Predictive Analytics In Child Welfare: An Overview Of Current Initiatives And Ethical Frameworks To Inform Equitable Policy And Practice

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Outline

- About PSMG: "advance the field of prevention science and support the implementation of evidence-based prevention programs."

- Brief overview of child welfare policy and practice in the US

  - Focus on <u>preventing</u> child abuse and neglect and <u>implementing</u> evidence-based practices in public child welfare

- Predictive analytics in child welfare

- An ethical framework applied to a child welfare prevention policy

- Findings from recently completed qualitative study

National Overview of Child Welfare System

Exhibit S–2 Statistics at a Glance, 2019

Referrals

4,378,000 million* REFERRALS alleging maltreatment to CPS involving 7,880,400 million CHILDREN[1]

54.5% referrals SCREENED IN[2] *(become reports)*

45.5% referrals SCREENED OUT[2]

Reports

2,368,325 million REPORTS received a disposition

Submitted by
68.6% professionals
15.7% nonprofessionals
15.7% unclassified

Children

3,476,000 million CHILDREN^ received either an investigation or alternative response

656,000^ VICTIMS
Includes 1,840 Fatalities*

2,820,000^ NONVICTIMS[3,4]

Services

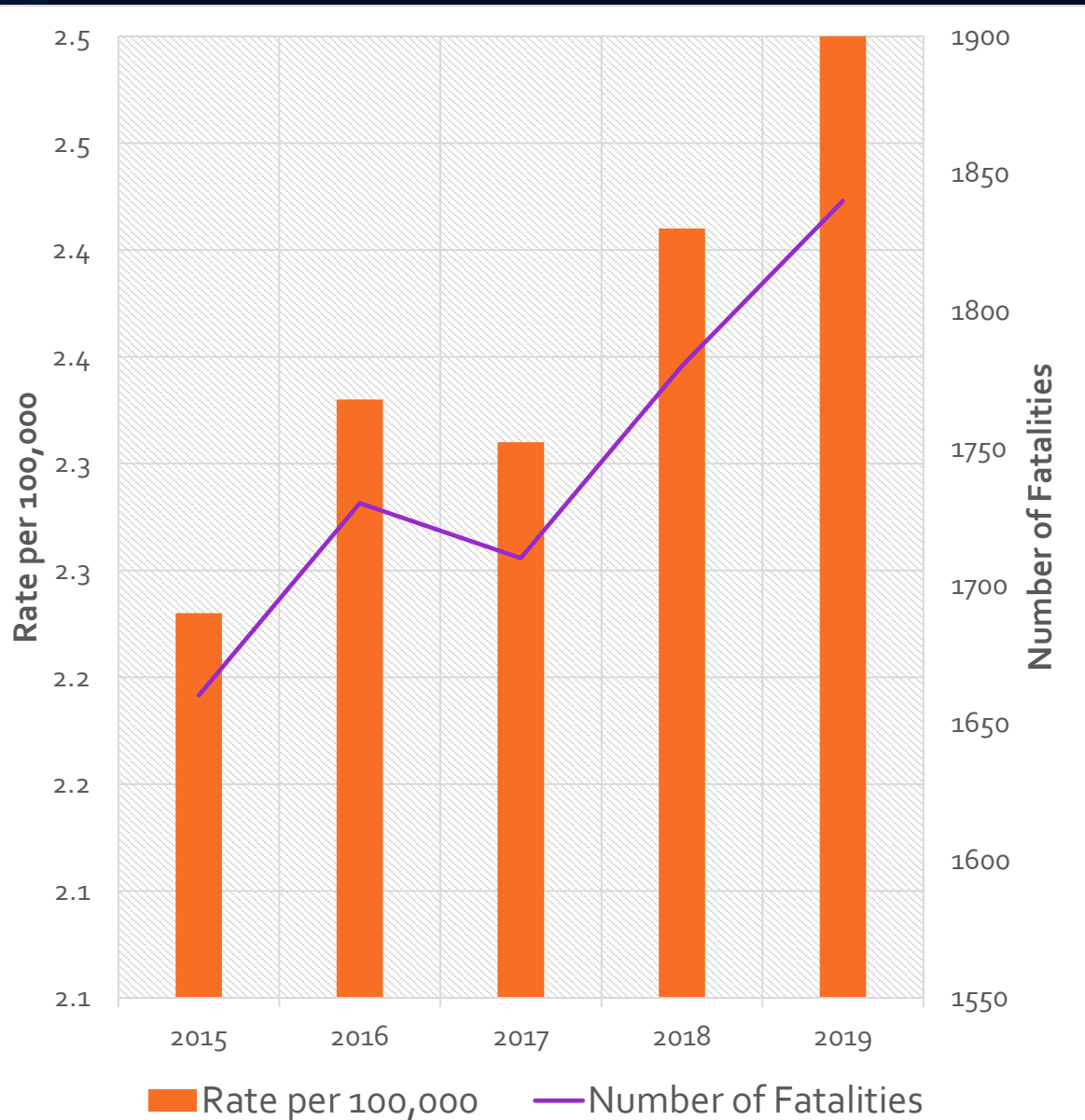380,805 VICTIMS[5] received postresponse services

898,559 NONVICTIMS[4,5] received postresponse services

142,056 VICTIMS[6] received foster care services *(on or after the report date)*

57,681 NONVICTIMS[4,6] received foster care services *(on or after the report date)*

Child Maltreatment 2019

U.S. Department of Health & Human Services
Administration for Children and Families
Administration on Children, Youth and Families
Children's Bureau

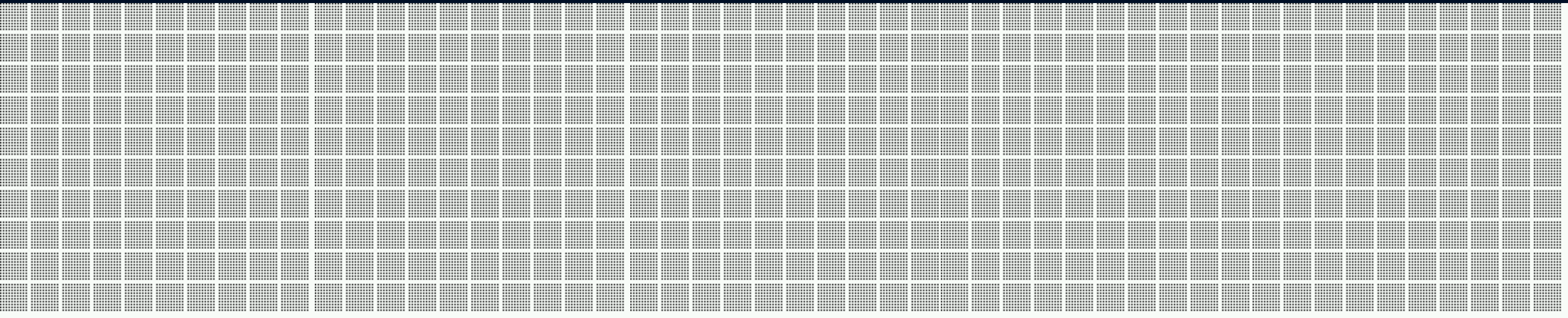# National Overview of Child Fatalities

2019 Child Fatalities:
- Mostly young children
  - 45% <1 years; 70% <3 years old
- Differences by race
  - 44% White; 2.2 per 100,000
  - 29% African-American; 5.1 per 100,000
- 73% neglect, 44% abuse
- 80% perpetrators are parental caregiver
- 34% had prior CPS contact, 7% identified as prior victim

100,000 dots
Can we prevent 3 child abuse fatalities in this group?
What about the 23 per 100,000 for infants < 1 years old?
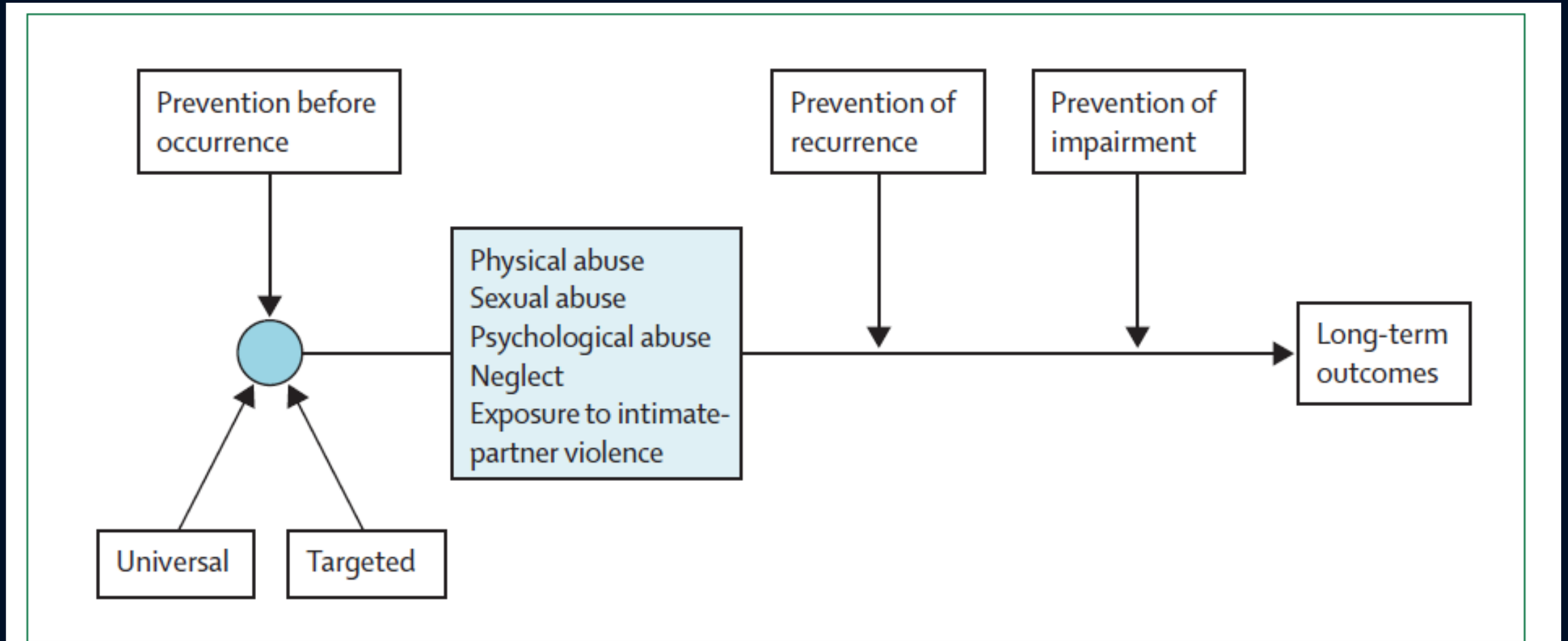
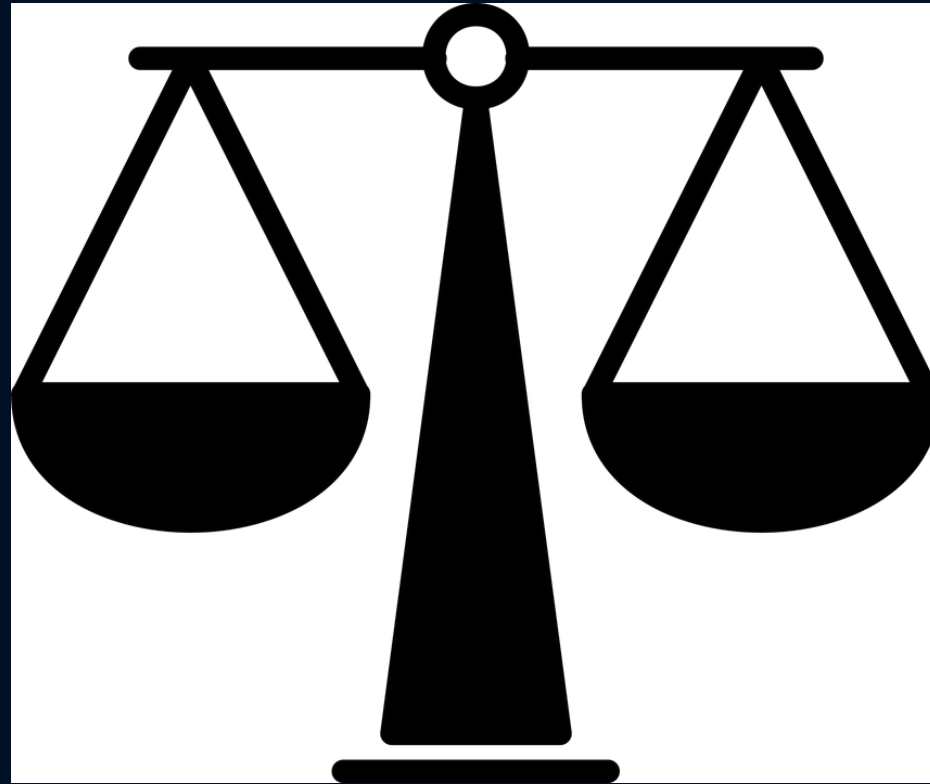# Prevention in the Child Welfare System

Figure 1: Framework for prevention of child maltreatment and associated impairment

Child Maltreatment Prevention Policy History

- "Modern" era began in 1960s, battered child syndrome

  - State reporting and response systems

- Led to CAPTA in 1974, (P=*prevention*)

  - Official reporting system = focus on preventing recurrence

- Keeping Children and Families Safe Act of 2003

  - Directly funds prevention

- Families First Preventive Services Act, 2018

- Always major imbalance in prevention vs. intervention

  - "Preventive Services" 15% of total child welfare expenditures
    https://www.childtrends.org/publications/child-welfare-financing-survey-sfy2018

Oversimplified Description of Child Welfare Policy over Time

Child Protection/Safety   Family Preservation

Children's Rights   Parental Rights

Foster care benefits   Foster care iatrogenic effects

Public good   Government intrusion

Prevention of Child Maltreatment Fatalities

Within Our Reach

A National Strategy to Eliminate Child Abuse and Neglect Fatalities

COMMISSION TO ELIMINATE CHILD ABUSE AND NEGLECT FATALITIES

Final Report, 2016

Imagine a society...

...where children do not die from abuse or neglect.

...where children are valued, loved, and cared for first and foremost by their parents.

Imagine a society...

...where research and integrated data are shared in real time in order to identify children most at risk for abuse or neglect fatalities and make informed and effective decisions about policies, practices, and resources.

Prevention of Child Maltreatment Fatalities

Recommendations to Save Lives Now

Within Our Reach
A National Strategy to Eliminate
Child Abuse and Neglect Fatalities

COMMISSION TO ELIMINATE
CHILD ABUSE AND NEGLECT FATALITIES

Final Report, 2016

- Identifying children and families most at risk of a maltreatment fatality is key to knowing when and how to intervene. Therefore, we recommend that states undertake a retrospective review of child abuse and neglect fatalities to help them identify family and systemic circumstances that led to child maltreatment deaths in the past five years. States will then use this information to identify children at highest risk now, and they will develop a fatality prevention plan to prevent similar deaths both now and in the future. Ensuring that the most vulnerable children are seen and supported is a critical element of this process.

- Sharing data electronically and in real time will have an immediate impact on improving child protection decision-making by state and local entities.

Analytics with administrative data to prevent child maltreatment?!?
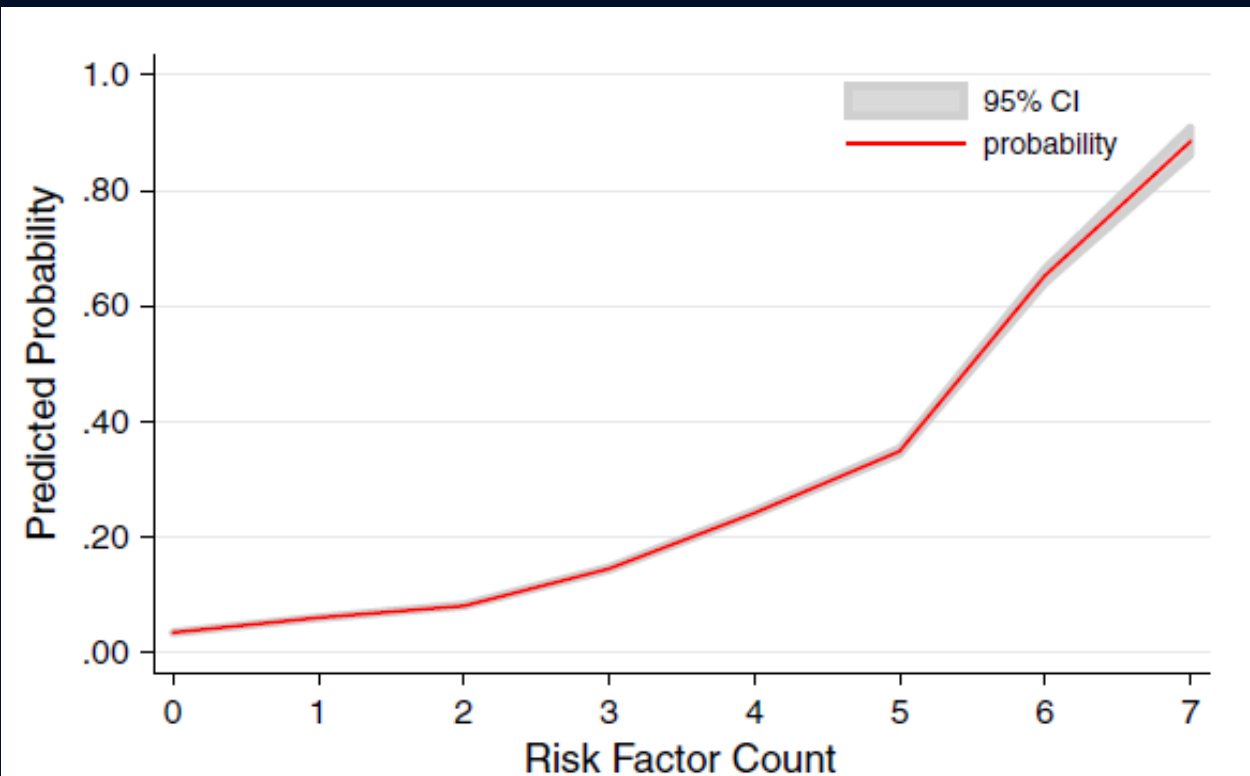
How did we get here?

- Translation of scholarly research

- Epidemiologic research of state-level data consistently showed promise

- Administrative records allow for prospective analysis using retrospective records,

  - Can we predict "future" events from prior data?

- Extended to "real-time" predictive analytics in child welfare practice

Predictors of child protective service contact between birth and age five: An examination of California's 2002 birth cohort

Emily Putnam-Hornstein [*], Barbara Needell

any child born with three or more of just a handful of risk factors (prenatal care that began after the first trimester, missing paternity, <=high school education, 3+ children in the family, maternal age <=24 years, Medi-Cal Coverage of the birth for a US-born mother), we could identify 50% of children reported for maltreatment before the age of five from just 15% of the total birth cohort.

1. Included risk factors are those considered "modifiable", at least in theory.
2. Risk factors are unweighted and ordered based upon their frequency withing the cohort (from most to least common).
3. Non-modifiable variables not included are set at the group mean, given other risk factors.

Fig. 2. Predicted probability of being reported for maltreatment (and 95% CI) by count of risk factors at birth.

The Rise (and Plateau) of Predictive Analytics

Uncharted Waters: Data Analytics and Child Protection in Los Angeles

BY DANIEL HEIMPEL

A county-led forum in Los Angeles n...
child abuse.

On Wednesday, July 22, Los Ang...
community forum to discuss the s...
determine which children are the...

The question of whether child we...
which uses data to infer what may...
liberties, racial profiling and the a...
children. Despite the understand...
family dysfunction versus family s...
promise.

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eckerd connects

Family & Children Services | Workforce Development | Job Corps

🏠 › FAMILY & CHILDREN SERVICES › ECKERD RAPID SAFETY FEEDBACK®

ECKERD RAPID SAFETY FEEDBACK®

eckerd Rapid Safety Feedback

Eckerd Connects' Eckerd Rapid Safety Feedback® (ERSF) was developed to stem the tide of child abuse deaths in Hillsborough County, Florida after an unprecedented nine child homicides in less than three under the previous system of care operator.

Data mining program designed to predict child abuse proves unreliable, DCFS says

By DAVID JACKSON and GARY MARX
CHICAGO TRIBUNE | DEC 06, 2017 AT 9:31 AM

Beverly Walker, director of the Illinois Department of Children and Family Services, announced this week that the department is ending a high-profile program that used computer data mining to identify children at risk for serious injury or death. (Nancy Stone / Chicago Tribune)

Current Models

Ethical Frameworks

FAT/ML

Fairness, Accountability, and Transparency in Machine Learning

https://www.fatml.org/

Responsibility

Make available externally visible avenues of redress for adverse individual or societal effects of an algorithmic decision system, and designate an internal role for the person who is responsible for the timely remedy of such issues.

Explainability

Ensure that algorithmic decisions as well as any data driving those decisions can be explained to end-users and other stakeholders in non-technical terms.

Accuracy

Identify, log, and articulate sources of error and uncertainty throughout the algorithm and its data sources so that expected and worst case implications can be understood and inform mitigation procedures.
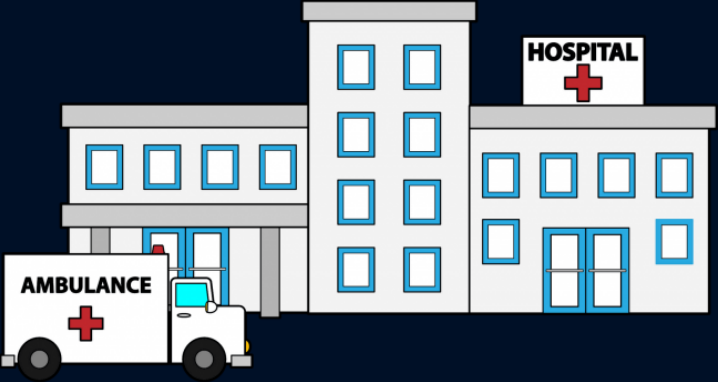
Auditability

Enable interested third parties to probe, understand, and review the behavior of the algorithm through disclosure of information that enables monitoring, checking, or criticism, including through provision of detailed documentation, technically suitable APIs, and permissive terms of use.

Fairness

Ensure that algorithmic decisions do not create discriminatory or unjust impacts when comparing across different demographics (e.g. race, sex, etc).
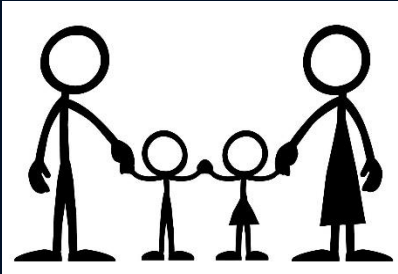
Birth Match

So, What is Birth Match?

Birth Record with Infant and Parent Information

Linked with historical CPS data

Matches identified resulting in local CPS response (investigation)

Prevention of Child Maltreatment Fatalities

Within Our Reach
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COMMISSION TO ELIMINATE
CHILD ABUSE AND NEGLECT FATALITIES

Final Report, 2016

Public health departments (birth match). Several states have "birth match" programs that require hospitals to alert CPS to the births of children born to parents who have previously had a termination of parental rights. These families then receive, at minimum, timely home visiting to ensure that this very high-risk combination of child vulnerability and likely parental incapacity receives a prompt protective response.[111] A detailed description of the

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Final Report, 2016

Appendix I: List of Proposed New Data Elements to Include in the Annual *Child Maltreatment* Report[125]

The number of children identified through birth match between hospitals and CPS as being at risk due to the prior termination of parental rights due to the parent's perpetration of violence on another child.

Better Use Data to Protect Children and Support Families

A policy action to Stop Family Violence

Safe Children:
Reducing Severe and Fatal Maltreatment

Action

Encouraging states to link and share data across systems can enable them to protect newborns at risk of maltreatment and to target preventive services to their families:

- Federal policy should encourage states to adopt Birth Match, a program that links state child-welfare, birth, and criminal-justice data to identify newborns at high risk of severe and fatal maltreatment.[6]

2. Implement birth match programs in order to identify and reach out to very high risk families within days of new births.

   a. In a decade, 20 states will have instituted birth match programs that alert child welfare services if births occur in families with prior failed cases or current open cases.

Initial Concerns about Birth Match Policy

- Developed in response to specific high-profile (media attention, headline grabbing) fatal maltreatment cases

- <u>No evidence</u> regarding prior TPR as a risk factor for fatal infant maltreatment
  - Yes prior CPS involvement is a risk factor, but no evidence for TPR as proxy for highest risk

- <u>No evidence</u> that Birth Match is efficacious or effective on any scale

- No publicly available reviews of policy implementation

- Is this the right thing to do? = Many open questions of ethics
  - Do the potential negative consequences of over-surveillance of vulnerable groups outweigh the benefits of preventing fatal maltreatment?
  - What is our societal tolerance for false positives?
  - Is this use of data in line with other applications in data science?

Prior Work

ORIGINAL ARTICLE

Check for updates

Preventing Infant Maltreatment with Predictive Analytics: Applying Ethical Principles to Evidence-Based Child Welfare Policy

Paul Lanier[1,2,3] · Maria Rodriguez[4] · Sarah Verbiest[1,2,5] · Katherine Bryant[2,5] · Ting Guan[1] · Adam Zolotor[3,6]

Algorithmic Transparency for the Smart City

Robert Brauneis & Ellen P. Goodman[1]

20 YALE J. L. & TECH. 103 (2018)

"As a society, we are now at a crucial juncture in determining how to deploy AI-based technologies in ways that promote, not hinder, democratic values such as freedom, equality, and transparency."[2]

FAT / ML   2018   2017   2016   2015   2014   Organization   Resources   Mailing list

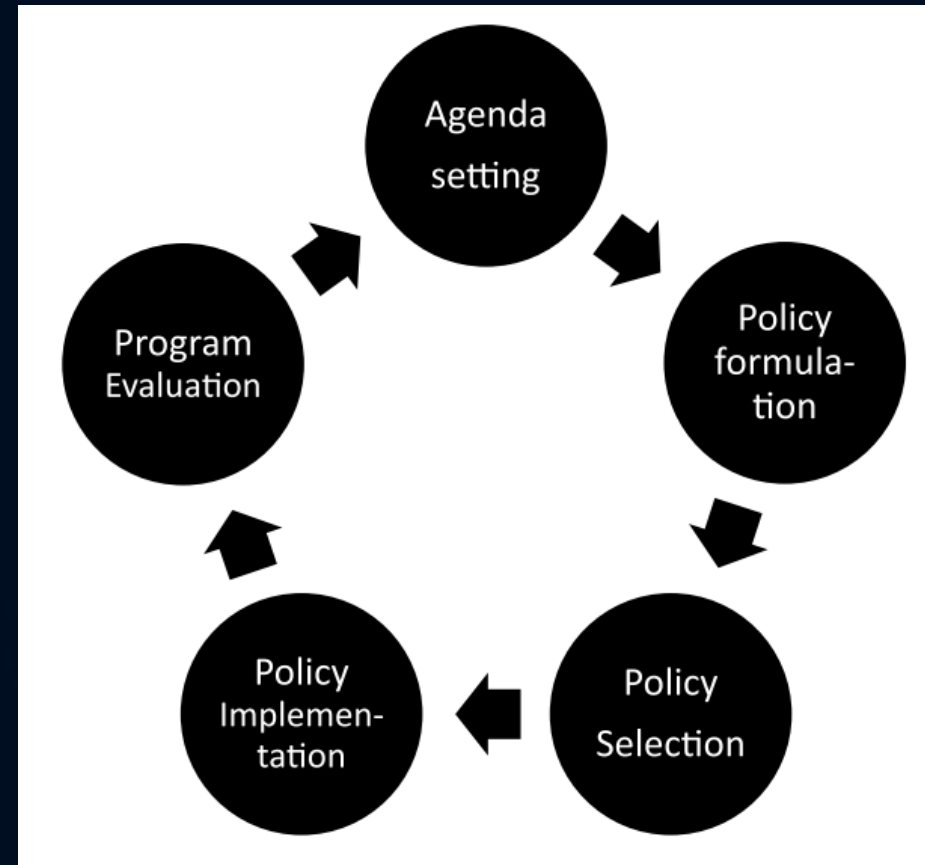**Fairness, Accountability, and Transparency in Machine Learning**

Bringing together a growing community of researchers and practitioners concerned with fairness, accountability, and transparency in machine learning

Current Study

PURPOSE: DESCRIBE THE IMPLEMENTATION OF BIRTH MATCH

Key Informant Interviews with State-Level Officials Responsible for Implementation of Birth Match

- Interview topics
  - History of Birth Match
  - Process for identification and automated data linkage
  - Organizational structure for policy implementation
  - Effectiveness of the policy through evaluation
  - Limitations and unintended consequences of the policy

Key Informant Interviews with State-Level Officials Responsible for Implementation of Birth Match
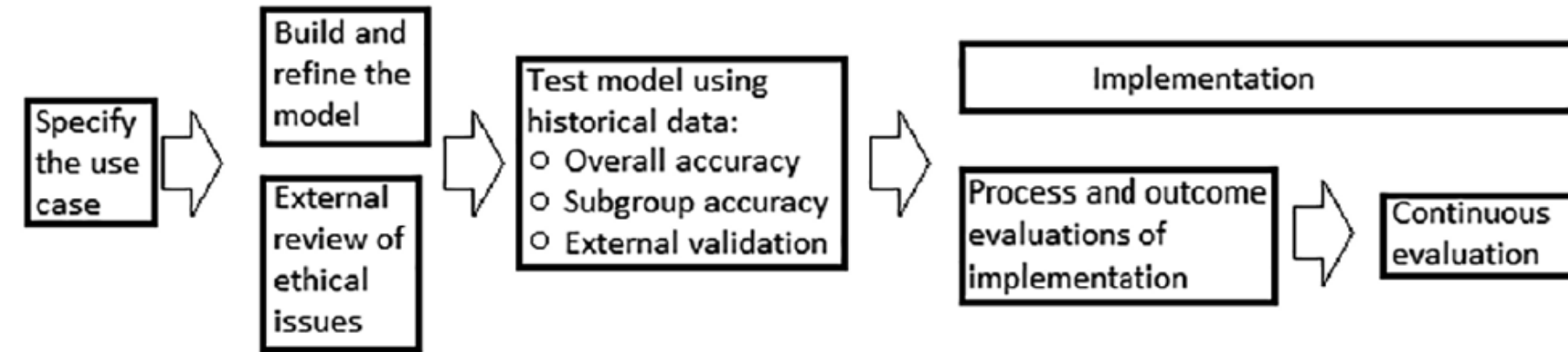
Findings

- Why did states decide to do Birth Match?

  - Focus on child safety following high-profile child deaths

  - Legal precedent for it (i.e., anticipatory neglect)

- What does their system look like when implemented?

  - No manual for Birth Match, all states doing it differently

  - Implementation challenges

- What have states found from evaluation of Birth Match?

  - Little or no ongoing evaluation or public review of the policy

  - Not sure if it is working to prevent infant maltreatment

  - Little or no consideration of unintended consequences or impact on families

  - Awareness of issues related to racial/ethnic disparities in child welfare, but hadn't looked at it

Conclusion and Recommendations

- Conduct research to determine whether Birth Match is effective and what are the tradeoffs

- Start with smaller pilots prior to statewide/jurisdiction implementation

- Engage families targeted by Birth Match in all stages of implementation

- Implement desirable documentation and principles of fairness, accountability, and transparency

- Education of the public, social workers, advocates, policymakers about algorithmic decision-making

FIGURE 1

A Framework for Implementing, Evaluating, and Assessing a PRM-Based Hotline Screening Process

Specify the use case

Build and refine the model

External review of ethical issues

Test model using historical data:
- Overall accuracy
- Subgroup accuracy
- External validation

Implementation

Process and outcome evaluations of implementation

Continuous evaluation

Maximize transparency and community engagement at every step of the process

Key questions framed in context of the use case and compared to prior practice:
- Is the algorithm as designed and as used more accurate than current practice in general and for subpopulations?
- Is the use of the PRM ethically equivalent to or superior to prior practice?
- Are practically and ethically necessary implementation processes employed?

A Practical Framework for Considering the Use of Predictive Risk Modeling in Child Welfare

By
BRETT DRAKE,
MELISSA JONSON-REID,
MARÍA GANDARILLA OCAMPO,
MARIA MORRISON,
and
DAREJAN (DAJI) DVALISHVILI

Future Questions/Directions for the Field

- Are we trying to identify a "black swan" – fatal infant maltreatment is extremely rare

- Is the goal to replace social workers with computers, or are we designing new tools to help social workers do their job (human-computer interaction)? How does this change the work?

- Can jurisdictions identify/use a common set of evaluative/equity criteria? How do we make this an ongoing process versus checking a box?

- Does COVID-19 and reduced reporting rates impact our calculus about the need for more surveillance?

Thank you!!
Questions/Comments

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