

Targeting Support to Families at Greatest Risk

Case study of the Allegheny County Department of Human Services Predictive Risk Model for Child Abuse and Neglect

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Summary: Vital records such as those of births and deaths are among the mundane ways that government records events and tracks data. Yet these universal data sources can be an untapped resource for finding trends and patterns that help improve public health. **An excellent example is the Department of Human Services (DHS) in Allegheny County, Pennsylvania, which uses data from birth records to prioritize prevention services to the families of children at highest risk of abuse or neglect.** Using predicted risk scores, the county created a universal family support program and offered services tailored to individual family needs, with emphasis on reaching those at greatest risk. The program, [Hello Baby](#) has helped over [2,000](#) families in the county navigate the challenges of a newborn with personalized support. As DHS director Erin Dalton pointed out, “Our model helps us identify and concentrate resources on families with the biggest needs.”

Background on the challenge: The predictive risk model developed by Allegheny County addresses a significant and complex national problem. On an annual basis nationally nearly [8 million](#) children are reported as suspected victims of maltreatment, more than a [650,000](#) children are confirmed victims of maltreatment, and nearly [2,000](#) children die as a result of physical or sexual abuse or neglect. Further, child victims of maltreatment suffer lasting harm to their wellbeing that is evident in lower educational outcomes, and an adulthood characterized by higher incidence of substance use, lower earnings and greater likelihood of criminal activity.

Using data already on hand: Historically, targeting services to prevent child maltreatment has been done either by simply focusing on high poverty neighborhoods, or by using some small number of criteria. Allegheny County DHS has made a major leap forward by using timely, high-quality data that it already has, eliminating the need to ask new mothers a slew of screening questions or gather new data. With data from birth records, DHS has also narrowed the time lag before service delivery can begin, intervening as soon as it is possible. Now, some families are even identified for proactive before birth via hospital records on prenatal visits.

DHS has long been [recognized](#) as a leader in using data to more effectively serve those in need. With the help of a data science research team, DHS developed a predictive risk model (PRM) that enables priority outreach to families most in need of support to prevent child maltreatment. The PRM uses data from birth records about the health of the baby and the mother (and father if such data is provided). The program is voluntary and invites families to enroll shortly after the birth of their child. Support is provided until age three, because [80%](#) of child fatalities in the county occur before a child’s third birthday.

The need for a more precise way to target services. Inspiration to create this risk tool came from the realization that [50%](#) of critical child abuse and neglect incidents (fatalities and near fatalities) occurred in families who had never had a referral for child protective services. DHS leadership wanted to know how to identify families who had not previously been referred for services, and to be able to intervene *before* a tragic incident occurred. As DHS director Erin Dalton pointed out, “We could be absolutely perfect in our child welfare decision making and still miss half the opportunities to protect babies and support families. If we care about prevention, we have to find another way.”

Dalton wanted something more precise than standard methods to target such early childhood and family interventions, like being a teen parent or being on Medicaid, screening methods that identify too many targets and not the ones most in need. Also, according to the [researchers](#) supporting the project, “We find that the vast majority of families in programs such as home visiting do not fall into the categories of “high” or “complex” needs. This lack of connection with the families most in need means that the County is missing opportunities to prevent harm and protect children.”

How the model was built. According to the [methodology report](#) published by the research team, the model integrates 59 data elements to create a risk score that allows families most at risk to get individualized supportive services. The model identifies families with the highest likelihood of having a child placed in foster care before the age of three. The model was tested and validated for accuracy and was developed by an international team of experts including scholars from the [University of North Carolina](#), and the [Auckland Institute of Technology](#). A key to success in accessing the data from birth records was that the Department of Human Services worked with the county’s health department to amend their agreement with the state around access to individual level vital records data in a way that allows DHS to receive this ongoing data feed for this express purpose only.

Creating the risk model and the outreach and family support services program, [Hello Baby](#), spanned a number of years and included vigorous outreach to families and to agencies serving families and young children, as well as rigorous review of the research literature on child abuse and neglect. Outreach included conversations with families receiving services, service providers, clinical experts, judges, family court advocates, representatives of civil liberties, civil rights and social justice organizations, and national experts. A competitive RFP was issued to identify a team capable of developing the risk model, and two outside ethics evaluators were engaged to identify ways to prevent unethical use of the data model. Example of ethics and privacy guardrails created through this process include that there is no connection between the program and protective services; risk scores are not disclosed to any party; race is not used as a predictive factor in the model; and that not only is program participation optional, but families also have the choice to opt out of even having their risk score calculated.

Resources to address high risk families. Families receive information at the hospital right after their child’s birth, and then a postcard is sent to the home reminding them that they can opt

out of being included in the risk model. For families that do not opt out, a risk score is calculated and they are assigned to one of three tiers of service, based on the risk score produced by the Predictive Risk Model (PRM). Families with the most complex needs are offered more intensive services and supports. Grouping families into tiers of need enables the county to more effectively allocate resources by better matching families and babies to the right level of services and ensure that the most vulnerable families are offered services that fit their unique needs, as shown in the table below.

Hello Baby Services by Tier		
Tier of Service	Eligibility	Services Provided
Universal	<ul style="list-style-type: none"> All new parents in the county 	<ul style="list-style-type: none"> A “warmline,” the Hello Baby website, and a texting service staffed by volunteers to answer questions about newborns and parenting issues.
Family Support	<ul style="list-style-type: none"> Families deemed at “moderate” risk by the Predictive Risk Model Parents from Universal tier who self-refer for additional support 	<ul style="list-style-type: none"> Service provided via existing network of 27 Family Centers with a rich array of services, including home visiting, family support, and child care subsidies.
Priority	<ul style="list-style-type: none"> Families deemed at “elevated” risk by the Predictive Risk Model Parents from other tiers who self-refer for more intensive support 	<ul style="list-style-type: none"> Support from a two-person team including a family engagement specialist, who functions as a peer counselor, and a social worker who plays the role of case manager. Teams work with families to learn about their unique needs, connect them to resources, and provide wraparound assistance, available until the child turns three years old.

Families may opt into a higher tier of service than their risk score indicates. Families may also be referred to a higher tier of service by a case worker.

Risk scores are calculated on a weekly basis for all newborn babies (unless the family has opted out) by an algorithm in the secure data warehouse by trained staff who protect the data. The model and the predictive risk scores it produces are only accessible to the analyst team. No information about the risk score or the data elements that derived it are shared with service providers - they are simply provided the name and contact information for the family being referred. Participation by families is entirely optional.

Grounded in data and research. The program's structure is grounded in research and the team is committed to continuous improvement. Review of child maltreatment literature found that high-risk families are more likely to participate in a universal intervention, so the risk model and the universal support program reach all babies in the county. Research also found that outreach by home visitors is most effective when done by someone of the same background or culture as the parent(s), so that element was built into the selection process for the service provider. An early process evaluation identified ways to improve program operations and an outcome evaluation is under way. Amy Malen, DHS assistant deputy director, who oversees the program explained this spirit of continuous inquiry and improvement, "What we've learned through our outreach efforts has led to a more coordinated approach, resulting in increased engagement rates."

Replicability of the model: The model developed in Allegheny County was used with birth record data for the State of California and found to be effective there as well. Birth record data is uniform across the nation -- this means that even jurisdictions without the data analytic resources and capacity of Allegheny County or the State of California can adopt this approach. Birth record data can be used to triage the most at-risk children and protect them for their lifetime, using information from the day they were born.

Conclusion. In summary, while Hello Baby was launched during the pandemic and has yet to produce results from outcome evaluation, not only is this a model to watch, the predictive risk model used to prioritize families for services can be copied by other jurisdictions if they want to reach the right families for proactive intervention to prevent child maltreatment.