



Ending Child Fatalities from Abuse and Neglect:

*A call for connected data,
collaboration, and innovation*

► Child Welfare

Nearly five children die each day from abuse or neglect in the United States. Sadly, this is nearly a seven percent increase from 2012.¹ At the same time, the workloads of those charged with protecting our at-risk children have increased, even while child welfare budgets have decreased.²

The current opioid epidemic threatens to push an already overloaded child welfare system past the breaking point. The second-most common reason for foster care entry is parental drug abuse. Children who entered foster care at least partially because of their parents' drug abuse increased from 22 percent to 32 percent from 2005 to 2015.³

While our resources may be constrained, our resolve should never falter in the fight to save children's lives. What if we could leverage the data in the child welfare and adjacent systems to pinpoint those children who are most at risk and help child welfare providers allocate their attention accordingly?

Our experience in aviation safety shows we can. Acting as a trusted, objective third party, MITRE has been enabling airlines to share safety data through an anonymized collaborative for over 20 years. The data is then analyzed across a cohesive data set with 95 percent of their peers. This allows them to measure their safety performance against industry averages and customizable benchmarks, and empowers airlines and the FAA to work together to drive improvements and continue to reduce the likelihood of fatalities. Based on this model in aviation, MITRE has created a similar data and analytics environment to begin to pinpoint risks and tackle the problem of child fatalities due to abuse and neglect.

However, success will not be found in shared data and analytics alone. It will require combining the best efforts at all levels of government, with academia, with industry partners, and child welfare workers and healthcare providers working on the ground to tackle this problem expeditiously. Everyone who works to improve the lives of children has a critical role to play and potentially holds data crucial to our effort. MITRE's role is to bring all parties together, to bridge the divides between

¹ U.S. Department of Health & Human Services, Administration for Children and Families, Administration on Children, Youth and Families Children's Bureau. (2018). *Child Maltreatment 2016*. <https://www.acf.hhs.gov/sites/default/files/cb/cm2016.pdf>

² Child Trends. "Child Welfare Financing SFY 2014: A Survey of Federal, State, and Local Expenditures." 2014. <https://childtrends-ciw49tixgw5lbab.stackpathdns.com/wp-content/uploads/2016/10/2016-53ChildWelfareFinancingSFY2014-1.pdf>

³ Child Trends. "Five things to know about the opioid epidemic's effect on children." Sarah Catherine Williams and Kerry DeVooght. <https://www.childtrends.org/child-trends-5/5-things-know-opioid-epidemic-effect-children/>



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our public and private partners, and to serve as the objective third party everyone can trust to act in the public's best interest.

Our recent data and analytics work with the U.S. Department of Health and Human Services (HHS), Office of the Assistant Secretary for Planning and Evaluation, studied the efforts of local child welfare agencies that are attempting to implement predictive analytic solutions into their operations⁴. We identified both challenges and opportunities that child welfare leaders must consider as they continue evaluating how to use analytics effectively, safely, and ethically to improve their performance.

The increasing amount of data being collected by government agencies—across health and human services agencies, as well as criminal justice systems—presents an opportunity for applying advanced analytics to learn from patterns in historical data in order to predict the likelihood of future events. Information that is routinely collected by caseworkers can be used to help calculate the risk of repeated maltreatment. When data collected across the spectrum of interactions that touch an at-risk child's life is connected, the resulting analysis can help guide decision making and support overtaxed caseworkers to make better informed, evidence-based decisions.

Such predictions can also help estimate the number of children likely to enter the foster care system and determine realistic caseloads for caseworkers. How might these insights help? With the increasing pressures facing the child welfare system, leaders must continue to look for ways to focus limited resources where they can have the greatest impact and identify and protect the most vulnerable.

The most crucial challenge? Acquiring timely and high-quality data necessary to support the implementation of advanced analytics—especially predictive analytics, which requires significant amounts of data to make artificial intelligence and machine learning impactful. The most prevalent barrier to overcome is the ability to share data, because of statutes governing data sharing and the interpretation of those statutes, as well as the quality of the data already available to each child welfare agency. Even when it is legal for agencies to share data, privacy concerns or potential misuse of data can often prevent it from being shared.

Access to data beyond the traditional child welfare system is also important and is an essential part of our vision. Using more comprehensive data, agencies can better understand how their services impact the likelihood that a child will enter the juvenile justice system, develop substance abuse problems, graduate high school, go to college, or to become involved with the child welfare

⁴ "Predictive Analytics in Child Welfare: An Assessment of Current Efforts, Challenges, and Opportunities." Chris Teixeria and Matthew Boyas, The MITRE Corporation for U.S. Department of Health and Human Services, Office of the Assistant Secretary for Planning and Evaluation. October 2017. <https://aspe.hhs.gov/pdf-report/predictive-analytics-child-welfare-assessment-current-efforts-challenges-and-opportunities>



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system again as an adult. Availability of cross-agency data is often a challenge, but can be overcome through collaboration and trusted partnerships. This will enable stakeholders to better protect the lives of vulnerable children and improve child welfare outcomes.

Tearing down the barriers to sharing data both within a single county and across multiple jurisdictions increases the potential for implementing advanced analytics with the precision and effectiveness our analytical approaches need. By cross-referencing data sets, we can be more confident that enough cases are analyzed to produce results that are statistically strong enough for sound decision making. They can be greatly improved when data from multiple agencies and sources is combined. This helps to address situations where the data sets analyzed contain too few cases to produce results that are statistically strong enough to form the basis for sound decision making.

From Aviation Safety to Child Protection

Our federally funded research and development efforts span the whole of government, allowing MITRE to apply knowledge and solutions from work with any one of our government agency partners to others facing common problems. This enhances the effectiveness of our efforts overall, maximizing the benefit of the public we serve. Building off our decades-long work with the U. S. Federal Aviation Administration (FAA) to improve aviation safety through an analytics-focused safety collaborative, we are able to apply tested strategies and methods that can provide the basis for innovative approaches to using data to protect the lives of at-risk children. Aviation regulations, operations, and outcomes have improved as predictive analytics models have helped reduce fatalities among U.S. commercial air carriers by 67 percent today compared to fatality rates over the previous 10 years.

MITRE recently worked with data from a large county health and human services agency to apply our aviation approach with success. De-identified data sets—information that does not identify the individual—were placed in a dedicated, secure environment. Combining child welfare, pediatrics, and data science expertise, our team created several models that identified risk factors which could help caseworkers with their daily decision making. Using advanced analytical techniques, we developed models that identified new factors that caseworkers should consider when investigating whether a child is at elevated risk for severe abuse or neglect.

For example, an outcome that could have been different: a child who had previously been identified as at-risk by the child welfare system was catastrophically abused and injured when left in the care of a household member with a violent criminal history. Without recent department of corrections or child welfare data at their fingertips, caseworkers were unable to identify that the child was in a dangerous environment and intervene before the convicted abuser committed homicide, abusing



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the child with greater force than would be sustained during a fistfight with an adult. While we cannot change this outcome, we can learn from it, and work together to keep it from happening again.⁵

As with aviation catastrophes, the number of child abuse and neglect fatalities is a relatively rare occurrence in a single county or jurisdiction. However, advances in aviation safety are largely due to an analytics-focused safety collaborative where multiple stakeholders voluntarily share data in a protected and de-identified manner. Airlines' hesitation to share their individual proprietary data among themselves directly would be understandable. But sharing this continuously evolving and expanding data with MITRE acting as a trusted, objective third party enables all airlines' data to be anonymized and analyzed across a cohesive data set with 95 percent of their peers, and allows them to measure their safety performance against industry averages and customizable benchmarks. This empowers airlines and the FAA to work together to drive improvements and continue to reduce the likelihood of fatalities.

A Call for Collaboration and Innovation

Mid-air collisions that result in fatalities in the United States today are rare. Ongoing critical data analysis is happening for every flight over the United States. Now we can imagine a world where data can increase safety in the sky, but we also can create a safer world on the ground for our children.

By convening multiple federal and state child welfare agencies, MITRE is the hub through which agencies can collaborate to solve crucial problems. We are ready to work with states and localities that have experienced scrutiny due to abuse and neglect fatalities or have been subject to inquiries from government oversight bodies concerning their use of data to pinpoint systemic risk, and anyone seeking to tackle the challenge of ending child abuse and neglect, head-on. With data from numerous sources combined in a common and secure data environment that is supported with cutting edge analytical tools and techniques, we can bring stakeholders together to gain the insights and precision to stop fatalities, near fatalities, and other tragic outcomes.

We will continue working with HHS, state and local governments, and our other partners using our data analytics solutions to increase the well-being of children at risk. We believe that child welfare leaders and caseworkers will be able to identify opportunities for early intervention through the development of analytical models created through collaboration and cooperation. They can be more proactive—intervening well before a situation escalates to a tragedy.

⁵ "The 7-year-old sneaked out of bed for a cookie. His stepfather now faces murder charges." David Neal, The Miami Herald, 1/2/2018. <http://www.miamiherald.com/news/state/florida/article192558774.html>



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We imagine child welfare systems not bound to examine what happened, but empowered with the data insights necessary to improve the lives of children. Together we can pioneer the way forward, connecting data and people to end child abuse. Join us in our mission to solve problems for a safer world.

Mark Thomas

*Principal Investigator
Child Welfare*

Dr. Mark Thomas is the executive director for Population Health and Wellbeing in MITRE's Center for Transforming Health, where he spearheads a number of transformational initiatives for the U.S. Department of Health and Human Services. He has more than 15 years of experience working with federal, state, and local organizations, and nonprofit and commercial health systems to bring innovation to the administration, integration, strategy, and delivery of healthcare and human services.

He has presented his work to an array of audiences, including the National Governors Association, the National Council on State Legislatures, and the Commission to Eliminate Child Abuse and Neglect Fatalities. Dr. Thomas' work has focused on maternal-child health disparities, behavioral health, and social determinants of health and wellbeing. Prior to working at the macro-policy level, he began his career working in mental health with at-risk children and families, where he experienced first-hand the complex and interconnected challenges facing local public health and human service agencies. Dr. Thomas holds a Ph.D. in child and family studies, with a health research concentration; an M.P.A., with a certification in health services management and policy; and an M.A. in marriage and family therapy, all from Syracuse University, and a B.S. in family science from Brigham Young University.

Christopher Teixeira

*Principal Investigator
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Christopher Teixeira, M.S. is the chief engineer for the Model-Based Analytics Department within MITRE. He is leading work to inform child welfare administrators on how predictive analytics can support their efforts in serving children.

During his tenure at MITRE, he has supported multiple federally funded research and development centers across a variety of projects, such as supporting the Department of Energy in understanding how to safely and effectively treat nuclear waste and helping the Veterans Benefits Administration use sophisticated modeling techniques to better serve veterans. He earned an M.S. in operations research from George Mason University and a B.S. in mathematics from Worcester Polytechnic Institute.