

National Institute of General Medical Sciences and grant 1R34DA050343 from the National Institute on Drug Abuse.

Role of the Funder/Sponsor: The National Institute on Drug Abuse was involved in the design and conduct of the study and management of the data. The funders otherwise had no role in the collection, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Disclaimer: This article reflects the views of the authors and may not reflect the opinions or views of the National Institutes of Health or Adolescent Brain Cognitive Development Consortium Investigators.

Additional Information: Data used in the preparation of this article were obtained from the Adolescent Brain Cognitive Development study (<https://abccdstudy.org>), held in the National Institute of Mental Health Data Archive. This is a multisite, longitudinal study designed to recruit more than 10 000 children aged 9 to 10 years and follow up with them over 10 years into early adulthood. The Adolescent Brain Cognitive Development data repository grows and changes over time. A listing of participating sites and a complete listing of the study investigators can be found at https://abccdstudy.org/wp-content/uploads/2019/04/Consortium_Members.pdf. The Adolescent Brain Cognitive Development data used in this report came from the National Institute of Mental Health Data Archive (doi:10.1515/1412097).

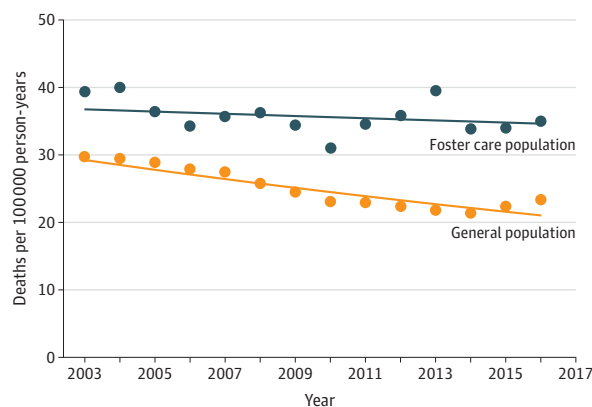
1. Bunikowski R, Grimmer I, Heiser A, Metze B, Schäfer A, Obladen M. Neurodevelopmental outcome after prenatal exposure to opiates. *Eur J Pediatr*. 1998;157(9):724-730. doi:10.1007/s004310050923
2. Hans SL, Jeremy RJ. Postneonatal mental and motor development of infants exposed in utero to opioid drugs. *Infant Ment Health J*. 2001;22(3):300-315. doi:10.1002/imhj.1003
3. Nygaard E, Slinning K, Moe V, Due-Tønnessen P, Fjell A, Walhovd KB. Neuroanatomical characteristics of youths with prenatal opioid and poly-drug exposure. *Neurotoxicol Teratol*. 2018;68:13-26. doi:10.1016/j.ntt.2018.04.004
4. Walhovd KB, Moe V, Slinning K, et al. Volumetric cerebral characteristics of children exposed to opiates and other substances in utero. *Neuroimage*. 2007;36(4):1331-1344. doi:10.1016/j.neuroimage.2007.03.070
5. Compton WM, Dowling GJ, Garavan H. Ensuring the best use of data: the Adolescent Brain Cognitive Development study. *JAMA Pediatr*. 2019;173(9):809-810. doi:10.1001/jamapediatrics.2019.2081
6. Hagler DJ Jr, Hattori S, Cornejo MD, et al. Image processing and analysis methods for the Adolescent Brain Cognitive Development study. *Neuroimage*. 2019;202:116091. doi:10.1016/j.neuroimage.2019.116091

All-Cause Mortality Among Children in the US Foster Care System, 2003-2016

Children in foster care have worse medical and behavioral health than children in the general population. This is influenced by multiple factors, including a high incidence of poverty, exposure to trauma, and chronic medical conditions.^{1,2} Despite known differences in health, less is known regarding differences in mortality. In this cross-sectional study, we compared mortality rates and trends for children in the US foster care system with those in the general population for the 2003-2016 time period.

Methods | Data for children in foster care were obtained from the Adoption and Foster Care Analysis and Reporting System. This study was determined to not represent human subjects research by the institutional review board of the Children's Hospital of Philadelphia. Mortality per person-years was calculated using the number of deaths (identified when death was the listed reason for foster care exit) and the total annual foster care population (the number of children in foster care at any time during a calendar year). Mortality per person-years for children within the general population was extracted from the Centers for Disease Control and Prevention online database WONDER (Wide-Ranging Online Data for Epi-

Figure. National Trends in Mortality in US Foster Care and the General Population, 2003-2016



Annual adjusted death rate per 100 000 person-years for children in foster care and the general population. Point estimates for annual adjusted mortality were made using the margins estimation command in Stata, version 14.2 (StataCorp LLC) from a negative binomial regression after controlling for age (age bins: 1-4, 5-9, 10-14, or 15-18 years), sex (male or female), race (American Indian or Alaska Native, Asian or Pacific Islander, black or African American, or white), and ethnicity (Hispanic or non-Hispanic). Linear mortality trends were estimated using a negative binomial regression containing an interaction term between foster care status (yes or no) and year ($P = .004$) after controlling for age, sex, race, and ethnicity.

demographic Research).³ Analyses were limited to children 1 to 18 years of age. Infants younger than 1 year were excluded given that 40% of infant deaths occur on day 1 of life,⁴ and infants never discharged from the hospital are unlikely to enter foster care. Multiracial categorizations within the Adoption and Foster Care Analysis and Reporting System were reassigned to match the Centers for Disease Control and Prevention's 4 racial categories: American Indian or Alaska Native, Asian or Pacific Islander, black or African American, or white.⁵ Data were not imputed. Negative binomial regressions were used to calculate mortality rates (for 2003-2016) and trends as an annualized percent change, each adjusted for age, race, sex, ethnicity, and calendar year. Separate race- and age-stratified analyses were conducted. Analyses were performed using Stata, version 14.2 (StataCorp LLC).

Results | Among 8 348 656 person-years for children in foster care from 2003 to 2016, there were 3485 deaths or 35.4 deaths per 100 000 person-years vs 25.0 for the general population (1 036 855 826 person-years), with an incident rate ratio of 1.42 (95% CI, 1.37-1.47) (Figure and Table). There was higher mortality among children in foster care within each race category (eg, among black or African American children, the adjusted mortality rate per 100 000 person-years was 43.8 [95% CI, 41.4-46.2] vs 34.1 [95% CI, 33.9-34.4]) and also within each age category (except for ages 15-18 years) (eg, for children aged 1-4 years, the adjusted mortality rate per 100 000 person-years was 50.7 [95% CI, 47.8-53.6] vs 27.5 [95% CI, 27.3-27.7]) compared with the general population. Between 2003 and 2016, mortality rates for children in foster care remained steady (−0.5 annual percent change; 95% CI, −1.3% to 0.4%) while mortality in the general population decreased by 2.5% per year

Table. Adjusted Mortality Rates for Children in US Foster Care and the General Population, 2003-2016

	Foster care		All children		
	No. of person-years	Adjusted mortality per 100 000 person-years (95% CI) ^a	No. of person-years	Adjusted mortality per 100 000 person-years (95% CI) ^a	IRR (95% CI)
Overall ^a	8 348 656	35.4 (34.2 to 36.7)	1 036 855 826	25.0 (24.9 to 25.0)	1.42 (1.37 to 1.47)
By race ^b					
American Indian or Alaska Native	234 320	39.7 (32.2 to 47.2)	18 138 968	28.7 (28.0 to 29.5)	1.38 (1.14 to 1.67)
Asian or Pacific Islander	113 655	37.5 (25.9 to 49.1)	56 257 710	14.6 (14.3 to 14.9)	2.57 (1.88 to 3.50)
Black or African American	2 947 346	43.8 (41.4 to 46.2)	171 767 302	34.1 (33.9 to 34.4)	1.28 (1.22 to 1.35)
White	5 053 335	35.3 (33.6 to 36.9)	790 691 846	23.6 (23.5 to 23.7)	1.49 (1.43 to 1.57)
By age category, y ^c					
1-4	2 269 561	50.7 (47.8 to 53.6)	223 775 803	27.5 (27.3 to 27.7)	1.84 (1.74 to 1.95)
5-9	1 991 137	21.0 (19.0 to 23.0)	281 001 153	12.8 (12.6 to 12.9)	1.65 (1.50 to 1.81)
10-14	1 976 291	26.1 (23.9 to 28.3)	291 894 943	15.6 (15.4 to 15.7)	1.68 (1.54 to 1.83)
15-18	2 111 667	49.6 (46.6 to 52.5)	240 183 927	48.2 (47.9 to 48.5)	1.02 (0.97 to 1.09)
Annualized percent change ^d	NA	-0.5 (-1.3 to 0.4)	NA	-2.5 (-2.6 to -2.5)	1.02 (1.01 to 1.03)

Abbreviations: IRR, incident rate ratio; NA, not applicable.

^a Negative binomial regression was used to examine mortality rates across the 2003-2016 time period controlling for age categories, sex, race, ethnicity, and year.

^b Stratified adjusted analysis by race categories. Negative binomial regression was used to examine mortality rates after controlling for age categories, sex, ethnicity, and year.

^c Stratified adjusted analysis by age categories. Negative binomial regression was used to examine mortality rates after controlling for sex, race, ethnicity, and year.

^d Annualized percent change was calculated using a negative binomial regression containing an interaction term between foster care status (yes or no) and year ($P = .004$) after controlling for age, sex, race, and ethnicity.

(95% CI, -2.6% to -2.5%) for an annualized incident rate ratio of 1.02 (95% CI, 1.01-1.03).

Discussion | Our study findings suggest that children in foster care represent a critically vulnerable population. Children in foster care were 42% more likely to die than children in the general population, and the disparity was largely irrespective of race or age. In addition, the mortality gap widened over time.

This study has at least 2 significant limitations. First, differences in mortality may be underestimated because children in foster care are unable to be excluded from the Centers for Disease Control and Prevention data file, and more deaths in foster care were excluded relative to person-years in foster care because of incomplete demographic data. Second, differences in mortality may be related to known baseline health differences between children in foster care and the general population.² Although the Adoption and Foster Care Analysis and Reporting System data file indicated that less than half of the children who died in foster care had some medical condition (consistent with prior literature⁶), condition specifics were not available in foster care records nor were comparable data available for the general population. Therefore, we cannot conclude that foster care is contributing to this observed difference in mortality; rather, it may be reflective of broader, underlying health and social disparities.

These statistics should motivate policy makers, health care professionals, and researchers to work together to better understand these results and to identify potential interventions to reduce mortality for children in foster care.

Barbara H. Chaichachati, MD, PhD
Joanne N. Wood, MD, MSHP
Nandita Mitra, PhD
Krisda H. Chaichachati, MD, MPH, MSHP

Author Affiliations: SafePlace: The Center for Child Protection and Health, Division of General Pediatrics, The Children's Hospital of Philadelphia, Philadelphia, Pennsylvania (B. H. Chaichachati, Wood); Center for Pediatric Clinical Effectiveness, The Children's Hospital of Philadelphia, Philadelphia, Pennsylvania (B. H. Chaichachati, Wood); Leonard Davis Institute of Health Economics, University of Pennsylvania, Philadelphia (B. H. Chaichachati, Wood, Mitra, K. H. Chaichachati); Department of Pediatrics, Perelman School of Medicine, University of Pennsylvania, Philadelphia (Wood); PolicyLab, The Children's Hospital of Philadelphia, Philadelphia, Pennsylvania (Wood); Department of Biostatistics, Epidemiology, and Informatics, University of Pennsylvania, Philadelphia (Mitra); Division of General Internal Medicine, Perelman School of Medicine, University of Pennsylvania, Philadelphia (K. H. Chaichachati).

Corresponding Author: Barbara H. Chaichachati, MD, PhD, Division of General Pediatrics, Children's Hospital of Philadelphia, 3500 Civic Center Blvd, Bldg 12, Philadelphia, PA 19146 (chaichachab@email.chop.edu).

Accepted for Publication: December 16, 2019.

Published Online: April 20, 2020. doi:10.1001/jamapediatrics.2020.0715

Author Contributions: Dr B. H. Chaichachati had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Concept and design: B. H. Chaichachati, Wood, K. H. Chaichachati.

Acquisition, analysis, or interpretation of data: All authors.

Drafting of the manuscript: B. H. Chaichachati, K. H. Chaichachati.

Critical revision of the manuscript for important intellectual content: All authors.

Statistical analysis: All authors.

Supervision: Wood, K. H. Chaichachati.

Conflict of Interest Disclosures: Dr B. H. Chaichachati reported that her employer receives compensation for her expert witness court testimony. Dr Wood reported that her employer receives compensation for her expert witness court testimony. No other disclosures were reported.

Funding/Support: This study was supported in part by grant K12-HS026372-01 from the Agency for Healthcare Research and Quality (Dr K. H. Chaichachati). The data used in this article were made available in part by the National Data Archive on Child Abuse and Neglect, Cornell University, Ithaca, New York. The data from the Substantiation of Child Abuse and Neglect Reports Project were originally collected by John Doris and John Eckenrode. Funding support for preparing the data for public distribution was provided by contract 90-CA-1370 between the National Center on Child Abuse and Neglect and Cornell University.

Role of the Funder/Sponsor: The funders had no role in the design and conduct of the study; collection, management, analysis, and interpretation of the data; preparation, review, or approval of the manuscript; and decision to submit the manuscript for publication.

Disclaimer: The collector of the original data, funding agency, and National Data Archive on Child Abuse and Neglect bear no responsibility for the analyses or interpretations presented here.

Additional Contributions: Brett Drake, PhD, Washington University, provided critical discussion at the outset of this project and did not receive financial compensation.

1. Putnam-Hornstein E, Needell B, King B, Johnson-Motoyama M. Racial and ethnic disparities: a population-based examination of risk factors for involvement with child protective services. *Child Abuse Negl.* 2013;37(1):33-46. doi:10.1016/j.chiabu.2012.08.005

2. Simms MD, Dubowitz H, Szilagyi MA. Health care needs of children in the foster care system. *Pediatrics.* 2000;106(suppl 4):909-918.

3. Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying cause of death 1999-2017 (data from the Multiple Cause of Death Files, 1999-2017, compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program). CDC WONDER online database. Published December 2018. Accessed June 28, 2019. <http://wonder.cdc.gov/ucd-icd10.html>

4. Matthews TJ, MacDorman MF, Thoma ME. Infant mortality statistics from the 2013 period linked birth/infant death data set. *Natl Vital Stat Rep.* 2015;64(9):1-30.

5. Liebler CA, Halpern-Manners A. A practical approach to using multiple-race response data: a bridging method for public-use microdata. *Demography.* 2008;45(1):143-155. doi:10.1353/dem.2008.0004

6. Lindley LC, Slayter EM. End-of-life trends and patterns among children in the US foster care system: 2005-2015. *Death Stud.* 2019;43(4):248-259. doi:10.1080/07481187.2018.1455765

Mental Health Status Among Children in Home Confinement During the Coronavirus Disease 2019 Outbreak in Hubei Province, China

As the coronavirus disease 2019 (COVID-19) epidemic progressed in Wuhan, Hubei province, China, the Chinese government ordered a nationwide school closure. More than 180 million students in China were restricted to their homes (<http://www.chinanews.com/sh/2020/02-17/9094648.shtml>). The COVID-19 infection has become a global pandemic. As of April 9, 2020, the infection has caused 188 countrywide closures around the world and has affected 1 576 021 818 learners (<https://zh.unesco.org/themes/education-emergencies/coronavirus-school-closures>). The caution about protecting the mental health of children in home confinement is warranted. This study investigated depressive and anxiety symptoms among students in Hubei province, China, which can help optimize interventions on the mental health of children for stakeholders in all countries affected by COVID-19.

Methods | In Hubei province, students in Wuhan were restricted to home from January 23, 2020, and those in Huangshi (a city about 52 mi [85 km] from Wuhan) started observing the restrictions on January 24, 2020. The students in the city of Huangshi remained at home until March 23, 2020, and those in Wuhan until April 8, 2020. A total of 2330 students in grades 2 through 6 in 2 primary schools in Hubei province, of whom 845 were from Wuhan and 1485 were from Huangshi, were invited to complete a survey between February 28 and March 5, 2020. This study was approved by the Ethics Committee of Tongji Medical College, Huazhong University of

Table 1. Characteristics of Participants

Characteristic	Participants, No. (%)
Sex	
Male	1012 (56.7)
Female	772 (43.3)
Location of school	
Huangshi	1109 (62.2)
Wuhan	675 (37.8)
Grade	
2	373 (20.9)
3	329 (18.4)
4	406 (22.8)
5	298 (16.7)
6	378 (21.2)
Worry about being infected with coronavirus disease 2019	
Quite worried	665 (37.3)
Moderately worried	445 (24.9)
Slightly or not worried	674 (37.8)
Optimism about the coronavirus disease 2019 epidemic	
Quite optimistic	908 (50.9)
Moderately optimistic	665 (37.3)
Not optimistic	211 (11.8)
Children's Depression Inventory-Short Form	
Depressive symptoms	403 (22.6)
No depressive symptoms	1381 (77.4)
Screen for Child Anxiety Related Emotional Disorders	
Anxiety symptoms	337 (18.9)
No anxiety symptoms	1447 (81.1)
Total	1784 (100.0)

Science and Technology. Students completed the investigation through an online crowdsourcing platform (<https://www.wjx.cn/>). The survey link was sent to the guardian's cellular telephone, and the statement "I permit my child to participate in the survey" was presented to the guardian before the survey. The students proceeded to the survey after their guardian had consented. All questionnaires were included in the analysis after a quality audit, with an effective rate of 100.0%.

Information included sex, school grade, optimism about the epidemic, whether they worried about being infected by COVID-19, and depressive and anxiety symptoms measured by the Children's Depression Inventory-Short Form (CDI-S) and the Screen for Child Anxiety Related Emotional Disorders, respectively. Both measures were validated for use in Chinese.¹⁻³ Generalized linear regressions were applied for continuous variables and logistic regressions for binary variables. Results were statistically analyzed with SPSS for Windows 22.0 (IBM). Statistical significance was defined by *P* values less than .05.

Results | Among 2330 students, 1784 participants (1012 boys [56.7%]; 1109 children [62.2%] residing in Huangshi) completed the survey, yielding a response rate of 76.6% (Table 1). Students had been restricted to home for a mean (SD) of 33.7