution where the death took place is of great importance, as deaths that took place within health institutions are more likely to contain sufficient information about the cause of death. Table 4.2 shows the institution where the deaths took place by year of death. Approximately 70% of perinatal deaths took place in a health institution over the three years. The majority of perinatal deaths took place in a hospital, accounting for more than 65% (68,9% in 2011; 70,1% in 2012 and 66,7% in 2013) of deaths each of the years in the three-year period. This was followed by deaths that occurred at home which were 4,2% in 2011, 3,9% in 2012 and 3,4% in 2013. A quarter of perinatal deaths in 2013 had the institution of death occurrence not specified.

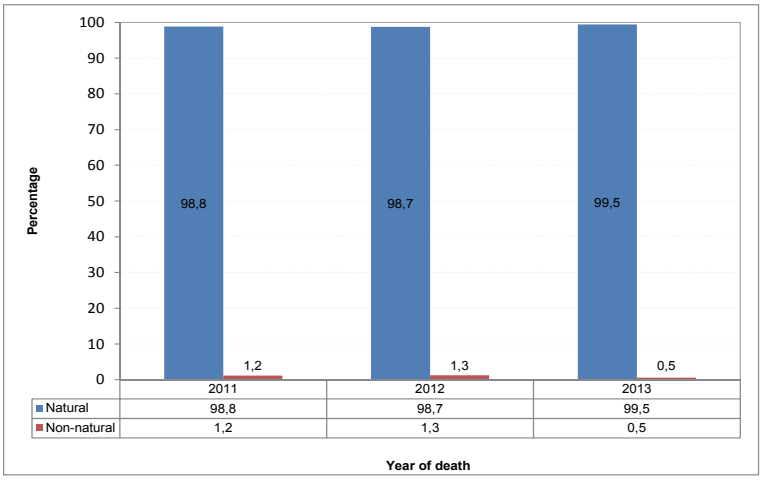
Table 4.2: Number and percentage distribution of perinatal deaths by place or institution of death occurrence, 2011−2013

Institution where death took place	Number			Percentage		
	2011	2012	2013	2011	2012	2013
Hospital	15 362	16 234	14 760	68,9	70,1	66,7
Emergency room/Outpatient	195	227	231	0,9	1,0	1,0
Dead on arrival	376	380	376	1,7	1,6	1,7
Nursing home	75	49	70	0,3	0,2	0,3
Home	940	895	758	4,2	3,9	3,4
Other	372	365	323	1,7	1,5	1,6
Unspecified/ unknown	4 970	5 017	5 598	22,3	21,7	25,3
Total	**22 290**	**23 167**	**22 116**	**100,0**	**100,0**	**100,0**

4.4 Natural and non-natural causes of early neonatal deaths

Non-natural causes of death comprise all deaths that were not attributable, or may not have been attributable to natural causes. All causes of death from Chapters 1 to 18 of the ICD-10 are classified as natural causes and those contained in Chapter 19 as non-natural causes. Figure 4.1 shows the distribution of natural and non-natural deaths for early neonatal deaths. Early neonatal deaths due to non-natural causes were less than 2% in the three-year period, and 99,5% of the early neonatal deaths were due to natural causes in 2013.

Figure 4.1: Percentage distribution of natural and non-natural causes of early neonatal deaths, 2011−2013



4.5 Birth weight

Low birth weights are associated with the majority of neonatal deaths, as low birth weights are a vital determinant of perinatal survival. When a baby is born weighing less than 2 500 grams, he or she is considered to have a low birth weight. Both the BI-1663 and DHA-1663 forms make provision for capturing the mass of stillbirths in grams; however, only the DHA-1663 makes an additional provision for capturing duration of pregnancy in completed weeks.

Table 4.3 shows stillbirth weights by year of death. It is worth noting that for all three years, almost a third of stillbirths had unspecified weight, and as such, information on weight has to be interpreted with caution.

Most stillbirths weighed between 1 500g and 1 999g for all the three years. This was followed by stillbirths that weighed between 2 000g to 2 499g in 2011(10,0%) and (10,4%) in 2013, whilst in 2012 stillbirths that weighed 1 500g to 1 999g were followed by those that weighed 500g to 749g (10,3%). Fewer stillbirths weighed less than 500g in the three-year period.

Table 4.3: Number and percentage distribution of stillbirths by birth weight and year of death

Weight (grams)	Year of death					
	Number			Percentage		
	2011	2012	2013	2011	2012	2013
Less than 500	3	14	251	0,0	0,1	1,7
500 – 749	1 351	1 507	1 496	9,5	10,3	10,2
750 – 999	792	847	978	5,6	5,8	6,7
1 000 – 1 249	1 153	1 197	1 141	8,1	8,2	7,8
1 250 – 1 499	786	860	860	5,5	5,9	5,9
1 500 – 1 999	1 556	1 701	1 635	10,9	11,6	11,2
2 000 – 2 499	1 423	1 486	1 517	10,0	10,1	10,4
2 500 – 2 999	1 238	1 217	1 222	8,7	8,3	8,4
3 000 – 3 499	876	874	903	6,2	6,0	6,2
3 500 – 3 999	344	373	401	2,4	2,5	2,7
4 000 or more	264	275	273	1,9	1,9	1,9
Not stated	4 426	4 312	3 927	31,2	29,3	26,9
Total	**14 212**	**14 663**	**14 604**	**100,0**	**100,0**	**100,0**

4.6 Main groups of underlying causes of death

The distribution of perinatal deaths by main cause of death and sex is provided in Table 4.4 below. For both males and females, the main group *certain conditions originating in the perinatal period* accounted for more than 90% of perinatal deaths in the three-year period. *Congenital malformations, deformations and chromosomal abnormalities* was the second most reported cause of death in the main group of underlying causes with proportions between 3% and 5% in the three-year period. The rest of the main groups were less than 1%. There was no noticeable difference in the distribution of underlying causes of death by sex for each of the three years.

Table 4.4: Number and percentage distribution of perinatal deaths by main group of underlying causes of death and sex, 2011−2013

Main group of underlying causes	Year of death									Year of death								
	2011			2012			2013			2011			2012			2013		
	Sex of deceased			Sex of deceased			Sex of deceased			Sex of deceased			Sex of deceased			Sex of deceased		
	Male	Female	Unknown	Male	Female	Unknown	Male	Female	Unknown	Male	Female	Unknown	Male	Female	Unknown	Male	Female	Unknown
Certain infectious and parasitic diseases (A00-B99)	50	54	10	98	74	5	50	45	1	0,4	0,6	1,1	0,8	0,8	0,5	0,4	0,5	0,1
Neoplasms (C00-D48)	8	7	2	9	5		2	2		0,1	0,1	0,2	0,1	0,1		0,0	0,0	
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50-D89)	5	2	3		3		2	1		0,0	0,0	0,3		0,0		0,0	0,0	
Endocrine, nutritional and metabolic diseases (E00-E90)	2	2	2				1	1		0,0	0,0	0,2				0,0	0,0	
Mental and behavioural disorders (F00-F99)		1									0,0							
Diseases of the nervous system (G00-G99)	13	7	2	5	1		4			0,1	0,1	0,2	0,0	0,0		0,0		
Diseases of the eye and adnexa (H00-H59)	6	3		1	4		2	1		0,1	0,0		0,0	0,0		0,0	0,0	
Diseases of the respiratory system (J00-J99)	3	5			1		1			0,0	0,1			0,0		0,0		
Diseases of the digestive system (K00-K93)	2	1		1			1			0,0	0,0		0,0			0,0		
Diseases of the skin and subcutaneous tissue (L00-L99)								1									0,0	
Diseases of the genitourinary system (N00-N99)	1		1							0,0		0,1						
Pregnancy, childbirth and the puerperium (O00-O99)					1									0,0				
Certain conditions originating in the perinatal period (P00-P96)	11 125	9 179	819	11 524	9 195	1 033	11 029	8 977	916	94,8	95,0	91,8	93,9	93,9	94,3	94,8	94,5	93,8
Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	432	367	39	546	460	44	493	427	56	3,7	3,8	4,4	4,4	4,7	4,0	4,2	4,5	5,7
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00-R99)	24	18	1	29	18	2	27	32	3	0,2	0,2	0,1	0,2	0,2	0,2	0,2	0,3	0,3
External causes of morbidity and mortality (V01-Y98)	61	20	13	63	33	12	26	14	1	0,5	0,2	1,5	0,5	0,3	1,1	0,2	0,1	0,1
Total	**11 732**	**9 666**	**892**	**12 276**	**9 795**	**1 096**	**11 638**	**9 501**	**977**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**	**100,0**

4.6.1 Causes of death among stillbirths

Table 4.5 shows the distribution of stillbirths by main cause of death and broad underlying cause of death. The applicable main groups of causes of death for 2011, 2012 and 2013 were:

i. Pregnancy, childbirth and puerperium (O00-O99)

ii. Certain conditions originating in the perinatal period (P00-P96)

iii. Congenital malformations (Q00-Q99)

However, there was only one case for the main group *pregnancy, childbirth and puerperium* which was in 2012 that was death due to *failed attempted abortion*. For the three-year period, the highest proportion of deaths was due to *certain conditions originating in the perinatal period,* which accounted for 97% of stillbirths for all the three years, while congenital malformations accounted for 3% of stillbirths for each year.

Table 4.5: Number and percentage distribution of stillbirths by main and broad groups of underlying causes, 2011−2013

Main groups of underlying causes	Broad groups of underlying causes	Year of death					
		Number			Percentage		
		2011	2012	2013	2011	2012	2013
Pregnancy, childbirth and puerperium (O00-O99)	Pregnancy with abortive outcome (O00-O08)		1		0,0	0,0	0,0
Certain conditions originating in the perinatal period (P00-P96)	Foetus and newborn affected by maternal factors and by complications of pregnancy, labour and delivery (P00-P04)	2 894	3 338	3 494	20,4	22,8	23,9
	Disorders related to length of gestation and foetal growth (P05-P08)	776	729	707	5,5	5,0	4,8
	Respiratory and cardiovascular disorders specific to the perinatal period (P20-P29)	572	602	573	4,0	4,1	3,9
	Infections specific to the perinatal period (P35-P39)	9	10	8	0,1	0,1	0,1
	Haemorrhagic and haematological disorders of foetus and newborn (P50-P61)	24	40	18	0,2	0,3	0,1
	Transitory endocrine and metabolic disorders specific to foetus and newborn (P70-P74)	33	33	30	0,2	0,3	0,3
	Digestive system disorders of foetus and newborn (P75-P78)	3	5	2	0,0	0,0	0,0
	Conditions involving the integument and temperature regulation of foetus and newborn (P80-P83)	13	17	13	0,1	0,1	0,1
	Other disorders originating in the perinatal period (P90-P96)	9 591	9 500	9 388	67,5	64,8	64,3
Congenital malformations (Q00-Q99)	Congenital malformations of the nervous system (Q00-Q07)	67	95	87	0,5	0,6	0,6
	Congenital malformations of eye, ear, face and neck (Q10-Q18)	2	1	6	0,0	0,0	0,0
	Congenital malformations of the circulatory system (Q20-Q28)	23	32	22	0,2	0,2	0,2
	Congenital malformations of the respiratory system (Q30-Q34)	4	7	8	0,0	0,0	0,1
	Cleft lip and cleft palate (Q35-Q37)	2	0	2	0,0	0,0	0,0
	Other congenital malformations of the digestive system (Q38-Q45)	1	5	5	0,0	0,0	0,0
	Congenital malformations of the urinary system (Q60-Q64)	2	3	4	0,0	0,0	0,0
	Congenital malformations and deformations of the musculoskeletal system (Q65-Q79)	13	15	18	0,0	0,1	0,1
	Other congenital malformations (Q80-Q89)	160	198	185	1,1	1,4	1,3
	Chromosomal abnormalities, not elsewhere classified (Q90-Q99)	23	32	34	0,2	0,2	0,2
Total		**14 212**	**14 664**	**14 604**	**100**	**100,0**	**100,0**

Due to the high proportion of stillbirths which accounted for the main group *certain conditions originating in the perinatal period*, it was then investigated further and the broad groups of underlying causes and individual underlying causes were analysed. Table 4.6 shows the distribution of the main group *certain conditions originating in the perinatal period* by broad age groups, individual underlying causes and year of death. Almost two-thirds (68.9% in 2011; 66.5% in 2012 and 65.9% in 2013) of deaths emanating from the main group *certain conditions originating in the perinatal period* were due to the underlying cause *foetal death of unspecified cause* for each of the three years.

The second most frequently reported underlying cause of death for the main group *certain conditions originating in the perinatal period*, was *foetus and newborn affected by maternal conditions that may be unrelated to present pregnancy* responsible for 9,3% in 2011; 11,6% in 2012 and 11,9% in 2013 within this main group.

Table 4.6: Number and percentage distribution of broad groups of underlying causes by underlying causes of death for stillbirths, 2011−2013

Broad groups of underlying causes	Underlying cause of death	Year of death					
		Number			Percentage		
		2011	2012	2013	2011	2012	2013
Foetus and newborn affected by maternal factors and by complications of pregnancy, labour and delivery (P00-P04)	Foetus and newborn affected by maternal conditions that may be unrelated to present pregnancy (P00)	1 293	1 649	1 698	9,3	11,6	11,9
	Foetus and newborn affected by maternal complications of pregnancy (P01)	232	192	240	1,7	1,3	1,7
	Foetus and newborn affected by complications of placenta, cord and membranes (P02)	1 256	1 336	1 403	9,0	9,4	9,9
	Foetus and newborn affected by other complications of labour and delivery (P03)	112	158	141	0,8	1,1	1,0
	Foetus and newborn affected by noxious influences transmitted via placenta or breast milk (P04)	1	3	12	0,0	0,0	0,1
Disorders related to length of gestation and foetal growth (P05-P08)	Slow foetal growth and foetal malnutrition (P05)	20	19	18	0,2	0,2	0,1
	Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	756	710	689	5,4	5,0	4,8
Respiratory and cardiovascular disorders specific to the perinatal period (P20-P29)	Intrauterine hypoxia (P20)	523	541	528	3,8	3,9	3,9
	Neonatal aspiration syndromes (P24)			1	0,0	0,0	0,0
	Interstitial emphysema and related conditions originating in the perinatal period (P25)	4	6	8	0,0	0,0	0,1
	Pulmonary haemorrhage originating in the perinatal period (P26)	7	2	8	0,1	0,0	0,1
	Chronic respiratory disease originating in the perinatal period (P27)	1	3	2	0,0	0,0	0,0
	Cardiovascular disorders originating in the perinatal period (P29)	37	50	26	0,3	0,4	0,2
Infections specific to the perinatal period (P35-P39)	Congenital viral diseases (P35)	1			0,0	0,0	0,0
	Bacterial sepsis of newborn (P36)			1	0,0	0,0	0,0
	Other congenital infectious and parasitic diseases (P37)		3	1	0,0	0,0	0,0
	Other infections specific to the perinatal period (P39)	8	7	6	0,1	0,0	0,0
Haemorrhagic and haematological disorders of foetus and newborn (P50-P61)	Foetal blood loss (P50)	2	1	1	0,0	0,0	0,0
	Umbilical haemorrhage of newborn (P51)		1		0,0	0,0	0,0
	Intracranial nontraumatic haemorrhage of foetus and newborn (P52)	5	6	4	0,0	0,0	0,0
	Haemorrhagic disease of foetus and newborn (P53)	1			0,0	0,0	0,0
	Other neonatal haemorrhages (P54)	1		2	0,0	0,0	0,0
	Haemolytic disease of foetus and newborn (P55)	2	14	5	0,0	0,1	0,0
	Kernicterus (P57)	1		2	0,0	0,0	0,0
	Disseminated intravascular coagulation of foetus and newborn (P60)	1	4		0,0	0,0	0,0
	Other perinatal haematological disorders (P61)	11	14	4	0,1	0,1	0,0
Transitory endocrine and metabolic disorders specific to foetus and newborn (P70-P74)	Transitory disorders of carbohydrate metabolism specific to foetus and newborn (P70)	33	33	30	0,2	0,2	0,2
Digestive system disorders of fetus and newborn (P75-P78)	Necrotizing enterocolitis of foetus and newborn (P77)	3	5	2	0,0	0,0	0,0
Conditions involving the integument and temperature regulation of foetus and newborn (P80-P83)	Other conditions of integument specific to foetus and newborn (P83)	13	17	13	0,1	0,1	0,1
Other disorders originating in the perinatal period (P90-P96)	Reactions and intoxications due to drugs administered to foetus and newborn (P93)	5	8	3	0,0	0,1	0,0
	Foetal death of unspecified cause (P95)	9 586	9 492	9 385	68,9	66,5	65,9
Total		**13 915**	**14 274**	**14 233**	**100,0**	**100,0**	**100,0**

4.6.2 Causes of early neonatal deaths

Table 4.7 shows the age differences in the ranking of the ten leading underlying causes of death for 2011–2013 for early neonatal deaths. *Respiratory and cardiovascular disorders specific to the perinatal period* was the leading cause of death in all age groups for each of the three years. For each of the three years, the ten leading causes of death differed greatly in ranking and also in proportions by age. In 2013, *disorders related to length of gestation and foetal growth* was the second leading cause of death for all the three age groups while the third leading cause of death for neonates aged under 1 hour was *foetus and newborn affected by maternal factors and by complications of, labour and delivery* responsible for 14,3% of early neonatal deaths which was ranked fourth and fifth respectively for those aged 1–23 hours and 24–167 hours. *Disorders related to length of gestation and foetal growth* moved from the fourth rank in 2011 for neonates aged less than one hour to the second rank in 2013 for the same age group.

Foetus and newborn affected by maternal factors and by complications of, labour and delivery which is mainly associated with antepartum infections maintained its rank as the third leading cause of death for neonates aged less than one hour. It also maintained the same rank for those aged 1–23 hours and 24–167 hours as the fourth and fifth leading cause of early neonatal death respectively from 2012.

For the ten leading causes of death for perinatal deaths by population group please refer to Appendix A.

Table 4.7: The ten leading underlying natural causes of death for early neonates, 2011−2013

Causes of death (based on ICD-10)	2011									2012									2013								
	Under 1 hour			1–23 hours			24–167 hours			Under 1 hour			1–23 hours			24–167 hours			Under 1 hour			1–23 hours			24–167 hours		
	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%
Respiratory and cardiovascular disorders specific to the perinatal period (P20-P29)	1	544	30,5	1	706	44,8	1	1 973	41,8	1	364	32,0	1	1 044	40,4	1	1 917	40,1	1	71	36,2	1	983	37,8	1	1 827	38,7
Disorders related to length of gestation and foetal growth (P05-P08)	4	209	11,7	2	276	17,5	2	594	12,6	4	146	12,8	2	382	14,8	2	596	12,5	2	30	15,3	2	463	17,8	2	652	13,8
Foetus and newborn affected by maternal factors and by complications of , labour and delivery (P00-P04)	3	257	14,4	4	172	10,9	5	253	5,4	3	149	13,1	4	335	13,0	5	284	5,9	3	28	14,3	4	343	13,2	5	360	7,6
Other disorders originating in the perinatal period (P90-P96)	2	333	18,7	3	208	13,2	3	588	12,5	2	170	14,9	3	347	13,4	3	534	11,2	4	22	11,2	3	362	13,9	3	504	10,7
Other congenital malformations (Q80-Q89)	6	65	3,6	5	49	3,1	7	97	2,1	6	32	2,8	6	82	3,2	8	104	2,2	5	15	7,7	5	98	3,8	8	103	2,2
Congenital malformations of the nervous system (Q00-Q07)	...	...	...	9	12	0,8	...	...	...	10	15	1,3	9	27	1,0	...	...	...	6	6	3,1	8	33	1,3	...	...	...
Infections specific to the perinatal period (P35-P39)	5	73	4,1	6	34	2,2	4	504	10,7	5	63	5,5	5	93	3,6	4	498	10,4	7	3	1,5	6	74	2,8	4	454	9,6
Congenital malformations of the circulatory system (Q20-Q28)	...	...	...	8	13	0,8	9	69	1,5	...	...	...	...	...	...	9	83	1,7	7	3	1,5	...	...	...	9	83	1,8
Haemorrhagic and haematological disorders of foetus and newborn (P50-P61)	8	26	1,5	7	23	1,5	6	220	4,7	7	24	2,1	7	42	1,6	6	232	4,9	9	2	1,0	7	41	1,6	6	249	5,3
Conditions involving the integument and temperature regulation of foetus and newborn (P80-P83)	10	20	1,1	10	9	0,6	...	...	...	...	...	...	8	28	1,1	...	...	...	9	2	1,0	9	29	1,1	...	...	...
Chromosomal abnormalities, not elsewhere classified (Q90-Q99)	7	31	1,7	...	...	...	10	39	0,8	...	...	...	...	...	...	...	...	...	...	...	...	10	24	0,9	10	51	1,1
Digestive system disorders of foetus and newborn (P75-P78)	9	21	1,2	...	...	...	8	93	2,0	8	21	1,8	10	24	0,9	7	120	2,5	...	...	...	...	...	...	7	104	2,2
Other viral diseases (B25-B34)	...	...	...	...	...	...	...	...	...	9	20	1,8	...	...	...	10	54	1,1	...	...	...	...	...	...	...	...	...
Other natural causes		152	8,6		62	3,8		239	4,9		94	8,3		153	5,8		319	6,6		13	6,7		138	5,3		301	6,4
Non natural causes		52	2,9		13	0,8		49	1,0		41	3,6		25	1,2		42	0,9		1	0,5		13	0,5		27	0,6
All causes		**1 783**	**100**		**1 577**	**100**		**4 718**	**100**		**1 139**	**100**		**2 582**	**100**		**4 783**	**100**		**196**	**100**		**2 601**	**100**		**4 715**	**100**

Concluding remarks

This statistical release presented information on perinatal deaths in South Africa for the years 2011, 2012 and 2013, based on data from the South African civil registration system maintained by the DHA. Overall, the number of perinatal deaths increased consistently from 13 020 in 1997 to a high of 25 287 in 2009, after which there was no consistent pattern. The results showed that the number of perinatal deaths that occurred and were registered at the DHA were 22 290 in 2011.This number increased to 23 167 in 2012 and thereafter decreased to 22 116 in 2013, which was a decline of 0,05 percentage points from the perinatal deaths that occurred in 2012. The distribution of perinatal deaths between 1997 and 2013 showed that the number of stillbirths was higher than the number of early neonatal deaths for all other years with the exception of 1997 and 1998.

In 2011, stillbirths accounted for 63,8% of all perinatal deaths while early neonatal deaths accounted for 36,2% of all perinatal deaths. The proportion of stillbirths increased to 66,0% in 2013 whereas early neonatal deaths decreased to 34,0% of all perinatal deaths. Overall, there were 22 perinatal deaths per 1 000 total births in 2011; 21 perinatal deaths per 1 000 total births in 2012; and 25 perinatal deaths per 1 000 total births in 2013. Further analysis of perinatal deaths by its sub-categories: early neonatal mortality and stillbirths, showed that early neonatal death rate was eight early neonatal deaths per 1000 total births in 2011 and 2012, with a peak of nine early neonatal deaths per 1 000 total births in 2013. The stillbirth rate increased from 14 stillbirths per 1 000 total births in 2011 to 17 stillbirths per 1 000 total births in 2013.

Differentials in perinatal mortality by sex from 2011 to 2013 showed that there were more male perinatal deaths than female perinatal deaths. In 2011, the proportion of male perinatal deaths (54,8%) exceeded the proportion of female perinatal deaths (45,2%). The gap in the proportion of male and female perinatal deaths widened slightly in 2013, with the former accounting for 55,1% of perinatal deaths and the latter accounting for 44,9% of perinatal deaths. Variations in perinatal deaths by province revealed that over the three-year period (2011−2013), Gauteng and KwaZulu-Natal had the highest percentages of perinatal deaths. The distribution of registered perinatal deaths throughout the three-year period indicated that the black Africans population group contributed higher percentages to the total number of perinatal deaths (over 75%).

The distribution of early neonatal deaths for each of the three years indicated that more than 50% of the early neonatal deaths occurred between 24 hours and 167 hours (1−7 days) after birth. On the one hand, the proportion of early neonatal deaths occurring before one hour of birth decreased from 22,1% in 2011 to 2,6% in 2013. On the other hand, the proportion of early neonatal deaths occurring between one hour of birth and 23 hours increased from 19,5% in 2011 to 34,6% in 2013. With regard to stillbirths, 15,1% of foetal deaths had an extremely very low birth weight, weighing less than 1 000 grams in 2011 and this percentage increased to 18,7% in 2013. Foetuses of very low birth weight (from 1 000 grams but less than 1 500 grams) accounted for 13,6% and 13,7% of stillbirths in 2011 and 2013, respectively. About 21,0% of foetal deaths had low birth weight (from 1 500 grams but less than 2 500 grams) and this percentage increased to 21,6% in 2013. Approximately 19,2% of stillbirths weighed 2 500 grams and above at delivery for both 2011 and 2013 stillbirths.

During the years 2011 to 2013, *foetus and newborn affected by maternal factors and by complications of pregnancy, labour and delivery* was attributed as an underlying cause for 20,8% of stillbirths in 2011, increasing to 24,5% of stillbirths in 2013. *Disorders related to length of gestation and foetal growth* were responsible for 5,6% of all stillbirths in 2011 and 5,0% of all stillbirths in 2013. *Respiratory and cardiovascular disorders specific to the perinatal period* were responsible for 4,1% and 4,0% of stillbirths in 2011 and 2013; respectively.

With regard to early neonatal deaths, *respiratory and cardiovascular disorders specific to the perinatal period* was the first leading cause of death in all age groups for the years 2011 to 2013.Over the same period, the second leading cause of death for age groups 1−23 hours and 24−167 hours was *disorders related to length of gestation and foetal growth. Disorders related to length of gestation and foetal growth* moved from the fourth rank in 2011 and 2012 for neonates aged less than one hour to the second rank in 2013.

Foetus and newborn affected by maternal factors and by complications of, labour and delivery which are mainly associated with intrapartum infections maintained their rank as the third leading cause of death for neonates aged less than one hour.

The evaluation of the quality and completeness of perinatal deaths data is essential for initiatives aimed at preventing perinatal deaths. Another benefit conferred by quality data on perinatal deaths is that not only do they give information on stillbirths and early neonatal deaths, but they also reflect the state of health of pregnant women, women delivering stillbirths and newborns that die. The underlying causes for both stillbirths and early neonatal deaths showed that mortality during the perinatal period can be reduced by effective and efficient care during pregnancy and special efforts such as warmth and hygiene to ensure that newborns survive the critical first seven days of life. Notwithstanding that approximately 70% of perinatal deaths that occurred between 2011 and 2013 took place in a health institution, as such increasing the likelihood of sufficient information on the underlying causes of death a quarter of perinatal deaths had institution of death occurrence not specified. Accordingly, concerted efforts are needed to improve the quality of perinatal deaths data as more than half of the information had unspecified method of ascertainment.

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Appendix A1. The ten leading underlying natural causes of perinatal deaths by population group, 2011

Death year	Causes of death based on ICD-10	Black African			White			Indian or Asian			Coloured			Other/Unknown/Unspecified		
		Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%
2011	Other disorders originating in the perinatal period (P90-P96)	1	7 873	47,2	1	155	39,4	1	57	35,6	1	568	47,5	1	2067	53,5
	Respiratory and cardiovascular disorders specific to the perinatal period (P20-P29)	2	2 960	17,7	3	54	13,7	3	29	18,1	3	142	11,9	2	610	15,8
	Fetus and newborn affected by maternal factors and by complications of pregnancy, labour and delivery (P00-P04)	3	2 759	16,5	2	78	19,8	2	30	18,8	2	217	18,1	3	492	12,7
	Disorders related to length of gestation and fetal growth (P05-P08)	4	1 358	8,1	4	28	7,1	4	10	6,3	4	128	10,7	4	331	8,6
	Infections specific to the perinatal period (P35-P39)	5	461	2,8	5	15	3,8	5	7	4,4	5	37	3,1	5	100	2,6
	Other congenital malformations (Q80-Q89)	6	289	1,7	8	9	2,3	6	6	3,8	6	21	1,8	7	46	1,2
	Haemorrhagic and haematological disorders of fetus and newborn (P50-P61)	7	207	1,2	6	10	2,5	…	…	…	7	18	1,5	6	53	1,4
	Digestive system disorders of fetus and newborn (P75-P78)	8	96	0,6	…	…	…	10	2	1,3	9	7	0,6	10	18	0,5
	Congenital malformations of the nervous system (Q00-Q07)	9	95	0,6	9	8	2,0	…	…	…	…	…	…	9	19	0,5
	Congenital malformations of the circulatory system (Q20-Q28)	10	78	0,5	7	9	2,3	…	…	…	8	10	0,8	8	21	0,5
	Chromosomal abnormalities, not elsewhere classified (Q90-Q99)	…	…	…	10	7	1,8	7	6	3,8	10	7	0,6	…	…	…
	Haemorrhagic and haematological disorders of fetus and newborn (P50-P61)	…	…	…	…	…	…	8	5	3,1	…	…	…	…	…	…
	Transitory endocrine and metabolic disorders specific to fetus and newborn (P70-P74)	…	…	…	…	…	…	9	2	1,3	…	…	…	…	…	…
	Other natural causes		440	2,6		16	4,1					38	3,2		81	2,1
	Non-natural causes		62	0,4		4	1,0					3	0,3		25	0,6
	All causes		**16 678**	**100,0**		**393**	**100,0**		**160**	**100,0**		**1 196**	**100,0**		**3 863**	**100,0**

Appendix A2. The ten leading underlying natural causes of perinatal deaths by population group, 2012

Death year	Causes of death based on ICD-10	Black African			White			Indian or Asian			Coloured			Other/Unknown/Unspecified		
		Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%
2012	Other disorders originating in the perinatal period (P90-P96)	1	7 682	44,4	1	138	40,7	1	73	39,2	1	561	41,8	1	2 097	52,4
	Fetus and newborn affected by maternal factors and by complications of pregnancy, labour and delivery (P00-P04)	2	3 172	18,3	2	67	19,8	2	32	17,2	2	284	21,2	3	551	13,8
	Respiratory and cardiovascular disorders specific to the perinatal period (P20-P29)	3	3 028	17,5	3	47	13,9	3	30	16,1	3	169	12,6	2	653	16,3
	Disorders related to length of gestation and fetal growth (P05-P08)	4	1 373	7,9	4	16	4,7	4	20	10,8	4	156	11,6	4	288	7,2
	Infections specific to the perinatal period (P35-P39)	5	509	2,9	5	13	3,8	10	3	1,6	5	33	2,5	5	106	2,6
	Other congenital malformations (Q80-Q89)	6	316	1,8	8	8	2,4	7	5	2,7	6	33	2,5	6	54	1,3
	Haemorrhagic and haematological disorders of fetus and newborn (P50-P61)	7	259	1,5	7	8	2,4	5	5	2,7	8	15	1,1	7	51	1,3
	Congenital malformations of the nervous system (Q00-Q07)	8	135	0,8	10	4	1,2	6	5	2,7	10	15	1,1	10	26	0,6
	Digestive system disorders of fetus and newborn (P75-P78)	9	122	0,7	…	…	…	…	…	…	9	15	1,1	8	32	0,8
	Congenital malformations of the circulatory system (Q20-Q28)	10	90	0,5	6	12	3,5	8	4	2,2	…	…	…	9	27	0,7
	Congenital malformations and deformations of the musculoskeletal system (Q65-Q79)	…	…	…	9	7	2,1	9	4	2,2	7	16	1,2	…	…	…
	Other natural causes		521	3,0		19	5,6		5	2,7		40	3,0		105	2,6
	Non-natural causes		90	0,5			0,0		0	0,0		4	0,3		14	0,3
	All causes		**17 297**	**100,0**		**339**	**100,0**		**186**	**100,0**		**1 341**	**100,0**		**4 004**	**100,0**

Appendix A3. The ten leading underlying natural causes of perinatal deaths by population group, 2013

Death year	Causes of death based on ICD-10	Black African			White			Indian or Asian			Coloured			Other/Unknown/Unspecified		
		Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%	Rank	No.	%
2013	Other disorders originating in the perinatal period (P90-P96)	1	8 169	45,5	1	136	39,8	1	54	36,2	1	500	42,1	1	1 417	56,6
	Fetus and newborn affected by maternal factors and by complications of pregnancy, labour and delivery (P00-P04)	2	3 479	19,4	2	70	20,5	3	21	14,1	2	256	21,6	2	399	15,9
	Respiratory and cardiovascular disorders specific to the perinatal period (P20-P29)	3	2 938	16,4	3	53	15,5	2	26	17,4	4	148	12,5	3	289	11,6
	Disorders related to length of gestation and fetal growth (P05-P08)	4	1 477	8,2	4	18	5,3	4	20	13,4	3	160	13,5	4	177	7,1
	Infections specific to the perinatal period (P35-P39)	5	452	2,5	8	6	1,8	5	5	3,4	5	29	2,4	5	47	1,9
	Other congenital malformations (Q80-Q89)	6	336	1,9	5	13	3,8	9	3	2,0	6	18	1,5	6	31	1,2
	Haemorrhagic and haematological disorders of fetus and newborn (P50-P61)	7	261	1,5	9	6	1,8	6	5	3,4	7	14	1,2	7	24	1,0
	Congenital malformations of the nervous system (Q00-Q07)	8	129	0,7	…	…	…	7	5	3,4	10	7	0,6	8	17	0,7
	Digestive system disorders of fetus and newborn (P75-P78)	9	103	0,6	…	…	…	…	…	…	…	…	…	9	14	0,6
	Congenital malformations of the circulatory system (Q20-Q28)	10	91	0,5	6	10	2,9	8	3	2,0	8	13	1,1	10	11	0,4
	Chromosomal abnormalities, not elsewhere classified (Q90-Q99)	…	…	…	7	9	2,6	…	…	…	9	8	0,7	…	…	…
	Congenital malformations and deformations of the musculoskeletal system (Q65-Q79)	…	…	…	10	6	1,8	…	…	…	…	…	…	…	…	…
	Congenital malformations of the urinary system (Q60-Q64)	…	…	…	…	…	…	10	2	1,3	…	…	…	…	…	…
	Other natural causes		467	2,6		15	4,4		5	3,4		32	2,7		71	2,8
	Non-natural causes		34	0,2		0	0,0		0	0,0		2	0,2		5	0,2
	All causes		**17 936**	**100,0**		**342**	**100,0**		**149**	**100,0**		**1 187**	**100,0**		**2 502**	**100,0**

Explanatory notes

Definitions of concepts used

1.1 Death

The permanent disappearance of all evidence of life at any time after a live birth has taken place (definition excludes foetal deaths)

1.2 Stillbirth or foetal death

The intra-uterine death of a foetus, of at least 26 weeks of gestation that showed no sign of life after complete expulsion or extraction from its mother's womb. The death is indicated by the fact that after such separation, the foetus does not breathe or show any other evidence of life, such as beating of the heart, pulsation of the umbilical cord or definite movement of voluntary muscles.

1.3 Early neonatal death

The death of a live-born infant during the first 7 completed days of life.

1.4 Perinatal death

Perinatal deaths are a combination of foetuses that are born dead **(stillbirths)** and infants that die within the first week after live birth **(early neonatal deaths).**

1.5 Neonatal death

The death of a live-born infant during the first 28 completed days of life.