



## E6 A Growth Chart Review in Sudden Unexpected Infant Death

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After attending this presentation, attendees will better understand the relationship between infant growth and Sudden Unexpected Infant Death (SUID).

This presentation will impact the forensic science community by exploring potential risk factors related to SUID, adding to the current research regarding the causes and preventive measures that may be taken.

SUID is used to describe the sudden and unexpected demise of an infant less than one year of age. The term expands on the previously common term Sudden Infant Death Syndrome (SIDS), which describes the death of an infant that cannot be explained, even following a thorough death scene investigation and autopsy, to include infant deaths of unknown cause as well as cases of possible asphyxia.<sup>1</sup> While the rates of SUID have declined over the past 30 years, largely attributable to a rise in safe sleep recommendations and campaigns, infant mortality still poses a problem in many parts of the country. For example, the United States national infant mortality rate is estimated to be 5.8 per 1,000 live births in 2016, but as of 2015 infant mortality rates in Shelby County, TN, remained as high as 8.23 per 1000 live births.<sup>2,3</sup> While socioeconomic factors likely play a large role in focally high infant mortality rates, associations with low birthweight and prematurity have been previously made. The objective of this study is to explore the relationship between infant growth and SUID by examining the growth curves of infants dying of SUID in accordance with data provided by the Centers for Disease Control and Prevention (CDC).

Autopsy reports and birth records from 85 cases of SUID from 2014-2016 were reviewed (44 females, 68 African Americans). Average gestational age was 38.64 weeks (*Standard Deviation (SD)*=1.87), excluding cases of prematurity prior to 36 weeks' gestation. Weight, length, and head circumference at both birth and death were recorded and compared to the 2000 CDC 0-36 months growth chart.<sup>4</sup> The average weight, length, and head circumference percentiles at birth were 31% (*z-score*=-0.67), 45% (*z-score*=-0.21), and 20% (*z-score*=-1.16), respectively. When corrected for gestational age, average percentiles were 41% for weight (*z-score*=-0.27), 57% for length (*z-score*=0.27), and 30% for head circumference (*z-score*=-0.71). Average age at death was 91 days (*SD*=56.29). The average weight, length, and head circumference percentiles at death were 45% (*z-score*=-0.39), 36% (*z-score*=-0.79), and 48% (*z-score*=0.05), respectively. When corrected for gestational age, average percentiles were 50% for weight (*z-score*=-0.09), 70% for length (*z-score*=-0.53), and 50% for head circumference (*z-score*=0.35). Of the 85 cases included, 72 were associated with an unsafe sleep environment; 50 were associated with co-sleeping, 18 were associated with covering the decedent with a blanket, and 38 were associated with prone or side sleeping of the decedent.

This preliminary review suggests that while low birthweight and head circumference at birth are associated with SUID, these values tend to normalize over time. It is possible that these associations are artifacts of prematurity, although head circumference at birth remains low even when correcting for gestational age. Additionally, when correcting for gestational age at time of death, infants dying of SUID appear on average to be reaching expected growth targets – even exceeding those targets, in the case of length. Confounding factors that should be further explored include maternal smoking during pregnancy, exposure to secondhand smoke, whether or not the infant was breastfed, and level of prenatal care. Finally, the strong association between SUID and unsafe sleeping conditions cannot be ignored. Education regarding safe sleep practices remains a vital instrument in preventing SUID.

### Reference(s):

1. *Sudden Unexpected Infant Death and Sudden Infant Death Syndrome*. Centers for Disease Control and Prevention, last modified February 1, 2017, [www.cdc.gov/sids/AboutSUIDandSIDS.htm](http://www.cdc.gov/sids/AboutSUIDandSIDS.htm).
2. *Country Comparison: Infant Mortality Rate*. Central Intelligence Agency, accessed July 31, 2017, [www.cia.gov/library/publications/the-world-factbook/rankorder/2091rank.html](http://www.cia.gov/library/publications/the-world-factbook/rankorder/2091rank.html).
3. *2015 Annual Report*. Shelby County Health Department: Office of Epidemiology and Infectious Diseases, accessed July 31, 2017, [www.tnshelbycountyhealth.civicplus.com/233/Reports-Data-Tables](http://www.tnshelbycountyhealth.civicplus.com/233/Reports-Data-Tables).
4. *Clinical Growth Charts: Birth to 36 Months*. Centers for Disease Control and Prevention, last modified June 16, 2017, [https://www.cdc.gov/growthcharts/clinical\\_charts.htm](https://www.cdc.gov/growthcharts/clinical_charts.htm).

### SUID, Growth Chart, Infant