The 2004 Cambodia Socioeconomic Survey (CSES) is a household survey that gathered information in a number of different areas including education, health, housing, expenditures, and income. While the primary objective of the survey is to provide information on the poverty situation in Cambodia, child health and nutrition are also addressed through questions regarding feeding practices, immunization, vitamin A supplementation, food intake, and anthropometry. In the CSES 2004, 8,645 children under the age of 6 years were measured and weighed during the period from November 2003 to January 2005. While this large sample provides the opportunity for detailed analysis of the nutritional status of children in Cambodia as well as examination of different factors that contribute to poor health and malnutrition, primary analysis and plausibility tests have revealed that the quality of measurement and age data are poor and thus unsuitable for determining prevalence estimates. Z-scores were calculated using the WHO Special Macro for DHS Household Surveys, which is based on the 2006 WHO Growth Standards and was adapted to fit the unique parameters of the 2004 CSES. The plausibility of the data was checked using Emergency Nutrition Assessment (ENA) for SMART software.

Height measurements are the most immediately apparent source of error in the 2004 CSES dataset. The SMART plausibility check revealed a strong digit preference for 0 and 5 in last decimal places of height measurements, yielding a score of “unacceptable” in this respect. Errors in height measurement collection and entry may have occurred. Because only one enumerator took anthropometric measurements at the household level, systematic bias and errors are likely. Accurately measuring a young child’s height can prove extremely difficult for one person, even with assistance from family members. Data quality was also an issue with age. The age ratio of 6-29 months to 30-59 months was 0.68, where a ratio of about 1.0 is expected. Inaccurate date of birth information collection is likely to have occurred at the household level. The date of birth is not included on the anthropometry questionnaire and must be instead taken from a different, individual-level questionnaire, which includes information on each household member present at the time of interview. Furthermore, when the date of birth was recorded on this questionnaire, verification (in the form of a birth certificate or immunization card) was neither requested nor noted as present or absent.

Errors in height and age measurements were initially detected by the vast number of cases with height-for-age z-scores (HAZ) that were more than -5 and -6 standard deviations away from the reference mean. With no exclusions based on biological implausibility compared to the reference or observed means, the rate of stunting (HAZ < -2 standard deviations) was found to be 61.8% with a standard deviation of 2.68. With exclusions made based on the reference mean, the standard deviation of HAZ scores remained high at 2.11. With exclusions made based on the observed mean, the standard deviation was found to be 1.74. HAZ scores were also not normally distributed regardless of exclusions based on reference or observed means.

Weight data was less problematic than height data, but is still of questionable accuracy. Similar to height, the SMART plausibility check revealed a strong digit preference for 0 and 5 in the last decimal places of weight measurements, yielding a score of “poor” in this respect. Potential errors in weight and age measurement likely caused problems with weight-for-age z-scores (WAZ). With no exclusions based on biological implausibility compared to the reference or observed means, the rate of underweight (WAZ < -2 standard deviations) was 41.9% with a standard deviation of 1.64. With exclusions made based on the reference mean, the standard deviation of WAZ scores was 1.54, and with exclusions made based on the observed mean, the standard deviation was 1.33. WAZ scores were also not normally distributed regardless of exclusions based on reference or observed means.

Weight-for-height z-scores (WHZ) were also affected by inaccurate measurement of height and weight. However, as mentioned earlier, height measurements were more clearly problematic. With no exclusions based on biological implausibility compared to the reference or observed means, the rate of acute malnutrition or wasting (WHZ < -2 standard deviations) was 14.7% with a standard deviation of 2.44. With exclusions made based on the reference mean, the standard deviation of WHZ scores was 1.76, and with exclusions made based on the observed mean, the standard deviation was 1.30. WHZ scores were also not normally distributed regardless of exclusions based on reference or observed means.

There are a number of potential factors that could have affected the quality of the 2004 CSES data. In particular, the fact that only one enumerator took measurements of children at each household is problematic. Not only are measurements difficult to take without assistance, but enumerators had no other measurements for comparison. Furthermore, two teams of 125 enumerators each were trained for only one day in anthropometry. While time was set aside for hands-on measurement practice during training, it is likely that enumerators had limited opportunity to practice their skills with so little time and so many people. Data was also only entered once (single entry), which may have caused some errors that could have been prevented by entering all data twice (double entry).

The aforementioned issues with data quality render the 2004 CSES child health and nutrition information difficult if not impossible to use for determining estimates of the prevalence of stunting, wasting, and underweight in Cambodia. In a low-income country such as Cambodia, one would expect to see normal distributions of HAZ, WAZ, and WHZ scores that are shifted to the left of the reference population mean, but retain a Gaussian shape. This was not the case for any of the three indicators, but was most obvious in the case of indicators that are dependent on height measurements (HAZ and WHZ).