MANCHESTER CHILD DEATH OVERVIEW PANEL (CDOP)

2020/2021 ANNUAL REPORT

1 April 2020 – 31 March 2021

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Manchester Safeguarding Partnership

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1. WELCOME & INTRODUCTION

Welcome to the 2020/21 Manchester Child Death Overview Panel (CDOP) Annual Report which covers a period dominated by the COVID-19 pandemic, that affected society and service provision in a way never before encountered. Following the publication of the HM Government Child Death Review: Statutory and Operational Guidance (England) in October 2018, changes were introduced to build on the interface between the hospital/community led mortality reviews (Child Death Mortality Reviews (CDRM)) and the final CDOP review. The improvements to the revised child death review process, aim to deliver a joined up whole system approach. However, the impact of these changes resulted in a reduction in the number of cases reviewed by the CDOP. During 2020/21 there were 52 child death notifications reported to the Manchester CDOP, with a 5-year average for 2016/21 of 60 notifications per year. A further reduction in the cases reviewed during 2020/21 (29) in comparison to 2019/20 (41), was exacerbated by the impact of COVID-19 across public sector service provision.

The CDOP has a statutory requirement to prepare and publish a local report on:

a) what has been done as a result of the child death review arrangements; and
b) how effective the child death review arrangements are in practice.

The CDOP Annual Report is produced to advise Child Death Review (CDR) Partners on local patterns and trends in child deaths, any lessons learnt, and actions taken, and the effectiveness of the wider child death review process. This report reviews the deaths of children normally resident in the area of Manchester, aged 0-17 years of age (excluding stillbirths and legal terminations of pregnancy) and focuses on the analysis of the number of cases closed between 1 April 2020 to 31 March 2021 (2020/21). Reporting on cases closed provides a full and complete data set, including the outcome of the final CDOP review. The richness of the data and information collated assists in the identification of factors antenatally, postnatally and throughout the child's life. This report aims to highlight relevant factors and modifiable factors that are likely to contribute to Manchester's infant (under one year of age) and child (age 1-17 years) mortality rate.

The Greater Manchester (GM) CDOP Network is made up of the four CDOPs (ten local authorities) across the GM footprint:

- Manchester CDOP
- Bury, Rochdale & Oldham CDOP
- Bolton, Salford & Wigan CDOP
- Tameside, Trafford & Stockport CDOP

The GM CDOP Network focuses on ensuring a consistent GM approach is adopted, with the aim of establishing an efficient child death review process, whilst maintaining the day to day business of the CDOP. The Manchester CDOP continues to work closely with neighbouring GM CDOPs to deliver a standardised approach when reviewing child deaths to identify patterns and trends across GM.

I would like to thank those who have contributed to the child death review process including CDOP members, practitioners completing data returns and colleagues that have contributed to the content of this report.

Barry Gillespie
Consultant in Public Health
Manchester Child Death Overview Panel Chair

2. THE CHILD DEATH REVIEW PROCESS

In line with Working Together to Safeguarding Children (2006)[1], the Child Death Overview Panel (CDOP) became a statutory function from 1 April 2008. Local Safeguarding Children Boards (LSCBs) were tasked with establishing a multi-disciplinary CDOP Subgroup to conduct a review into the death of all children 0-17 years of age, normally resident in their geographical area.

In October 2018, HM Government published the revised Child Death Review: Statutory and Operational Guidance (England)[2] for Clinical Commissioning Groups and Local Authorities as Child Death Review Partners (CDR Partners). CDR Partners are identified as Local Authorities and any Clinical Commissioning Groups for the local area as set out in the Children and Social Work Act 2017[3]. The guidance sets out the full process that follows the death of a child, who is normally resident in England and builds on the statutory requirements set out in Working Together to Safeguard Children (2018)[4]. The revised guidance clarifies how individual professionals and organisations across all sectors, involved in the child death review process, contribute to reviews in order to improve the experience of bereaved families and professionals involved in caring for children.

The publication of the revised guidance prompted significant changes to the way in which child deaths are reviewed. These changes include the expansion of the Department of Health and Social Care (DHSC) CDR dataset, the national templates used to collate information following a child death, the introduction of the Child Death Review Meeting (CDRM) and the implementation of local data management systems (eCDOP) to coincide with the National Child Mortality Database (NCMD).

2.1 DEPARTMENT OF HEALTH AND SOCIAL CARE (DHSC)

The DHSC have amended the data entry fields and national templates[5] used by CDOPs, to collate information following a child death. Year on year, the CDR dataset expands to collate multi-agency information to support CDOPs assess the causes of a child's death as part of the child death review process. Depending on the nature of the death, various templates are used to gather information regarding the circumstances leading to death, any underlying health conditions, the child's social and physical environment and details relating to service provision.

- A. Child death notification form
- B. Child death reporting form
- C. Child death analysis form

Supplementary Reporting Forms:

- Asthma and anaphylaxis
- Cardiac congenital or acquired
- Care pathway
- Chromosomal, genetic, or congenital anomaly excluding cardiac conditions
- Death as a result of fire, burns or electrocution
- Death of a child with an oncology condition
- Death as a result of injuries sustained from a falling object
- Death of a child with a life-limiting condition
- Deaths on a neonatal unit, delivery suite or labour ward

[1] https://webarchive.nationalarchives.gov.uk/20100408113130/http://www.dcsf.gov.uk/everychildmatters/resources-and-practice/IG00060/
[2] https://www.gov.uk/government/publications/child-death-review-statutory-and-operational-guidance-england
[3] https://www.legislation.gov.uk/ukpga/2017/16/part/1/chapter/2/crossheading/child-death-reviews/enacted
[4] https://www.gov.uk/government/publications/working-together-to-safeguard-children--2
[5] Child death reviews: forms for reporting child deaths - GOV.UK (www.gov.uk)

- Diabetic ketoacidosis
- Drowning
- Epilepsy
- Falls
- Infection
- Poisoning
- Sudden unexpected deaths
- Suicide or self-harm including alcohol or substance abuse
- Trauma or external factors
- Vehicle collisions
- Violent or maltreatment-related deaths

The completed forms help CDOPs collect information regarding child deaths in their area in a consistent way, assess the causes of child deaths to see if there are significant similarities between and recommend how to prevent similar deaths in future. CDOP areas were tasked with implementing arrangements to share the results of local CDRs with the NCMD, as a legal statutory requirement. Prior to the 1 April 2021, the DHSC templates were used by the Manchester CDOP to request child death information. As of the 1 April 2021, data is now captured electronically via the Greater Manchester eCDOP system which falls in line with the NCMD legal requirement, to submit CDR data at a national level.

2.2 CHILD DEATH REVIEW MEETING (CDRM)

The Child Death Review Meeting (CDRM) is a multi-professional meeting where all matters relating to an individual child death are discussed by the professionals directly involved in the care of the child during life and any investigation after death. The nature of the meeting varies according to the circumstances of the child's death and the practitioners involved. The CDRM can take place in the form of a final case discussion following a Joint Agency Response (JAR); a perinatal mortality review group meeting in the case of a baby who dies in a neonatal unit; a hospital based mortality review meeting following the death of a child in a paediatric intensive care unit; or similar case discussion.

In all cases, the aims of the CDRM are:

- to review the background history, treatment, and outcomes of investigations, to determine, as far as is possible, the likely cause of death;
- to ascertain contributory and modifiable factors across domains specific to the child, the social and physical environment, and service delivery;
- to describe any learning arising from the death and, where appropriate, to identify any actions that should be taken by any of the organisations involved to improve the safety or welfare of children or the child death review process;
- to review the support provided to the family and to ensure that the family are provided with:
    - the outcomes of any investigation into their child's death;
    - a plain English explanation of why their child died (accepting that sometimes this is not possible even after investigations have been undertaken) and any learning from the review meeting;
- to ensure that the CDOP and, where appropriate, the Coroner is informed of the outcomes of any investigation into the child's death; and
- to review the support provided to staff involved in the care of the child.

Information, reports, and notes of the CDRM are shared with the appropriate CDOP.

2.3 CHILD DEATH OVERVIEW PANEL (CDOP)

CDR Partners have a legal responsibility to ensure that the deaths of children normally resident in their area are reviewed. This function is carried out by the Child Death Overview Panel (CDOP) to ensure that a review is undertaken for all infant/child deaths age 0-17 years, excluding babies who are stillborn, late foetal loss and planned terminations of pregnancy carried out within the law.

In reviewing the death of each child, the CDOP considers relevant factor and modifiable factors in the family environment, parenting capacity and service provision. The CDOP identifies what action could be taken locally, regionally or at a national level with the aim of preventing child deaths and to improve the health and safety of children and young people.

The functions of the CDOP are:

- to collect and collate information about each child death, seeking relevant information from professionals;
- to analyse the information obtained, including the report from the CDRM, in order to confirm or clarify the cause of death, to determine any contributory factors, and to identify learning arising from the child death review process that may prevent future child deaths;
- to make recommendations to all relevant organisations where actions have been identified which may prevent future child deaths or promote the health, safety and well-being of children;
- to notify the Child Safeguarding Practice Review Panel (CSPR) and Local Safeguarding Partnership (LSP) when it suspects that a child may have been abused or neglected;
- to notify the Medical Examiner and the Doctor who certified the cause of death, if it identifies any errors or deficiencies in an individual child's registered cause of death. Any correction to the child's cause of death would only be made following an application for a formal correction;
- to provide specified data to the National Child Mortality Database (NCMD);
- to produce an annual report for child death review partners on local patterns and trends in child deaths, any lessons learnt, and actions taken, and the effectiveness of the wider child death review process; and
- to contribute to local, regional and national initiatives to improve learning from child death reviews, including, where appropriate, approved research carried out within the requirements of data protection.

The Manchester CDOP membership is made up of senior multi-agency professionals who have knowledge and expertise in fields such as public health, children's social care, paediatrics, police, education etc. The panel consists of representation from a range of organisations who can make a valuable contribution when undertaking a child death review. Each professional provides information and advice to enable a thorough review and analysis, with the aim of identifying relevant factors, modifiable factors, and emerging themes.

The purpose of a review and analysis is to identify any matters relating to the death(s), that are relevant to the welfare of children in the area or to public health and safety, to consider whether action should be taken. The aim of the child death review process is to ensure that information is systematically captured for every death to enable learning and prevent future deaths. The CDOP publishes an annual report which provides an overview of local patterns and trends and evidences what has taken place as a result of the child death review arrangements and how effective the arrangements are in practice.

2.4 MANCHESTER CDOP THEMED PANEL MEETINGS

Some child deaths are reviewed at a Themed Panel to discuss a particular cause or group of causes. The Manchester CDOP holds Themed Panel meetings to review perinatal/neonatal deaths (<28 days of life) and infant deaths (under 1 year of age), where the infant was never discharged from hospital. Such arrangements allow for the attendance of appropriate professional experts including the Manchester

University NHS Foundation Trust Consultant Neonatologist and Designated Doctor for Child Death, to inform discussions and allow easier identification of themes. Deaths reviewed at the Themed Panel are pre-screened to highlight any relevant factors and/or modifiable factors during the antenatal/postnatal period, focusing on issues relating to service provision.

2.5 LEARNING DISABILITIES MORTALITY REVIEW (LeDeR) PROGRAMME

Once the Manchester CDOP is notified of the death of a child aged 4-17 years who has learning disabilities, or is very likely to have learning disabilities but not yet had a formal assessment for this, information is shared and the death is reported to the Learning Disabilities Mortality Review (LeDeR) Programme. The Manchester CDOP reports deaths to LeDeR via the online referral form and provides core information about the child which is submitted to the LeDeR Local Area Contact.

Once all investigations have concluded and sufficient information has been collated to ensure the CDOP can undertake a comprehensive review, the Manchester CDOP invites the LeDeR representative to attend the panel meeting at which the death is reviewed. During the CDOP meeting, the LeDeR Local Area Contact may offer advice and expertise about learning disabilities (if appropriate) and ensure that the CDOP provides sufficient core data to support the LeDeR Programme. Once the Manchester CDOP has conducted a review, documentation is submitted to the LeDeR Local Area Contact. This includes the final Analysis Form which highlights the:

- common contributory factors leading to deaths
- factors that may have contributed to the vulnerability, ill health or death of the child
- modifiable factors that may reduce the risk of future child deaths
- learning points and issues identified in the review
- recommendations and actions that may inform and support local, regional or national learning

2.6 GREATER MANCHESTER eCDOP

The software company QES placed a bid for the national tender and was appointed as technical providers to develop and host the NCMD. QES developed a supporting CDOP case management and reporting system known as eCDOP. The eCDOP system operates in line with the statutory guidance to assist CDOPs and ensure compliance. The system is known for improving efficiencies throughout the multi-agency information gathering process.

The eCDOP system automatically transfers multi-agency data at each relevant stage of the process into the NCMD therefore reducing the duplication of data entry. Over 1000 data entry fields auto-populate directly into the NCMD which significantly reduces double data entry and prevents local CDOPs having to do update NCMD records manually. The information is then used to analyse data nationally in order to improve learning and implement strategic improvements in healthcare for children in England, with the overall goal to reduce infant/child mortality.

The four Greater Manchester (GM) CDOPs adopted a collaborative approach and agreed to purchase an eCDOP system that would support the ten GM local authorities. The system went live on 1 April 2021, therefore all child death notifications must be reported electronically via the GM eCDOP system[6], in line with the statutory requirement to notify the CDOP of all child deaths aged 0-17 years of age, within 24 hours (or the next working day) of the child's death.

[6] https://www.manchestersafeguardingpartnership.co.uk/resource/cdop/

2.7 NATIONAL CHILD MORTALITY DATABASE (NCMD)

The National Child Mortality Database (NCMD) is a repository of data relating to all child deaths in England. The NCMD was commissioned by the Healthcare Quality Improvement Partnership (HQIP) on behalf of NHS England and is delivered by the University of Bristol, in collaboration with the University of Oxford, University College London (UCL) Partners and the software company QES. The NCMD enables more detailed analysis and interpretation of all data arising from the child death review process, to ensure that lessons are learned, that learning is widely shared and that actions are taken locally and nationally, to reduce child mortality. The introduction of the NCMD aims to learn lessons that could lead to changes to improve outcomes for children.

As of the 1 April 2019, it became a statutory requirement that CDOPs across England submit data via the NCMD. For every child death, CDR Partners must ensure that:

1. A notification form is completed and sent to the CDOP secretariat or equivalent immediately after the death of a child
2. The details on the notification form are entered onto the NCMD within 24 hours of receipt of the form by the CDOP secretariat or equivalent
3. The CDOP gathers information from all agencies that were involved with the child during their life or after death through completion of a reporting form
4. The CDOP secretariat identifies the most appropriate agency to complete the relevant supplementary reporting forms, depending on the cause of death, and request for that agency to complete the relevant forms
5. When completed, reporting forms and supplementary reporting forms are returned to the CDOP secretariat or equivalent, and information is entered onto the NCMD
6. A local CDRM is convened, to include all professionals that were involved with the child during their life or after death
7. Anonymous versions of the completed CDOP templates (notification form, reporting form, supplementary reporting forms and draft analysis form) are presented to the CDOP, to conduct an independent review of the death
8. Following the CDOP review, the details are entered on the final analysis form and data is submitted to the NCMD.

3. MANCHESTER'S DEMOGRAPHICS

3.1 INDICES OF DEPRIVATION 2019

A key tool used in assessing deprivation is the Indices of Deprivation 2019 that combines data from across seven domains of deprivation to produce an overall relative measure of deprivation:

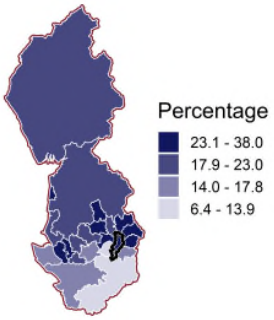
- Income: Measures the proportion of the population experiencing deprivation relating to low income
- Employment: Measures the proportion of the working age population in an area involuntarily excluded from the labour market
- Health Deprivation and Disability: Measures the risk of premature death and the impairment of quality of life through poor physical or mental health
- Education, Skills Training: Measures the lack of attainment and skills in the local population
- Crime: Measures the risk of personal and material victimisation at local level
- Barriers to Housing and Services: Measures the physical and financial accessibility of housing and local services
- Living Environment: Measures the quality of both the indoor and outdoor local environment

Each small area in England is ranked from 1 (most deprived) to 32,844 (least deprived)[7]. According to the 2019 Index of Multiple Deprivation (IMD), as an average score, Manchester ranks 6 out of 326 local authorities in England, 1 being the most deprived.

3.2 MANCHESTER'S CHILD HEALTH PROFILE 2021

The Manchester Child Health Profile 2021[8] provides an annual snapshot of child health across the City. Overall, comparing local indicators with England averages, the health and wellbeing of children in Manchester is worse than England. Children and young people aged 0-19 years account for 25.5% (140,900) of Manchester's total population. Children aged 0-4 years account for 6.7% (37,100) of the total population. Manchester's infant mortality rate of 6.1 per 1,000 live births (2017/19), is worse than the England rate of 3.9, with an average of 45 infants dying before the age of one each year. This is a slight decrease in comparison to previous years (2016/18) where the standardised rate was recorded as 6.4 per 1,000 live births, with an average of 48 infant deaths before the age of one. Manchester's child mortality rate (2017/19) of 16.2 per 100,000 children (aged 1-17 years), is worse than the England rate of 10.8, with an average of 19 child deaths each year. This is a slight decrease in comparison to previous years (2016/18) where the standardised rate was recorded as 18.4 per 100,000 children, with an average of 21 child deaths (aged 1-17 years) each year. 33.6% of Manchester children under 16 years of age are living in poverty in comparison to the England average of 18.4% (2018/19).

Diagram 1: Map of the North West with Manchester outlined, showing the relative levels of children living in poverty.



[7] https://www.gov.uk/government/statistics/english-indices-of-deprivation-2019
[8] https://fingertips.phe.org.uk/profile/child-health-profiles

4. CHILD DEATH NOTIFICATIONS REPORTED TO THE CHILD DEATH OVERVIEW PANEL (CDOP)

There were 52 child death notifications reported to the Manchester CDOP from 1 April 2020 to 31 March 2021 (2020/21). At the end of the CDOP reporting year (31 March 2021) there was a total of 89 cases that remained open pending a CDOP review, 39 of which were historical child death notifications where the death occurred prior to 1 April 2020 and the remaining 50 where the death occurred during 2020/21 period.

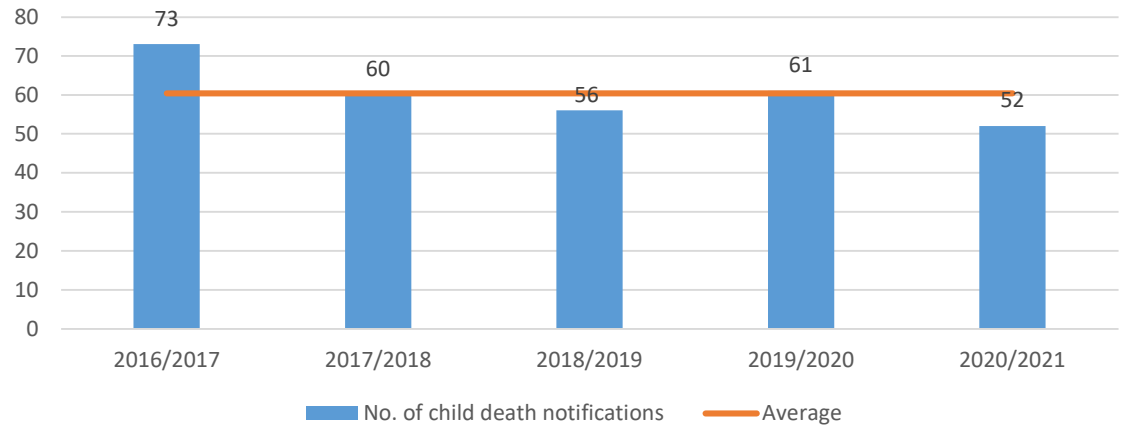
The publication of the revised guidance has had a significant impact in terms of the operational aspects of the CDR process and the development of the new arrangements for CDOPs locally, which is far more complex in comparisons to previous requirements. This has resulted in an increase in case management functions, to ensure statutory requirements are adhered to.

There is a time lapse between a death being reported to the CDOP and the case being discussed and closed at panel. This depends heavily upon the circumstances leading to death, pending CDRMs and, for deaths subject to one or more forms of investigation, the CDOP must await the final conclusion, before conducting a review. Deaths subject to multiple investigations such as internal agency reviews, coronial investigations, criminal proceedings, and child safeguarding practice reviews, can take years before all have concluded and sufficient information is submitted to CDOP.

From 1 April 2016 to 31 March 2021 there were 302 child deaths reported to the Manchester CDOP. There has been a variation in the number of child deaths reported year on year, with an average of 60.4 notifications per year.

The latest Office of National Statistics (ONS) 2019 mid-year estimates[9] projects Manchester's child population (0-17 years) as 122,914, accounting for 22% of Manchester's total population (552,858). With a total of 52 child death notifications reported to the Manchester CDOP during the period 2020/21, this would indicate Manchester's overall child death rate as 4.23 deaths per 10,000 children (aged 0-17 years) which is a slight decrease in comparison to the rate of 4.96, as recorded for 2019/20.

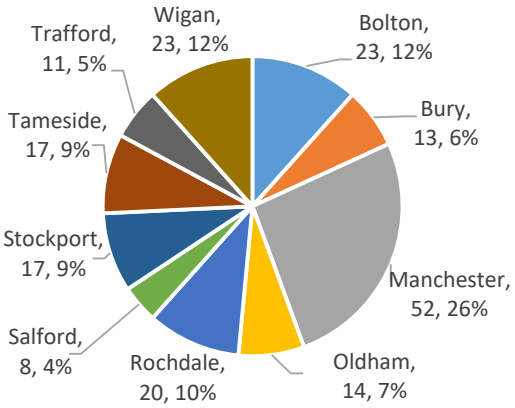
Diagram 2: Number of child deaths reported to the Manchester CDOP per CDOP year (2016/21)



9 https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland

A total of 198 deaths were reported to the four GM CDOPs during 2020/21, of which 26% of the children resided in Manchester City. This is an 18% (42) decrease in GM child deaths, in comparison to the 240 deaths notifications during 2019/20. Since child death records began in the 1980s, there has been a steady reduction in the rate of child death.

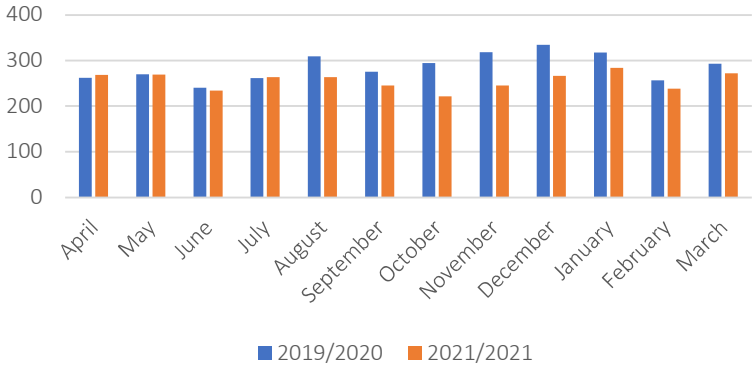
Diagram 3: Number of child deaths reported to GM CDOPs (2020/21)



GM Child Death Overview Panels	No. of child death notifications	
Bolton, Salford & Wigan CDOP	54	27%
Bury, Rochdale & Oldham CDOP	47	24%
Manchester CDOP	52	26%
Tameside, Trafford & Stockport CDOP	45	23%
Total	198	100%

The NCMD Child Death Review Data: Year ending 31 March 2021[10] provides an overview of the national CDR data. The NCMD was notified of 3,068 child deaths in England during 2020/21. In the same period, 2,575 child deaths, some of which occurred during the period or before, were reviewed in detail by local CDOP areas. The data release also covers the first year of the COVID-19 pandemic and shows that an estimated 25 children are likely to have died of COVID-19 infection between 1 March 2020 and 28 February 2021.

Diagram 4: Child death notifications across England, reported to the NCMD, by month (2019/21)



Year of notification to NCMD	* No. of child death notifications
2019/2020	3,429
2020/2021	3,068
Total	6,497

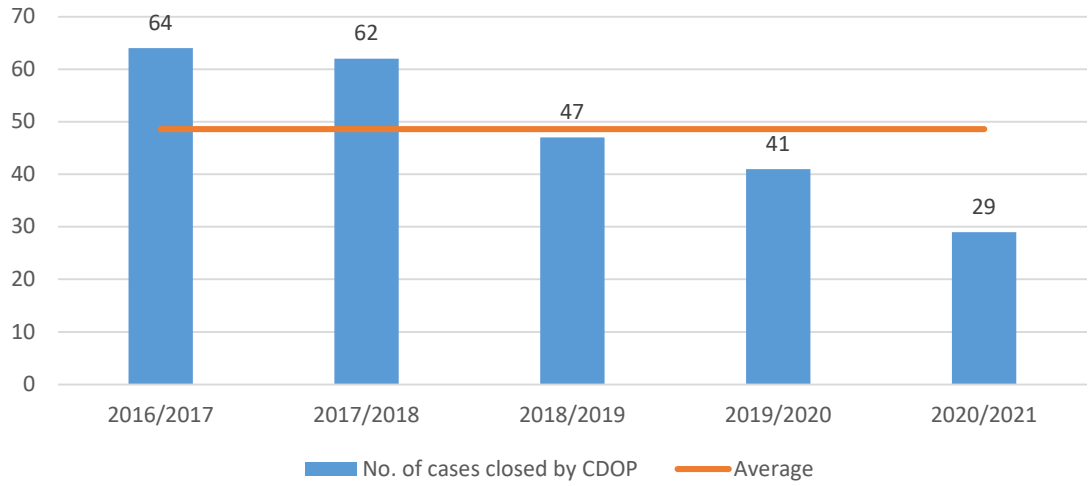
* *Data source: NCMD Child Death Review Data: Year ending 31 March 2021*

[10] https://www.ncmd.info/2021/11/11/child-death-data-release-2021/

5. CASES CLOSED BY THE CHILD DEATH OVERVIEW PANEL (CDOP)

Once the CDRM has taken place, all investigations have concluded and sufficient information has been collated, the CDOP holds the final multi-disciplinary review. Examining deaths using the data of cases discussed and closed at panel, provides a full dataset to conduct analysis. This annual report focuses on data relating to the 29 cases discussed and closed by the CDOP from 1 April 2020 to 31 March 2021 (2020/21). Of the 29 cases closed during 2020/21, 4 (14%) deaths occurred during the same period and the remaining 25 (86%) are historical cases, where the death occurred prior to 1 April 2020. From 1 April 2016 to 31 March 2021, the Manchester CDOP closed a total of 243 cases. Year on year, there has been variations in the number of cases closed by the Manchester CDOP, with an average of 48.6 cases closed per year.

Diagram 5: Number of cases closed by the Manchester CDOP per CDOP year (2016/21)



Following the publication of the revised Child Death Review: Statutory and Operational Guidance (England), it was anticipated that the CDOP would see a decrease in the number of closed cases per year due to additional national requirements. The national changes have drastically impacted upon the level of data as requested by the DHSC, the time taken to process case information and documentation during the CDOP review.

In previous years, the Manchester CDOP conducted timely reviews for expected child deaths, where the death was anticipated within 24 hours due to natural causes such as extreme prematurity and life limiting conditions. The Manchester CDOP operates in line with the current guidance, which stipulates that a CDOP review should not take place until the CDRM has concluded and information is shared for discussion at panel. Whilst the Manchester CDOP welcomes the new standardised approach to CDRMs, this impacts heavily on the timescale in which the panel undertakes a review, therefore resulting in fewer cases closed.

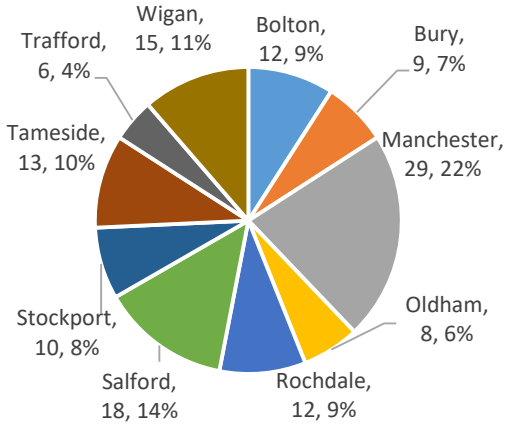
Information submitted following a CDRM is detailed and extremely useful in supporting the Manchester CDOP carry out a thorough review of the death. The CDOP utilises CDRM reports, assessing the care provided, to highlight any issues in relation to service provision such as, the identification of illness, assessment, investigations and diagnosis; treatment or healthcare management; communication or teamwork within or between agencies; and organisational or systemic issues. The Manchester CDOP identifies relevant factors including underlying staffing issues, equipment, work environment,

education and training requirements and documents positive aspects of service delivery to record examples of excellent care.

Whilst the number of child deaths reported to the Manchester CDOP has slightly decreased in comparison to 2019/20 (average of 60.4 notifications per year), it is anticipated that the panel will continue to see a reduction in the number of cases closed over the coming years. It has been recognised by the NCMD programme team that the interface between the CDRM and CDOP process will impact the timescale of completed reviews due to operational aspects of the revised child death review process. The circumstances leading to death and the nature of the death also impact upon the number of cases closed by the CDOP. Deaths where the cause appears to be unnatural, sudden, and unexpected can be subject to multiple investigations that can remain ongoing for a number of years, which impacts on the timeliness of the CDOP review. To undertake a comprehensive review, the Manchester CDOP will await the conclusion of all investigations and once finalised, request copies of reports that document the outcome for consideration at the panel meeting.

The four GM CDOPs discussed and closed 132 cases during the 2020/21 period. This is a significant fall in the number of cases closed in comparison to previous years which reflects the impact of the changes to the national child death review process.

Diagram 6: Number of cases closed by GM CDOPs (2020/21)

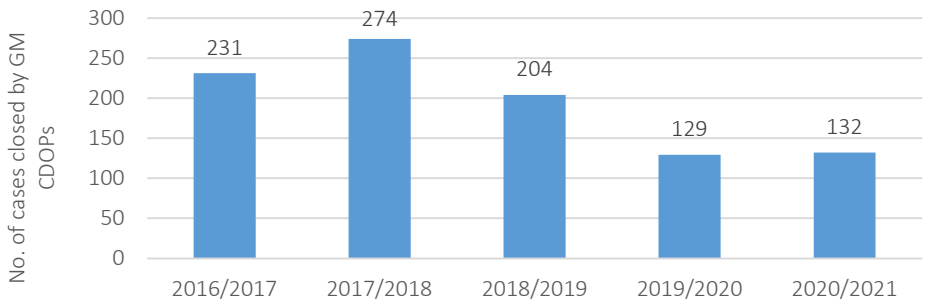


GM Child Death Overview Panels	* No. of case closed	
Bolton, Salford & Wigan CDOP	45	34%
Bury, Rochdale & Oldham CDOP	29	22%
Manchester CDOP	29	22%
Tameside, Trafford & Stockport CDOP	29	22%
Total	132	100%

** Data source: NCMD Quarter 4 2020/21 Monitoring Report*

Owing to changes to the child death review process and additional national requirements, there has been a decrease in the number of closed cases. Overall, there has also been a reduction in the number of child death notifications reported locally, across the GM footprint and nationally.

Diagram 7: Number of cases closed by GM CDOPs (2016/21)



6. A SUMMARY OF 2020/21 CASES CLOSED

6.1 AGE, GENDER & ETHNICITY

Of the 29 cases closed, 13 (45%) children were female and 16 (55%) male. 12 (41%) of the infants were neonatal deaths (<28 days). A further 8 (28%) deaths occurred before the first year of life (28-364 days), accounting for a total of 69% (20) of cases closed. Of the 20 infant deaths (0-364 days), 8 (38%) had one or more modifiable factors identified in the review (see section 6.3).

Diagram 8: Manchester CDOP cases closed by gender and age at time of death (2020/21)

Age Group	No. Cases Closed[11]	
0-27 days	12	41%
28-364 days	8	28%
1-4 years	<5	-
5-9 years	<5	-
10-14 years	<5	-
15-17 years	<5	-
Total	29	100%

Year on year, infants under the age of one account for the majority of cases with modifiable factors, with the most common factors occurring in the antenatal period such as maternal smoking in pregnancy.

Diagram 9: Manchester CDOP cases closed by ethnic grouping (2020/21)

Ethnic Grouping	No. Cases Closed	
Asian or Asian British	9	31%
Black or Black British	<5	-
Mixed	<5	-
Other ethnic group	<5	-
Unknown	<5	-
White	13	45%
Total	29	100%

The largest number of cases closed were recorded in children who were White (13, 45%) and Asian or Asian British (9, 31%). Breaking the data down further into specific ethnicities identifies the largest number of cases closed were children of English/Welsh/Scottish/Northern Irish/British heritage (10, 34%) and child from the Pakistani community (6, 21%). In the previous year 2019/2020, the largest number of deaths was also recorded in children who were White (15, 37%) of English/Welsh/Scottish/Northern Irish/British heritage (12, 29%) and Asian/Asian British children (15, 37%) from the Pakistani community (11, 27%).

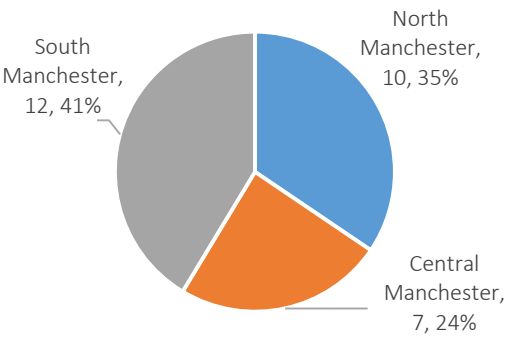
[11] Suppression of data to anonymise statistics: Personal data where the value is less than 5 has been removed (<5/-)

6.2 AREA OF RESIDENCE & DEPRIVATION

The 2019 Index of Multiple Deprivation (IMD), ranked Manchester as 6 out of 326 local authorities in England (where 1 is the most deprived). 33.6% of children (under 16 years of age) in Manchester are living in poverty (2018/19) which is higher than the North West (23.0%) and England (18.4%)[12]. The number of children (under 16 years of age) residing in relative low-income families have increased from 27.1%, 29,510 (2016) to 33%, 37,373 (2018/19). The rate of households with children who are homeless or at risk of homelessness, is higher in Manchester (29.2), in comparison to the England average (14.9) (2019/20).

Within GM, Manchester has the highest proportion of residents (43%) residing in the most deprived 10% of neighbours in England[13]. Across GM, 6 of the 10 local authorities have a higher proportion of their population living in the most deprived areas of the country in comparison to the North West average, with Manchester being the most deprived local authority. All GM local authorities but Trafford have deprivation scores above the national average. This emphasises that deprivation remains a significant public health concern and demonstrates a significant correlation between poverty and child death.

Diagram 10: Area of residence for closed cases by the Manchester CDOP (2020/21)



Of the 29 cases closed, the majority of children resided in areas of deprivation with 83% (24) of families residing in quintile 1 (most deprived). Of the 29 cases closed, 41% (12) of the children resided in south Manchester[14]. Breaking the data down into neighbourhoods identifies Baguley and Cheetham and as having the largest number of deaths, jointing accounting for 28% (8) of the 29 cases closed. Year on year, there continues to be a strong correlation with the higher rate of deaths in areas of deprivation where the Lower Layer Super Output Area (LSOA) are deemed most deprived.

The social deprivation and the increased risk of child death has been highlighted at a national level following the publication of the NCMD Child Mortality and Social Deprivation Report[15]. The report analyses data for children who died during 2019/20 in England and identifies a clear association between the risk of child death and the level of deprivation (for all categories of death except cancer). More specifically, *the report* states that over a fifth of all child deaths might be avoided if children living in the most deprived areas had the same mortality risk as those living in the least deprived – which translates to over 700 fewer children dying per year in England.

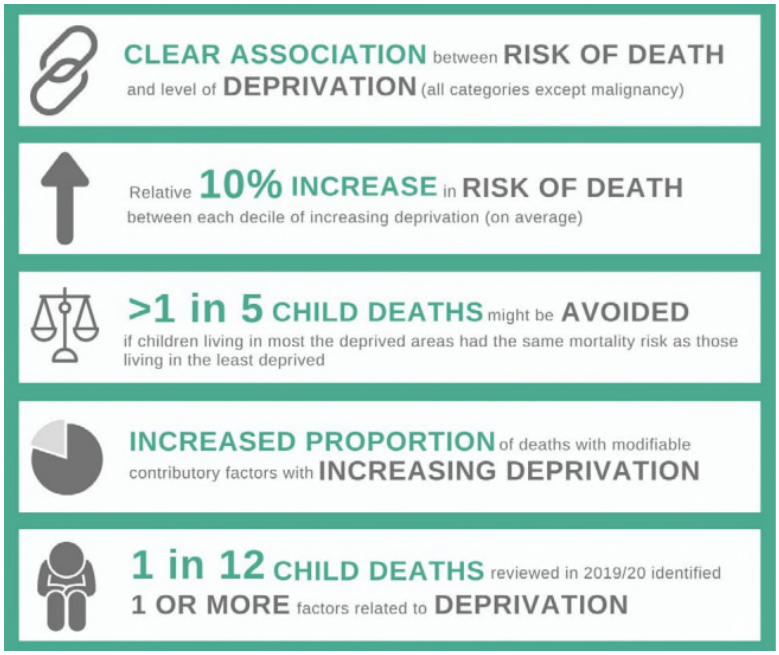
[12] https://fingertips.phe.org.uk/profile/child-health-profiles

[13] https://secure.manchester.gov.uk/downloads/download/414/research_and_intelligence_population_publications_deprivation

[14] https://www.manchesterlco.org/howwework

[15] https://www.ncmd.info/2021/05/13/dep-report-2021/

Diagram 11: NCMD Child Mortality & Social Deprivation Key Findings (2019/20)



The most common age at death was less than 1 year (63%) and more boys than girls died (56.5% vs 43.5%), while the majority of children who died lived in urban areas (87.8%). It was determined that child mortality increased as deprivation increased. More specifically, on average, there was a 10% increase in the risk of death between each decile of increasing deprivation. A total of 2,738 child deaths were reviewed during 2019/2020 by CDOPs in England. Analysis of the data highlights the proportion of deaths with modifiable factors increased with increasing deprivation (factors relating to the social environment were the most common). While, overall, at least 1 in 12 of all child deaths reviewed had one or more factors related to deprivation identified.

The report documented the work of the Manchester CDOP as an exemplar case study, to highlight the value of CDOPs in influencing changes in local and regional policies. The report praised Manchester services and initiatives such as the Manchester reducing infant mortality strategy (2019/24), Vulnerable Babies Service, Baby Clear Programme and ICON Programme.

Professor Sir Michael Marmot FRCP, Director, UCL Institute of Health Equity UCL Dept of Epidemiology and Public Health:

'The harrowing accounts of child loss both illustrate how the causation works and where intervention might have saved lives. The illustration that such intervention is possible is another strength. For example, the Manchester Reducing Infant Mortality Strategy has five priority themes: quality of services, maternal and infant wellbeing, addressing the wider determinants of health, keeping children safe from harm, and providing support for those bereaved by baby loss.'

6.3 RELEVANT FACTORS & MODIFIABLE FACTORS

Information is collated using the Department of Health and Social Care (DHSC) national CDOP reporting forms[16]. Completed forms are presented during the CDOP meeting to assess the death. As part of the child death review process, the CDOP is responsible for analysing information to determine the categorisation of death (see appendix 2), relevant factors and modifiable factors.

Information is collated and categorised using the four domains:

Domain A: Factors intrinsic to the child:

Factors in the child (and in neonatal deaths, in the pregnancy) relating to the child's age, gender and ethnicity; any pre-existing medical conditions, developmental or behavioural issues or disability, and for neonatal deaths, the mother's health and wellbeing.

Domain B: Factors in social environment including family and parenting capacity:

Factors in family structure and functioning and any wider family health issues; provision of basic care (safety, emotional warmth; stimulation; guidance and boundaries; stability); engagement with health services (including antenatal care where relevant); employment and income; social integration and support; nursery/preschool or school environment.

Domain C: Factors in the physical environment:

Factors relating to the physical environment the child was in at the time of the event leading to death, and for neonatal deaths, the mother's environment during pregnancy including poor quality housing; overcrowding; environmental conditions; home or neighbourhood safety; as well as known hazards contributing to common childhood injuries (e.g. burns, falls, road traffic collisions)

Domain D: Factors in Service Provision:

Factors in relation to service provision or uptake including any issues relating to identification of illness, assessment, investigations and diagnosis; treatment or healthcare management; communication or teamwork within or between agencies; and organisational or systemic issues. Consider underlying staff factors, task factors, equipment, and work environment, education and training, and team factors.

For each of the four domains, the Manchester CDOP determines the level of relevance (0-2) for each factor, relating to the registered cause of death and to inform learning of lessons at a local, regional, and national level. The categories are:

0 Information not available

1 No factors identified, or factors identified but are unlikely to have contributed to the death

2 Factors identified that may have contributed to vulnerability, ill health, or death

[16] https://www.gov.uk/government/publications/child-death-reviews-forms-for-reporting-child-deaths

As part of the review, the CDOP is responsible for identifying modifiable factors, although categorising a death as having modifiable factors does not necessarily mean the CDOP regards the death in question as preventable, but that there may be emerging trends which could reduce the risk of future child deaths:

Modifiable factors identified: The review has identified one or more factors across any domain which may have contributed to the death of the child and which might, by means of a locally or nationally achievable intervention, be modified to reduce the risk of future child deaths

No modifiable factors identified: The review did not identify any modifiable factors

Inadequate information upon which to make a judgement: The review was unable to identify if any modifiable factors were present.

Diagram 12: Categorisation of death for cases closed by the Manchester CDOP, GM CDOPs and CDOPs across England (2020/21)

Category of Death		Manchester 2020/2021 Cases Closed[17]		GM 2020/2021 Cases Closed		England 2020/2021 Cases Closed	
1	Deliberately inflicted injury, abuse, or neglect	<5	-	<5	-	51	2%
2	Suicide or deliberate self-inflicted harm	<5	-	<5	-	98	4%
3	Trauma and other external factors	<5	-	7	5%	116	5%
4	Malignancy	<5	-	7	5%	220	9%
5	Acute medical or surgical condition	<5	-	8	6%	132	5%
6	Chronic medical condition	<5	-	8	6%	140	5%
7	Chromosomal, genetic, and congenital anomalies	9	31%	34	26%	625	24%
8	Perinatal/neonatal event	8	28%	41	31%	859	33%
9	Infection	<5	-	10	8%	135	5%
10	Sudden unexpected, unexplained death	<5	-	11	8%	198	8%
	Not known	<5	-	<5	-	<5	-
	Total	29	100%	132	100%	2574	100%

Of the 29 cases closed by the Manchester CDOP, the largest number of deaths were categorised as chromosomal, genetic and congenital anomalies (9, 31%) and perinatal/neonatal event (8, 28%). Year on year, both categorises account for the largest proportion of child deaths and have remained stable overtime, as is the case across the GM CDOPs.

The majority of child deaths are due to medical causes which encompass multiple categories of death including acute medical or surgical, chronic medical, chromosomal, perinatal/neonatal event, malignancy and infection. Small numbers were attributable to non-medical causes including trauma, deliberate harm/abuse/neglect, suicide/self-harm and sudden unexpected/unexplained death.

[17] Suppression of data to anonymise statistics: Personal data where the value is less than 5 has been removed (<5/-)

There has been a consistent GM pattern in the categories of death over a number of years. Perinatal/neonatal events and deaths due to chromosomal, genetic and congenital anomalies remain, by far, the two main causes of death accounting for over half of all closed cases by the Manchester CDOP, GM CDOPs and CDOPs across England.

Diagram 13: Frequency of relevant associated factors in closed cases by the Manchester CDOP (2020/21)

Factors identified that may have contributed to vulnerability, ill-health or death (2)	No. of factors categorised as a relevance of 2[18]
Factors intrinsic to the child	
Acute/Sudden onset illness	24
Asthma	<5
Epilepsy	<5
Diabetes	<5
Other chronic illness	10
Learning disabilities	<5
Motor impairment	<5
Sensory impairment	<5
Other disability or impairment	5
Emotional/behavioural/mental health condition in the child	<5
Allergies	<5
Alcohol/substance misuse by the child	<5
Domain B: Factors in social environment including family and parenting capacity	
Emotional/behavioural/mental/physical health condition in a parent or carer	9
Alcohol/substance misuse by a parent/carer	5
Smoking by the parent/carer in household	<5
Smoking by the mother during pregnancy	<5
Domestic violence	<5
Co-sleeping	<5
Bullying	<5
Gang/knife crime	<5
Pets/animal assault	<5
Consanguinity	<5
Poor parenting/supervision	<5
Child abuse/neglect	<5
Domain C: Factors in the physical environment	
Housing	<5
Domain D: Factors in Service Provision	
Access to health care	<5
Prior medical intervention	<5
Prior surgical intervention	<5

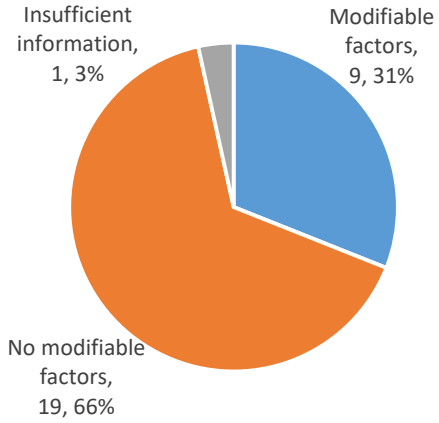
There may be factors present, although not deemed relevant to the child's cause of death. These are categorised as a relevance of 1. Some cases present no modifiable factors but have multiple relevant factors that may have contributed to vulnerability, ill-health or death of the child such as parental

[18] Suppression of data to anonymise statistics: Personal data where the value is less than 5 has been removed (<5/-)

alcohol/substance use and housing conditions and therefore categorised as a relevance of 2. For example, natural causes of death categorised as chromosomal, genetic, and congenital anomalies, where the child was known to have an autosomal recessive disorder, may not display any modifiable factors but there may have multiple factors as a relevance of 2. Where there are multiple modifiable factors and relevance 2 factors present, the vulnerability of the child increases.

The Manchester CDOP identified one or more modifiable factors in 9 (31%) cases which is lower than the England average of 34% (as recorded by the NCMD). The highest number of modifiable factors were recorded in deaths categorised as a perinatal/neonatal event (<5) and sudden unexpected, unexplained death (<5).

Diagram 14: Modifiable factors identified in cases closed by the Manchester CDOP (2020/21)



Modifiable Factors	No. Cases Closed	
Modifiable factors	9	31%
No modifiable factors	19	66%
Insufficient information	1	3%
Total	29	100%

Year on year, deaths categorised as a perinatal/neonatal event continue to have the largest number of modifiable factors identified in the review. Modifiable factors in perinatal/neonatal deaths mostly relate to antenatal maternal health and wellbeing, which can lead to poor outcomes for both mother and infant such as maternal smoking in pregnancy and maternal obesity in pregnancy. Factors also include, engagement with health services in accessing antenatal care, social and environmental conditions during pregnancy.

Diagram 15: Modifiable factors identified in cases closed by the Manchester CDOP, GM CDOPs, NW CDOPs and CDOPs across England (2020/21)

CDOP Area(s)	Modifiable Factors		No modifiable factors		Insufficient information	
Manchester	9	31%	19	66%	1	3%
Greater Manchester	57	43%	74	56%	1	1%
North West	136	43%	*	*	*	*
England	882	34%	*	*	*	*

Manchester % cases with modifiable factors
31%

GM % cases with modifiable factors
43%

England % cases with modifablefactors
34%

Modifiable factors were present in 57, 43% of the GM CDOPs 2020/2021 cases closed, 56% having no modifiable factors and 1% having insufficient information to make a judgment. The 2020/2021 national data, as provided by the NCMD, records modifiable factors present in 34% of cases closed by CDOPs across England. The highest number of GM CDOPs modifiable factors were recorded in deaths categorised as a perinatal/neonatal event (19, 33%) and sudden unexpected, unexplained death (11, 19%).

Though attempts have been made to standardise the process of identifying and categorising modifiable factors, it is often a subjective matter which is decided on a case by case basis. The GM CDOPs continue to conduct reviews in line with an agreed GM set standard of modifiable factors, as developed by the GM CDOP Network. The standard ensures consistency across the four GM CDOPs when undertaking reviews and identifying modifiable factors.

Of the 29 cases closed, the Manchester CDOP identified modifiable factors in 9 (31%) deaths. These are factors where local or nationally achievable intervention could be modified to potentially reduce the risk of future child deaths. Of the 9 deaths with modifiable factors, 8 (89%) children died before the age of 1, 5 of which were during the neonatal period.

Some deaths feature multiple modifiable factors which vary depending on the circumstances leading to death and the cause of death ascertained. For example, deaths categorised as a perinatal/neonatal event, may exhibit more than one modifiable factor such as maternal smoking in pregnancy, maternal obesity in pregnancy and lack of antenatal care service uptake. Modifiable factors act as multiplier effect, increasing the child's vulnerability where multiple factors are present.

Diagram 16: Modifiable factors identified in cases closed by the Manchester CDOP (2020/21)

* Smoking continues to the most common modifiable factor identified by the Manchester CDOP with maternal smoking in pregnancy and household smoking a factor in deaths categorised as a perinatal/neonatal event and sudden unexpected, unexplained death. Maternal obesity, where mother has a raised body mass index (BMI) of 30+ during pregnancy is also a modifiable factor in perinatal/neonatal deaths, as is maternal alcohol and/or substance use during pregnancy. Multiple modifiable factors were also identified (antenatally and postnatally) in sudden unexpected, unexplained deaths the most common being unsafe sleeping arrangements including parental alcohol and/or substance use.

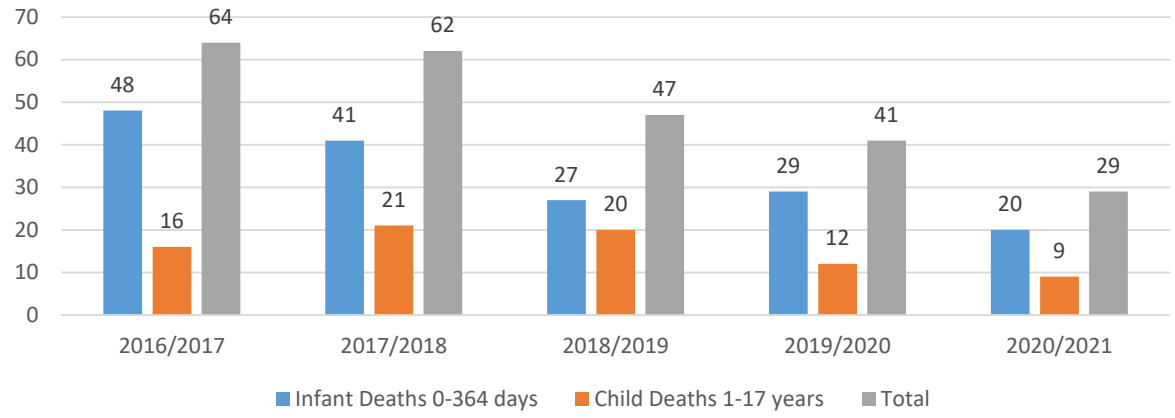
Though the numbers involved are relatively small, it emphasises that factors relating to smoking remain key modifiable factors for infant and child deaths. Despite ongoing efforts to reduce the rate of smoking, this continues to influence in the death of children and remains a steady modifiable factor. Further, the link between smoking and obesity strongly correlate with deprivation, meaning they represent a significant health inequality.

6.4 INFANT DEATHS (0-364 DAYS OF LIFE)

Of the 29 cases closed (2020/2021), a large proportion of the deaths occurred in the neonatal period (<28 days of life) accounting for 41% (12) of the total cases closed.

A further 8 (28%) infants died before the age of one (28-364 days of life), highlighting 69% (20) of the deaths occurring in the first year of life. This remains to be a year on year trend, as is the case across GM CDOPs (91, 69%), highlighting infants under the age of one as the most vulnerable age group.

Diagram 17: Manchester CDOP cases closed by age at time of death (2016/21)



Of the 20 infant deaths, a large proportion of the deaths were categorised as a perinatal/neonatal event and chromosomal, genetic, and congenital anomalies. Of the 8 deaths categorised as a perinatal/neonatal event, all infants were delivered prematurely, with prematurity featuring as the registered cause of death. Many infant deaths were anticipated due to the death ultimately being related to perinatal/neonatal events and chromosomal, genetic and congenital anomalies. This reflects that deaths in the first year of life are often due to the complications of prematurity or from underlying health conditions.

Babies are considered viable at around 24 weeks' gestation, meaning it's possible for them to survive at this stage. Infants delivered under 24 weeks' gestation, have a significantly reduced chance of

survival. The World Health Organization (WHO)[19] defines preterm birth as babies born alive before 37 weeks of pregnancy are completed, with sub-categories of preterm birth based on gestational age:

- extremely preterm (less than 28 weeks)
- very preterm (28 to 32 weeks)
- moderate to late preterm (32 to 37 weeks)

Of 20 infant deaths, 17 (85%) babies were delivered preterm (<37 weeks). Babies born before full term (<37 weeks) are vulnerable to health problems associated with prematurity. The earlier in the pregnancy a baby is born, the more vulnerable they are. Preterm birth occurs for a variety of reasons. Most preterm births happen spontaneously, but some are due to early induction of labour or caesarean birth, whether for medical or non-medical reasons. Common causes of preterm birth include multiple pregnancies, infections and chronic conditions such as diabetes, high blood pressure and genetic influence.

Around 8 out of 100 babies are born prematurely[20]. Using the WHO preterm birth sub-categorises, highlights 33% (7) of the preterm infants (7) were born extremely preterm (<28 weeks). Twins and triplets are often born prematurely with an average delivery date for twins at 37 weeks and 33 weeks' gestation for triplets. There were a number of infant deaths <5) recorded as a twin pregnancy some of which also resulted in a late foetal loss (<24 weeks' gestation) or stillbirth (>24 weeks) although, in line with Child Death Review: Statutory and Operational Guidance (England), stillbirths and late foetal loss are not subject to CDOP reviews.

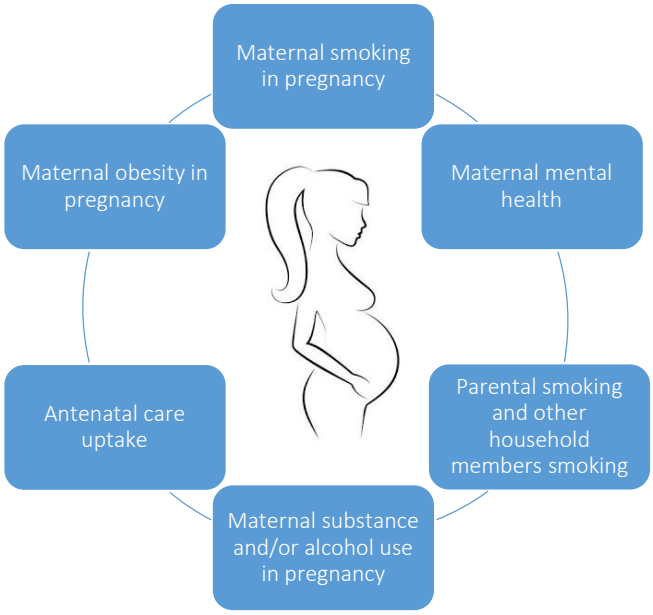
Low birth weight is defined by the WHO[21] as weight at birth less than 2500 g (5.5 lb). Low birth weight continues to be a significant health problem and is associated with a range of both short- and long-term consequences. Low birth weight is complex and includes preterm neonates, small for gestational age neonates at term and the overlap between these two situations. Typically, both preterm and small for gestational age neonates, have the worst outcomes.

The Royal College of Obstetricians and Gynaecologists[22] defines small for gestational age to an infant born with a birth weight less than the 10th centile[23]. Historically small for gestational age at birth has been defined using population centiles. The use of centiles is customised for maternal characteristics (maternal height, weight, parity, and ethnic group) as well as gestational age at delivery and infant sex, identifies small babies at higher risk of morbidity and mortality than those identified by population centiles. Of the 20 infant deaths, 18 (90%) had a birth weight of less than 2500 grams, 16 of which were preterm deliveries (<37 weeks' gestation).

Whilst prematurity impacts the infant's birth weight, low birth weight is also influenced by maternal lifestyle such as smoking and wider maternal health including pre-eclampsia. When reviewing infant deaths, the Manchester CDOP identifies modifiable factors and relevant factors during pregnancy that increase the risk to both mother and baby. These factors may also contribute to an early onset of labour, leading to poorer outcomes. All the associated factors act as a multiplier effect increasing the risk of prematurity, or that the infant may not be born in the best possible condition.

[19] https://www.who.int/news-room/fact-sheets/detail/preterm-birth
[20] www.nhs.uk/conditions/pregnancy-and-baby/premature-early-labour
[21] www.who.int/nutrition/publications/globaltargets2025_policybrief_lbw/en/
[22] www.rcog.org.uk/globalassets/documents/guidelines/gtg_31.pdf
[23] www.rcpch.ac.uk/resources/uk-who-growth-charts-neonatal-infant-close-monitoring-nicm

Diagram 18: Modifiable factors and/or relevant factors identified in infant death cases closed by the Manchester CDOP (2020/21)



6.5 MATERNAL OBESITY IN PREGNANCY

A modifiable and relevant factor highlighted by the Manchester CDOP is mother's raised body mass index (BMI) during pregnancy. For most adults, an ideal BMI is in the 18.5 to 24.9 range (healthy weight range). The NHS defines the BMI categories[24] as:

- below 18.5 - underweight
- between 18.5 and 24.9 - healthy weight range
- between 25 and 29.9 - overweight range
- between 30 and 39.9 - obese weight range
- 40 and over - severely obese weight range

Being overweight increases the risk of complications for pregnant women and baby[25]. The higher a woman's BMI, the higher the chance of complications. Problems for baby can include being born prematurely and an increased risk of stillbirth (from an overall risk of 1 in 200 in the UK to 1 in 100 if mother has a BMI of 30 or more).

The increasing chances are in relation to:

- miscarriage - the overall chance of miscarriage under 12 weeks is 1 in 5 (20%); for women with a BMI over 30, the chance is 1 in 4 (25%)
- gestational diabetes - women with a BMI of 30 or above, are 3 times more likely to develop gestational diabetes than women who have a BMI below 25
- high blood pressure and pre-eclampsia - women with a BMI of 30 or above at the beginning of their pregnancy, have a chance of pre-eclampsia which is 2 to 4 times higher than that of women who have a BMI below 25
- blood clots - all pregnant women have a higher chance of blood clots compared to women who are not pregnant, for women with a BMI of 25 or above, the chance is increased further
- the baby's shoulder becoming "stuck" during labour (sometimes called shoulder dystocia)
- heavier bleeding than normal after the birth (post-partum haemorrhage)

[24] https://www.nhs.uk/conditions/obesity/
[25] https://www.nhs.uk/conditions/pregnancy-and-baby/overweight-pregnant/

- having a baby weighing more than 4kg (8lb 14oz) - the overall chance of this for women with a BMI of 20 to 30 is 7 in 100 (7%); for women with a BMI of above 30, the chance is doubled to 14 in 100 (14%)
- women are also more likely to need an instrumental delivery (forceps or ventouse), or an emergency caesarean section

Deaths categorised as a perinatal/neonatal event, where mothers BMI in pregnancy is recorded as underweight (BMI <18.5) or obese (BMI 30+), are deemed a modifiable factor by the Manchester CDOP. Maternal obesity in pregnancy continues to be a relevant factor and features as a modifiable factor for Manchester, and across GM, in deaths categorised as a perinatal/neonatal event.

Infants born to women who begin pregnancy obese have a higher risk of premature death than children born to mothers at a healthy weight. Children who are obese at reception age are more likely to become overweight or obese adults and have shorter life expectancy.

The Healthy Weight Team was established in September 2018 in response to the rising levels of severe obesity and following a Serious Case Review where a 13-year-old child died from a heart condition exacerbated by morbid obesity. The team puts the needs of children and families first, providing innovative, evidence-based intervention, and its work is now part of Manchester's Healthy Weight Strategy 2020–25. The Manchester Population Health Team launched the five-year Healthy Weight Strategy[26] in 2021. The strategy advocates a whole system approach which begins with pregnant women and babies. The strategy advocates equipping health professionals with the resources to begin sensitive conversations about weight in pregnancy, increasing breastfeeding and making healthy choices in weaning with infants. Delivering on the healthy weight outcomes in maternity services and early years is a key outcome for the City's Start Well Board.
Manchester has received national COVID-19 recovery funding to support tier two weight management provision. This has reduced the eligibility criteria to allow more residents access to local support. The two tiers of weight management provision are commissioned by the Manchester Population Health Team, for women aged 16 years and over.

A social prescribing service for pregnant women who have a BMI of 28 and over, offers a voucher to access a free local weight loss group. A specialist service is also available for pregnant woman with a BMI of 35 or above, to encourage lifelong change by supporting pregnant women achieving a healthier lifestyle through education and personalised goal setting. Both programmes offer advice and support on nutrition, lifestyle, and behaviour change to enable women to be healthy throughout their pregnancy and beyond. Both services provide advice on nutrition in relation to breastfeeding and complementary feeding. Midwives can refer pregnant women into the tier three service from 12 weeks gestation which includes psychological therapy and, where appropriate, pharmacotherapy.

The Manchester Healthy Weight Nurse Team successfully won the national 'Nursing Times Public Health Nursing Award 2021'[27] for their work supporting families referred to the specialist service, supporting overweight and obese children, to achieve healthier lifestyle and improve life chances.

Emma Schneider, Project Lead for the Manchester Healthy Weight Team, said: *"Winning this award and for the Healthy Weight Team to be recognised at such a prestigious event was an absolute career highlight! I feel so lucky to work with the most passionate, knowledgeable, caring, and dedicated team you will ever find, and who make me proud every day."*

[26] https://www.manchester.gov.uk/downloads/download/7356/manchester_healthy_weight_strategy
[27] https://www.nursingtimes.net/news/leadership-news/winners-of-the-2021-nursing-times-awards-revealed-28-10-2021/

6.6 SMOKING

Smoking continues to have a negative impact on the general health of children and remains a key modifiable factor for child deaths in Manchester. Depending on the nature of the death, the CDOP collates information regarding the smoking status of the child and during the antenatal period, maternal smoking in pregnancy and household members to monitor women who are exposed to harmful effects of environmental tobacco smoke during pregnancy.

Smoking in pregnancy has well known detrimental effects for the growth and development of baby and the health of the mother. Smoking during pregnancy can cause serious pregnancy related health problems including complications during labour and an increased risk of miscarriage, premature birth, stillbirth, low birth weight and sudden unexpected death in infancy (SUDI). Maternal smoking in pregnancy and/or parental household smoking was the most common occurring modifiable factor which the Manchester CDOP deemed a significant relevant factor in relation to the child's cause of death. Having a smoke free population and smoke free homes is the best way of protecting babies and children.

The National Tobacco Control Plan[28] includes an ambition to reduce smoking in pregnancy to 6% by the end of 2022, which is measured at the time of giving birth. The national average for SATOD is 9.6% and in Manchester, the smoking at time of delivery (SATOD) rate has been falling in recent years (8.9%). However, we cannot be complacent because 8.9% remains high and those women who do smoke may well have other vulnerabilities.

The Manchester Population Health Plan[29] priority 'The first 1000 days of a child's life' focuses on this area of work and is further addressed by the Manchester Tobacco Plan[30] and the Manchester Reducing Infant Mortality Plan[31]. Since 2018, Manchester has had an 'in maternity' Smoking in Pregnancy Service which is delivered by Manchester University NHS Foundation Trust. This programme has been rolled out across GM according to a broadly similar model, based on NICE guidance. This means that all women who smoke while pregnant are offered free Nicotine Replacement Therapy (NRT) and motivational support for the duration of their pregnancy and just beyond. Most pregnant smokers in Manchester qualify for an Incentive Scheme too. This scheme, which "rewards" women who stay smoke free with shopping vouchers, is administered by the GM Health and Social Care Partnership. The effectiveness of this approach is being studied as part of an ongoing Randomised Control Trial.

Addressing smoking during pregnancy alone is not enough. Manchester aspires to reduce adult smoking rates (which remain higher than national averages), so that women are not smoking when they become pregnant. Furthermore, for women to remain smoke free after they give birth, in order to protect the baby from environmental tobacco smoke in the home and to protect future pregnancies. Manchester now has a citywide, community stop smoking service called, "Be Smoke Free". This service is a nurse led service, which offers free and direct provision of combination pharmacotherapy, Electronic Cigarettes and twelve week's psychological and motivational support in line with NICE guidance. This service treats any smoker aged 12 and over if they live in Manchester or have a Manchester GP.

Whilst Manchester has specialist services, it is essential that all professionals who work with pregnant women and families, understand the importance of women giving up smoking and smoke free homes. Be Smoke Free have designed training in how to deliver "Very Brief Advice" (VBAs) about smoking and we would like to encourage a Make Every Contact Count (MECC) as a multi-agency approach.

[28] https://www.gov.uk/government/publications/tobacco-control-plan-delivery-plan-2017-to-2022
[29] https://www.manchester.gov.uk/healthplan
[30] https://www.manchester.gov.uk/downloads/download/6971/smoke_free_manchester
[31] https://www.manchester.gov.uk/downloads/download/7002/reducing_infant_mortality_strategy

6.7 SUDDEN & UNEXPECTED DEATH IN INFANCY/CHILDHOOD (SUDI/SUDC)

Deaths categorised as a sudden unexpected, unexplained death where the pathological cause of death was recorded as either 'sudden infant death syndrome (SIDS)' or remains 'unascertained', continue to feature multiple modifiable factors relating to forms of unsafe sleeping arrangements. Unsafe sleeping arrangements such as co-sleeping, are particularly dangerous if the parent/carer has consumed alcohol or ingested substances, which may limit their awareness. Other known risk factors include co-sleeping with babies born prematurely or those with a low birth weight, overheating, covering baby's face or head while sleeping, loose bedding and falling asleep with baby on a sofa or in an armchair.

In deaths categorised as sudden unexpected, unexplained death, the Manchester CDOP highlighted several modifiable factors identified including:

- Maternal alcohol use in pregnancy
- Maternal substance use in pregnancy
- Maternal smoking in pregnancy
- Parental smoking and/or other household smokers
- Unsafe sleeping arrangements
- Co-sleeping
- Baby placed to sleep on a soft surface (parental bed)
- Parental alcohol use
- Parental substance use

The Manchester CDOP also highlighted several relevant factors (relevance 2) which may have contributed to the vulnerability, ill-health or death of the infant such as parental mental health issues, housing conditions, domestic abuse, poor parenting/supervision and child abuse/neglect. It should be noted that factors (in the antenatal and/or postnatal period) act as multiplier effect, where there is more than one present this increases the vulnerability of the child

The Manchester CDOP continues to raise awareness of safer sleep messages via quarterly newsletters[32] to embed safer sleep advice into multi-agency practice. The Manchester CDOP promotes consistent safe sleep advice, published by the Manchester Local Care Organisation Safer Sleeping Practice for Infants[33]:

'The safest place for a baby to sleep is on their back, in a Moses basket or cot, in a room with the parent or carer for the first six months. This advice is the same for all times of the day and night when the baby is sleeping'

The Manchester Vulnerable Baby Service (VBS) is an integral service in delivering safe sleep messages to the community. The Manchester VBS was established with the aim of reducing the risks of sudden and unexpected death in infancy (SUDI) across the City. The service facilitates multi-agency case planning meetings for any unborn babies and infants under one year of age, who are considered to be vulnerable as defined by the referral criteria. Any practitioner can refer into the service if the family meets the criteria. In each case, the assessment of need and liaison with partners continues and is carried out by the VBS staff. The VBS continues to play a public health role in preventative measures, leading on safe sleeping policies across the City and strategically informing practice to improve outcomes for infants.

[32] https://www.manchestersafeguardingpartnership.co.uk/resource/cdop/
[33] https://www.manchestersafeguardingpartnership.co.uk/resource/safe-sleeping/

The Manchester Reducing Infant Mortality Strategy Steering Group established a Safer Sleep Task and Finish Group, to review local safer sleep messages and look at methods to deliver consistent advice within the community. Led by the Manchester Population Health Team, the group was made up of multi-agency professionals including Manchester City Council Communications and Marketing and the Manchester Local Care Organisation, with representation from the Health Visiting Service and Care of Next Infant (CONI) Programme. The group agreed to develop a Manchester safer sleep video containing useful tips for parents and carers on how to create a safer sleep environment. Across Manchester, there are up to 200 different languages spoken in the adult population therefore, the safer sleep animation aims to deliver key messages visually using simple graphics, which can be understood and readily available to all viewers. The 'Creating a safe sleep environment for your baby'[34] was published during The Lullaby Trust Safer Sleep Week 2021 and promotes the 'Be Cot Safe' message of:

'Be aware of your baby's sleep environment for every sleep, every where, every time.'

The video was published via YouTube and made available to professionals, parents, and carers to reduce the risk of sudden infant death syndrome (SIDS). Every baby born in Manchester, receives a free thermometer which also features Be Cot Safe advice to reduce the risk SIDS.

6.8 A MANCHESTER CASE STUDY

The death of an infant aged 6 months was reported to the Manchester CDOP by the responding on call GM Joint Agency Response (JAR) Paediatrician. As a sudden and unexpected death in the community, a referral was made to the GM JAR to conduct a rapid response review. A multi-agency strategy meeting was held involving services directly involved with the family, for professionals to work collaboratively and share information.

Mother booked the pregnancy at 14 weeks gestation and it was noted that there were several missed antenatal appointments. Mother and father were known to be smokers. The infant was born full term, with a low birth weight which was recorded as the 2nd centile[35] at the time of delivery.

Mother had been caring for the infant prior to death and awoke the following morning, to find the infant unresponsive. Ambulance services arrived on the scene and paramedics conducted cardiopulmonary resuscitation (CPR) before transferring the infant to the local Paediatric Emergency Department (PED). On arrival to PED, resuscitation attempts were continued but unsuccessful. There were some discrepancies surrounding the account provided, before the infant's collapse, particularly regarding the final place of sleep. On the night of the infant's death, the infant took feeds as usual and slept next to her mother on a double bed. The following morning, mother awoke to find the child lifeless.

Once all investigations concluded, the Manchester CDOP conducted the final review which highlighted multiple relevant factors and modifiable factors which were deemed may have contributed to vulnerability, ill health, or death of the child. The key modifiable factors included:

- Unsafe sleeping arrangements
- Baby placed on a soft surface to sleep, on the parental bed, with a large feather duvet

[34] https://www.youtube.com/watch?v=eUwbFKID_6c&t=6s

[35] https://www.nhs.uk/conditions/baby/babys-development/height-weight-and-reviews/baby-height-and-weight/

- High risk of co-sleeping in parental bed
- Parental smoking
- Parental substance use on the day of the infant's death
- Evidence of parental substance use in the bedroom shared by parent and the infant
- Smoking within the household and evidence of smoking in the bedroom
- Poor living conditions and unsuitable home environment

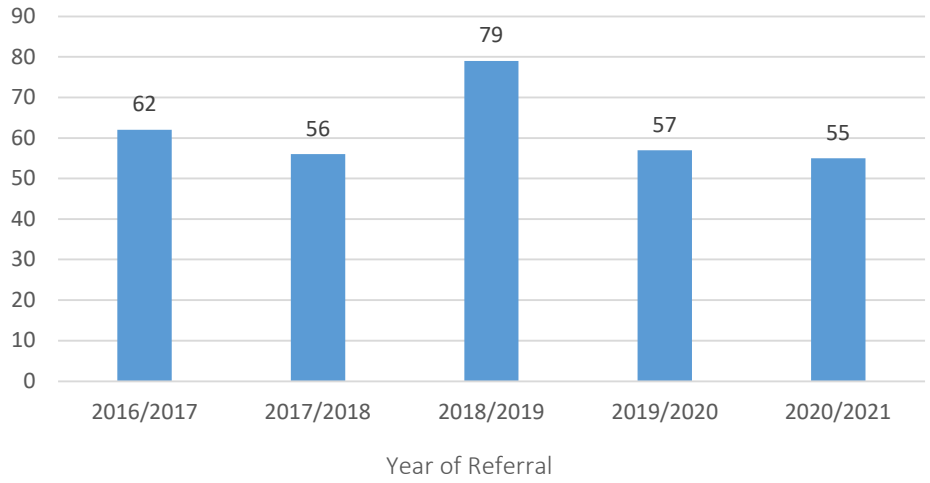
6.9 GREATER MANCHESTER RAPID RESPONSE (JOINT AGENCY RESPONSE)

The Greater Manchester Rapid Response Team was established in January 2009, to provide a rapid assessment of each sudden and unexpected death of an infant or child. The team is made up of Senior Paediatricians who provide a 24/7 on-call service across GM, working in close collaboration with partner agencies such as Greater Manchester Police (GMP), the GM Coroners, Health and Children's Social Care.

Following changes to the national guidance, the service falls under the remit of a CDRM and is now known as a Joint Agency Response (JAR). Revisions to the national guidance meant that it was longer a statutory requirement to investigate all sudden and unexpected deaths with a 'Rapid Response' Team. Instead, a JAR should occur in a more limited number of circumstances. The new guidance was discussed with the commissioners for the GM Rapid Response Service who requested that the on-call team continue to respond at the point of a child's death. It was agreed, that there should not be a narrowing of the inclusion criteria for such a response, and that the on-call team continue to respond to all deaths that were not anticipated as a significant possibility 24 hours prior to the death, or when the collapse that precipitated death was similarly unexpected (as defined in the Working Together to Safeguard Children 2008). The decision to see the same cohort of children was strongly approved by the Steering Group, the GM CDOP Chairs, and the local Coroners.

In total, 766 child death referrals have been made to the GM JAR since 1st January 2009. There has been year on year fluctuation in the numbers of cases referred to the Rapid Response Service, but there continues to be a mean of 1.2 cases referred each week. Between 1 April 2020 - 31 March 2021, the GM JAR received 55 child death referrals.

Diagram 19: Number of child death referrals to the GM JAR (2016/21)



Most cases (32%) occurred in infants under one year of age, with a peak incidence in infants aged between one month to six months of age (26%). There is a second peak in teenagers who exhibit risk-taking behaviours. The proportion of cases in each age category has stayed relatively constant since 2009, although during 2020/2021 there was a further rise from 2019/2020, in the number of 16-17-

year-old deaths (20%). This appears to map onto an increase in the number of deaths by apparent suicide, but numbers are too small to allow statistical analysis.

An ongoing challenge to the service has been maintaining the on-call rota, as doctors have moved on to new posts or retired. This has been compounded by COVID-19 related illness. There continues to be a national shortage of Paediatricians and this has been reflected in difficulties recruiting into vacant posts. COVID-19 has had a significant impact during 2020/2021 and preserving home visits whenever it is safe to do so, has been a real achievement, as a key part of the JAR function. Despite the challenges, increased used of virtual meetings has had a very positive impact on attendance at both initial meetings and CDRMs.

Deaths subject to the JAR process usually remain open to the CDOP for a longer period due to pending coronial investigations. Until the Coroner has ascertained a cause of death, the CDOP is unable to confirm if the death was in fact a sudden and unexpected death in infancy (SUDI)/childhood (SUDC). Where the pathological cause of death is recorded as 'sudden infant death syndrome' or 'unascertained', at any age, these deaths are categorised by the Manchester CDOP as a sudden unexpected, unexplained death (excluding sudden unexpected death in epilepsy).

The GM JAR Lead continues to be an integral part of the Manchester CDOP, attending panel meetings to interpret medical terminology and supporting the implementation of the Child Death Review: Statutory and Operational Guidance (England).

6.10 CHROMOSOMAL, GENETIC & CONGENITAL ANOMALIES

Of the 29 cases closed, 9 deaths were categorised as chromosomal, genetic and congenital anomalies, all of which were infant deaths (0-364 days of life) and 5 children recorded Asian/Asian British. The Manchester CDOP continues to determine the relevance of consanguinity in deaths categorised as chromosomal, genetic and congenital anomalies. Consanguinity refers to a relationship in which a couple are blood relatives, for example first cousins, second cousins etc. Consanguinity increases the risk of genetic disorders known as autosomal recessive disorders. Parents who are both unaffected healthy carriers of a genetic disorder present a 1 in 4 (25%) chance that the child could be affected and a 50% chance that the child could be a healthy carrier with no sign of the disorder but could pass the unusual gene on to the next generation. Unrelated parents have a 2% risk of having a child with a severe abnormality, whilst parents who are first cousins have a 5% risk and second cousins have a 3% risk. However, couples that are more closely related, such as a family with a history of cousin marriages going back generations, will have a higher risk of having a child with autosomal recessive disorders.

The Manchester University NHS Foundation Trust (MFT) provides one of the largest and most comprehensive multi-disciplinary clinical genetics units in UK and Europe providing integrated clinical and laboratory genetics services[36]. The aim of the regional genetic service is to provide a diagnostic, counselling and support service to individuals and their families with a genetic disorder affecting any body system at any age.

Practitioners can make referrals to the service for a number of reasons including:

- organisation of specialist prenatal diagnosis for a known familial genetic disorder
- diagnosis and counselling on diagnosis of foetal abnormality either on genetic testing or ultrasound
- investigation and diagnosis of congenital abnormality
- investigation and diagnosis of abnormalities of growth or development in childhood
- diagnosis of a metabolic disorder

[36] https://www.mangen.co.uk/

- diagnosis if a possible genetic disease, including eye, renal, cardiac and neurological disorders with known or possible genetic basis
- strong family history of cancer
- concern regarding personal or family history of a genetic disease
- access testing of family members for carrier status for single gene (mendelian disorders) including presymptomatic or predictive gene testing when indicated.

The specialist genetic service which is an integrated clinical and laboratory genetics service, aims to provide diagnostic, counselling and support to families with a genetic disorder. The service also offers management, support and appropriate information for genetic conditions and offers pre-symptomatic diagnosis.

The Manchester CDOP works with the Specialist Geneticist to request information to review factors in relation to service provision. The Manchester CDOP reviews whether a referral to the genetic service was made and if the family engaged, to access additional support and counselling. There are health requirements regarding awareness raising amongst both practitioners and the community about the associated health factors and services available that can provide advice and support.

As part of the Manchester Reducing Infant Mortality Strategy 2019-2024[37], work remains ongoing to raise awareness of the genetic service and how practitioners can make referrals. This includes information about autosomal recessive disorders, to increase the knowledge and understanding of genetics in the population.

The Health Visiting Teams deliver a universal screening service which is key in in the identification and referral of congenital anomalies found in infants and children. Data from the Manchester CDOP highlighted clusters and hotspot wards cross the City, where infant deaths and factors relating to consanguineous relationships were identified. Close relative (consanguineous) marriage has recognised benefits for couples and families. However, this pattern is linked to an increased risk of genetic disorders. The Health Visiting Teams in these localities have been provided with specialist genetic literacy training, so that they can explore potential indicators in the community and refer families to genetic services, for individual assessment, genetic testing, and discussions regarding support available. This is a new speciality within the Health Visiting Teams and supports an improved understanding of how genetics is expected to impact positively on mortality and morbidly in the City.

7. ACKNOWLEDGEMENTS

Thanks are due to Manchester CDOP and Themed Panel multi-agency members of their attendance and commitment, and colleagues in the Manchester Population Health Team who have contributed to the content of this annual report.

The Manchester CDOP remains continually thankful for the support from the Manchester Child Health Department, Manchester City Coroner's Office, Manchester City Register Office, and Manchester University NHS Foundation Trust (MFT) in supplying the necessary information required to conducted a thorough CDOP review.

[37] https://secure.manchester.gov.uk/downloads/download/7002/reducing_infant_mortality_strategy

8. 2020/21 MANCHESTER CDOP RECOMMENDATIONS

CHILD DEATH REVIEW MEETINGS (CDRM): DRAFT C. ANALYSIS FORMS

The publication of the Child Death Review: Statutory and Operational Guidance (England) documents significant changes to the child death review process including the introduction of the CDRMs. Colleagues at Manchester University NHS Foundation Trust (MFT) have been extremely supportive of the new national requirements and continue to submit CDRM documentation to the Manchester CDOP. Forms of hospital CDRMs include Perinatal Mortality Review Tool (PMRT) reports, Neonatal Intensive Care Unit (NICU) Mortality Reviews, Paediatric Intensive Care Unit (PICU) Morality Reviews and High Level Investigation (HLI) Reports, all of which provide useful information to enable the Manchester CDOP conduct a thorough review.

MFT has taken a proactive approach to conducting CDRMs across multiple departments including Obstetrics, Neonatology, Paediatrics and Adult Wards. Senior management and lead clinicians have embedded policies and practice, to meet the national statutory requirements in all areas of MFT including the implementation of the 'Procedure for CDRMs for child deaths occurring in non-paediatric areas of MFT'.

RECOMMENDATION 1: The Manchester CDOP is to liaise with MFT clinicians and senior management, to request the completion of the DHSC C. Analysis Form during CDRMs. The draft CDRM C. Analysis Form is to be shared with the appropriate CDOP (based on area of residence) to affirm the findings documented by the CDRM.

GREATER MANCHESTER eCDOP

Following the implementation of the National Child Mortality Database (NCMD) on 1 April 2019, CDOPs had a statutory requirement to submit data collated using the national CDOP templates, to the NCMD web portal. This includes large quantities of data being inputted into the NCMD from all reporting forms, supplementary reporting forms and analysis forms which has drastically increased the Manchester CDOP workload and neighbouring GM CDOP areas. The NCMD requirement for CDOPs to provide live notifications for all child deaths and a full dataset for all cases closed, has resulted in a significant increase in the Manchester CDOPs operational aspects and administrative functions, when processing cases.

The four GM CDOPs took a collaborative approach to developing a system to support all ten of the GM local authorities. The GM eCDOP system[38] allows professionals to report child deaths electronically via a web-based link, to notify the CDOP of all child deaths aged 0-17 years of age, within 24 hours (or the next working day) of the child's death.

RECOMMENDATION 2: As of the 1 April 2021, all child death notifications are to be reported electronically via the GM eCDOP. Email notifications and paper-based documentation will no longer be accepted by the GM CDOP areas. Professionals involved must complete an eCDOP A. Notification Form with as such information as possible, within 24 hours (or the next working day) of the child's death. The Manchester CDOP Co-ordinator is to process each A. Notification Form and generate requests to complete the B. Reporting Form, including Supplementary Forms, via the GM eCDOP system.

[38] https://www.ecdop.co.uk/GMCDOPS/live/public

9. APPENDICES

APPENDIX 1: MANCHESTER CDOP MEMBERSHIP

The Manchester CDOP membership includes:

1. Manchester CDOP Chair, Consultant in Public Health - Manchester Health and Care Commissioning, Manchester Population Health Team
2. Manchester CDOP Lay Representative, Therapy Services Team Leader - The Gaddum Centre
3. Deputy First Officer/Deputy Service Manager and Senior Paediatric Coroners Officer - Manchester City Coroner's Office *(ad hoc member)*
4. Detective Chief Inspector - Greater Manchester Police
5. Project Officer - Manchester City Council, Strategic Housing
6. Programme Lead - Manchester Health and Care Commissioning, Manchester Population Health Team
7. Head of Service Children's Community Nursing Team - Children's Community Palliative Care Team (STAR Team)
8. Senior Officer for QA of Safeguarding in Schools - Manchester City Council, Education
9. Head of Services Vulnerable Baby Service, Health Visiting South and Lead for Early Help and Prevention Manchester University NHS Foundation Trust Vulnerable Baby Service and Health Visiting Service - Manchester Local Care Organisation
10. Designated Nurse Safeguarding Children/Specialist Nurse Safeguarding Children - Manchester Health and Care Commissioning
11. Named Nurse for Safeguarding Children - Greater Manchester Mental Health Foundation Trust
12. Safeguarding and Quality Assurance Team Manager - Manchester Children's Social Care
13. Community Paediatrician, Designated Doctor for Child Death, GM Joint Agency Response Lead - Manchester University NHS Foundation Trust
14. General Manager - Child Adolescent Mental Health Services (CAMHS) *(ad hoc member)*
15. Bereavement Midwife - Manchester University NHS Foundation Trust, Saint Mary's Hospital
16. Consultant in Paediatric Emergency Medicine, Group Associate Medical Director - Manchester University NHS Foundation Trust
17. Consultant Paediatric Intensivist - North West and North Wales Paediatric Transport Service Intensive Care Paediatric Transport Service
18. Clinical Nurse Lead- Learning Disabilities, Learning Disabilities Mortality Review (LeDeR) Programme - Manchester Health and Care Commissioning *(ad hoc member)*

APPENDIX 2: C. ANALYSIS PROFOMA CATEGORISATION OF DEATH

1. Deliberately inflicted injury, abuse or neglect

This includes suffocation, shaking injury, knifing, shooting, poisoning & other means of probable or definite homicide; also, deaths from war, terrorism or other mass violence; includes severe neglect leading to death.

2. Suicide or deliberate self-inflicted harm

This includes hanging, shooting, self-poisoning with paracetamol, death by self-asphyxia, from solvent inhalation, alcohol or drug abuse, or other form of self-harm. It will usually apply to adolescents rather than younger children.

3. Trauma and other external factors, including medical/surgical complications/error

This includes isolated head injury, other or multiple trauma, burn injury, drowning, unintentional self-poisoning in pre-school children, anaphylaxis & other extrinsic factors. Also includes proven medical and surgical complications or errors as the primary cause of death. Excludes Deliberately inflected injury, abuse or neglect. (category 1).

4. Malignancy

Solid tumours, leukaemia's & lymphomas, and malignant proliferative conditions such as histiocytosis, even if the final event leading to death was infection, haemorrhage etc.

5. Acute medical or surgical condition

For example, Kawasaki disease, acute nephritis, intestinal volvulus, diabetic ketoacidosis, acute asthma, intussusception, appendicitis; sudden unexpected deaths with epilepsy.

6. Chronic medical condition

For example, Crohn's disease, liver disease, immune deficiencies, even if the final event leading to death was infection, haemorrhage etc. Includes cerebral palsy with clear post-perinatal cause.

7. Chromosomal, genetic and congenital anomalies

Trisomies, other chromosomal disorders, single gene defects, neurodegenerative disease, cystic fibrosis, and other congenital anomalies including cardiac.

8. Perinatal/neonatal event

Death ultimately related to perinatal events, e.g. sequelae of prematurity, antepartum and intrapartum anoxia, bronchopulmonary dysplasia, necrotising enterocolitis, post-haemorrhagic hydrocephalus, irrespective of age at death. It includes cerebral palsy without evidence of cause and includes congenital or early-onset bacterial infection (onset in the first postnatal week).

9. Infection

Any primary infection (i.e. not a complication of one of the above categories), arising after the first postnatal week, or after discharge of a preterm baby. This would include septicaemia, pneumonia, meningitis, HIV infection etc.

10.Sudden unexpected, unexplained death

Where the pathological diagnosis is either 'SIDS' or 'unascertained', at any age. Excludes Sudden Unexpected Death in Epilepsy (category 5).