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Child Welfare and Predictive Analytics: Safety in Numbers?

When Beverly Walker accepted her job as director of the Illinois Department of Children and Family Services (DCFS) in June 2017, she knew she was walking into a warzone. Hammered by allegations of mismanagement and incompetence, the agency had seen nine directors and acting directors in six years, and the most recent director had resigned amid an ethics probe and a series of high-profile child fatalities.[1] Walker spent her first five months working tirelessly for change.

Walker considered her employees to be first responders to families in crisis. The Illinois child abuse hotline received around 5,000 calls each week. About 1,500 of those calls turned into investigations, more than a quarter of which found evidence of abuse or neglect.[2] Walker likened DCFS to an emergency room: although the agency could not control who would need help or when, it could control its response. She knew that providing her staff with accurate, real-time information to make informed decisions, and minimizing case overloads that could impair judgment and lead to tragic outcomes were mission-critical. The stakes could never be higher than the life or death of a child.

In recent years, predictive analytics—the use of historical data, statistics, and modeling to anticipate the probability of future events—had garnered high praise and attention in the realm of child welfare.[3] U.S. state and federal government invested around $270 million annually in child welfare research, data collection, and analysis.[4] For its part, Illinois had launched a pilot program in May 2016 that used analytics to identify children with a prior DCFS investigation who were at risk for serious injury or death, in the hope of reducing such disastrous occurrences.[5]

Although Walker generally pushed for improved technologies that could streamline information management for her staff in the field,[6] she had begun to question the usefulness of the data-mining program. The new system seemed to obscure rather than improve sight lines, tying up limited resources while still enabling horrific acts of brutality that blindsided social workers and fueled public outrage. Walker wondered if a flawed program was better than no program at all. Could DCFS work with the analytics provider to reengineer algorithms and data sets to improve results, or should the agency discontinue the program entirely? She had much to consider.

Illinois DCFS

Illinois DCFS provided comprehensive services to protect children, investigate claims of child abuse and neglect, strengthen families through intervention, and secure and oversee foster care and adoption services when risk prevented children from remaining in their homes. One of the largest state welfare agencies in the country, Illinois DCFS employed around 2,600 people in more than 60 offices and had an operating budget of $1.2 billion in 2017.[7] In addition, DCFS licensed and monitored the state's child welfare agencies and more than 14,000 daycare centers, homes, and group homes.[8]

Each year DCFS received about a quarter of a million calls on its 24-hour child abuse and neglect hotline. To avoid unnecessary investigations, trained social workers screened hotline calls and decided which allegations warranted further examination for abuse or neglect. Calls that did not result in further investigation often led to referrals of families to community programs designed to prevent abuse. DCFS conducted more than 121,000 investigations in 2017, and found credible evidence of abuse or neglect in just over a quarter of them.[9] When formal investigations occurred, DCFS was usually able to provide services to the family that allowed the child to remain safely in the home. Only 4 percent of investigations resulted in children being removed from their homes.[10] Removal was considered a tool of last resort, because research and experience consistently underscored the trauma of separation for children and demonstrated that among children with similar abuse histories, those who were able to remain in their homes and avoid foster care tended to experience fewer arrests, lower teen pregnancy rates, higher income, and higher employment rates later in life.[11]

Illinois took a community-based approach to child welfare. It contracted with roughly 570 private providers for around 86 percent of its child welfare care to clients, outsourcing services from foster care to psychiatric counseling.[12]

Unfortunately, this practice of privatization had led to significant problems in recent years, particularly in the intact family services program. This program assisted around 2,700 children and involved some of the agency's riskiest cases, because children remained in their homes while DCFS provided a range of services, including frequent home visits, counseling, and resources to prevent further maltreatment.[13] After the intact family services program was completely privatized in 2012, a surge in child fatalities occurred: whereas only one child in the program died between 2007 and 2011, 15 children in the program died between 2012 and 2016.[14] DCFS acknowledged that when it turned over control of the program to contracted agencies, it did not adequately assess the quality

of work performed, ensure that agencies had sufficient means to address the needs of each family, or hold agencies accountable when children suffered.[15]

Part of this lack of communication and oversight stemmed from high turnover rates, staffing shortages, and budget constraints. Child protection investigators experienced high-stress working environments and dangerous conditions as they confronted risky situations and dealt with parents and caregivers who were sometimes hostile or abusing substances. More than 12 DCFS workers had been attacked (one fatally) or severely threatened on the job since 2013.[16] In fiscal year 2016, DCFS reported high vacancies in child protection investigator positions, which reduced its ability to comply with mandates to respond to hotline calls within 24 hours.[17] Although DCFS contracts and an Illinois federal court consent decree barred investigators from handling more than 10 cases at a time[18] and more than 153 cases per year, some investigators were carrying more than 30 new cases per month and handling as many as 280 cases annually.[19]

Walker's predecessor, George Sheldon, who had been appointed in 2015, relied on predictive analytics as a central part of his strategy to protect children who were known to DCFS from previous reports. He believed that using technology to enable DCFS to proactively scan its data to predict problems and intervene before tragedy struck would be a huge step forward. He hired a Florida non-profit, with whom he had prior connections, to assist in making the change and invested $366,000 in a pilot program called Eckerd Rapid Safety Feedback.

Eckerd Connects

Founded in 1968, Eckerd Connects (formerly Eckerd Kids) was a national non-profit organization providing services to more than 34,000 children and parents annually in 20 states and the District of Columbia.[20] Eckerd also managed the largest privately operated child welfare system in the country. After an unprecedented nine child fatalities in a Florida county between 2009 and 2011, the organization was tapped to lead the region's child protection services. It developed a cutting-edge approach to child welfare called Eckerd Rapid Safety Feedback (ERSF) that combined data analytics with quality case management to prioritize cases most at risk for leading to serious abuse or death.

After analyzing thousands of closed abuse cases, Eckerd found 15 data points that correlated with serious harm, including a child's age, the presence of substance abuse or criminal records for others in the home, and a parent's changing marital status.[21] The organization also identified key case practices that contributed to the overall effectiveness of safety plans—for example, the type and thoroughness of contacts made during the investigation. By scanning open cases for serious risk indicators and streamlining data retrieval to ensure that the scores it assigned reflected all available information, Eckerd could prioritize the highest-risk cases and recommend them for quality assurance reviews to ensure the best outcomes.

Measuring the success of a prevention tool was challenging, yet the results were promising: the Florida county's tragic pattern of child homicides ended, and no child abuse or neglect fatalities occurred in the county's population in the five years after implementation of the program.[22]

The priority tool could be customized for specific needs and jurisdictions around the country, and it quickly garnered national attention. Eckerd began working with jurisdictions in Illinois, Oklahoma, Maine, Alaska, and Connecticut, and in 2016 the organization was highlighted in a bipartisan congressional commission's final report for the development of a national strategy to eliminate child abuse and neglect fatalities.[23]

In testimony before a congressional human resources committee, Eckerd identified four key ingredients for successful implementation of ERSF: a well-defined challenge that a jurisdiction hoped to address, such as prevention of death among children with prior abuse reports; daily access to a state child welfare information system, which allowed predictions to continuously improve and update as new data was entered; access to quality assurance reviews assessing case practice; and experienced staff to review high-risk cases for key safety practices and to provide coaching to the field.[24]

Eckerd emphasized that ERSF did not leave decisions to machines—it was a tool meant to help child welfare agencies and their partners focus their attention where it was needed most to safeguard positive outcomes for children in their care. Data combined with quality assurance reviews ensured that children with the highest risk had supervisors checking in with investigators to confirm they were meeting the highest standards in case practice.

The Eckerd Rapid Safety Feedback Experience in Illinois

DCFS launched its ERSF pilot program in May 2016. Children who were the subject of an abuse or neglect allegation on the agency hotline were assigned a score between 1 and 100 that rated the probability that they would be killed or severely injured during the next two years. Scores were updated nightly based on new information in DCFS electronic databases. All calls were assigned and investigated according to standard department rules and procedures, but high-risk cases in particular were flagged and given an additional review process to ensure that caseworkers and investigators were leveraging all pertinent safety practices and providing the highest levels of care.

Once a high-risk case was identified and selected for review, the quality assurance team reviewed the case between the 10th and 14th day of the investigation, focusing on nine key areas that historically had significant impacts on outcomes. Among these critical areas were review of prior history, safety planning, type and thoroughness of contacts during the investigation, collaboration and communication levels among a family's various service providers, and the quality of supervision that the caseworker received. If reviewers had concerns about a child's safety or the information available to determine safety, they could request a staffing (i.e., a team decision meeting) with the investigator and his or her supervisor to discuss the case and agree on action items that could improve evaluations and effectiveness of protection plans. The investigation was followed until it closed, and the nine critical areas were reviewed again around the 45th day of the investigation, if it was still open. The state had three Eckerd review teams (each with five reviewers and a supervisor), and planned to review 200–250 cases per month (see **Exhibit 1**).[25]

Initially, DCFS focused on reducing the likelihood of a fatality or life-threatening episode among all children known from a prior report regardless of whether the prior report had been

substantiated. By September 2016, however, the department had determined that this focus was too broad and revised it to concentrate on children who were 0–8 years old.[26]

Despite the narrowed focus, the department was swamped with alerts for children needing urgent protection. ERSF predicted that more than 4,100 children had a 90 percent or greater probability of being killed or seriously injured in the next two years, and 369 children had a 100 percent chance of death or serious injury.[27]

Child care agencies expressed alarm when they began receiving starkly worded computer-generated notifications such as, "Please note that the two youngest children, ages 1 year and 4 years, have been assigned a 99% probability by the ERSF metrics of serious harm or death in the next two years."[28]

Eckerd representatives eventually apologized for the dire language of its program and any confusion that it might have caused. The organization clarified that the score was "merely meant to represent how closely a child matches historical data on fatality and harm cases."[29] Eckerd said that frontline child care workers were not supposed to receive raw scores or let the scores impact their independent evaluations; instead, DCFS supervisors trained and coached by Eckerd should review the data to determine which cases needed immediate attention and how best to address safety risks.

Although ERSF experienced its share of false positives and struggled to cope with the resulting challenges, false negatives proved even more devastating. Predictive analytics software failed to assign high-risk scores to several children who died from abuse and neglect. They included a 17-month-old girl named Semaj Crosby, who was found dead from asphyxiation under a couch in April 2017, and a 22-month-old boy named Itachi Boyle, who was killed less than a month later. Both children came from homes that had been the subject of more than eight hotline calls and investigations. Yet, despite extensive contact with DCFS, case workers had failed to discern dangerous conditions, and the data analytics program had assigned the children low scores that did not even flag their cases as warranting additional quality assurance reviews.[30] These back-to-back cases of children killed while their families were receiving DCFS assistance to prevent abuse generated a political and media firestorm, prompting legislative hearings for DCFS, the director's resignation, and a series of community meetings to facilitate change.

Both cases revealed significant data entry errors in the DCFS system. In addition, the DCFS database did not link investigations for many children to cases regarding their siblings or other adults in the same home. State law also forced DCFS to erase "unfounded" child mistreatment investigations, giving Eckerd analysts less data to work with. When Walker took the helm in June, she attacked each of these problems. DCFS subsequently changed the way it indexed and cross-referenced investigations so that investigators would know when previous investigations had taken place, and it considered legislative changes that would permit the retention of records of past unproven allegations.[31]

Walker knew that Illinois lacked a central, coordinated data system—not only for managing DCFS's own information but also for enabling investigators to have a more complete understanding of a child's risk through access to streamlined data from other state government departments such as health, corrections, and education. She wanted to identify the optimal selection and measurement of data in order to increase safety for kids, and hoped to hardwire good data management principals into DCFS.[33]

As part of this effort, Walker had recently instituted daily reports to the department and to contracted providers of any instance of repeat mistreatment of a child in the intact family services program.[34] The reports revealed that around 10 percent of cases in the program were experiencing subsequent hotline calls—a situation that Walker considered unacceptable.[35] She asserted that the agency needed to be laser-focused on understanding new risk and working with contracted providers to keep kids safe.

In her six months with DCFS, Walker had accelerated hiring to relieve investigator caseloads, improved data management and reporting capabilities, and reclaimed a number of high-risk cases from private providers to handle in-house. Now she was turning her attention to ERSF. Although she was skeptical about the utility of ERSF for the department as a whole, she mulled over whether the tool might be used effectively to review the intact family services program subset. Certainly, better information should lead to better responses and, ultimately, to better outcomes. Walker needed to determine how to maximize the value of data-driven decision-making tools for improving DCFS welfare and protection services.

Exhibit 1: Illinois DCFS Eckerd Team Investigations for FY2017

	1st Quarter FY17		2nd Quarter FY17		3rd Quarter FY17		FY17
	Total Assigned for Review	% Assigned for Review	Total Assigned for Review	% Assigned for Review	Total Assigned for Review	% Assigned for Review	Total Assigned for Review
Statewide	356		543		686		1585
Northern	**68**	**19.10%**	**110**	**20.26%**	**127**	**18.51%**	**305**
Rockford	16	23.53%	41	37.27%	37	29.13%	94
Aurora	52	76.47%	69	62.73%	90	70.87%	211
Central	**95**	**26.69%**	**201**	**37.02%**	**251**	**36.59%**	**547**
Peoria	40	42.11%	64	31.84%	96	38.25%	200
Springfield	26	27.37%	71	35.32%	82	32.67%	179
Champaign	29	30.53%	66	32.84%	73	29.08%	168
Southern	**122**	**34.27%**	**148**	**27.26%**	**186**	**27.11%**	**456**
Marion	78	63.93%	90	60.81%	96	51.61%	264
East St. Louis	44	36.07%	58	39.19%	90	48.39%	192
Cook	**71**	**19.94%**	**84**	**15.47%**	**122**	**17.78%**	**277**
Admin	3	4.23%	0	0.00%	2	1.64%	5
North	10	14.08%	33	39.29%	37	30.33%	80
Central	20	28.17%	19	22.62%	26	21.31%	65
South	38	53.52%	32	38.10%	57	46.72%	127

	1st Quarter FY17		2nd Quarter FY17		3rd Quarter FY17		FY17
	Staffings Conducted w/ Field	% Staffings Conducted	Staffings Conducted w/ Field	% Staffings Conducted	Staffings Conducted w/ Field	% Staffings Conducted	Staffings Conducted w/ Field
Statewide	111		93		197		401
Northern	19	17.12%	29	31.18%	55	27.92%	103
Central	26	23.42%	32	34.41%	54	27.41%	112
Southern	37	33.33%	18	19.35%	50	25.38%	105
Cook	29	26.13%	14	15.05%	38	19.29%	81

Source: Illinois Department of Children and Family Services, "Annual Progress and Services Report FY2018," p. 346.

Endnotes

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