Using Predictive Analytics to Identify High Risk Child Welfare Cases

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Definition & Overview

- **Predictive Analytics** is a field of data science that applies computational analysis to current and historical data in order to predict future outcomes, events, or behaviors.

- Through analysis of historical data we can identify patterns or a sets of variables that, when found together, are predictive of future outcomes. (Ie. Consumer buying patterns)

- Once established, the pattern, or **algorithm**, can be applied to current, real-time data to make a prediction about what will happen next.

Target Example

- Read the Forbes article entitled, “How Target Figured Out a Teen Girl was Pregnant Before Her Father Did”

- Small group discussions:
  - What is your general reaction to this article?
  - Do you think it’s ethical for stores to be collecting data on consumer buying patterns and using it to market towards specific individuals? Why or why not?
  - What ways might stores collect this data?
  - What are some potential applications of predictive analytics in the field of child welfare? How could it be helpful? Harmful? Ethical concerns? Do you think predictive analytics should be used in child welfare? Why or why not?

Is there such thing as a ‘Crystal Ball’?

- Can predictive analytics help us see into the future by analyzing the past?
- Is it possible to accurately predict which children and families are at the highest risk of suffering from a negative safety outcome such as a child fatality, near fatality, or serious injury?
- Applying a predictive algorithm to real-time data can allow us to make outcome predictions about the children on our caseloads.
  - Based off of past outcomes for children/families with similar risk factors
- Not a replacement for sound clinical judgement.
- Another “tool” in our “tool chest” to inform casework practice.

Applications in Child Welfare

- **New Zealand Model:** Economist Rhema Vaithianathan built two Predictive Risk Models (PRM) determining the likelihood that a child will be abused and/or neglected and ultimately end up in foster care (Vaithianathan, et al., 2012)
  - Allegany County Pennsylvania employing a similar model
- **Los Angeles County:** Contracted with analytic software company, SAS, for their Approach to Understanding Risk Assessment (AURA) experiment, which tracked child deaths, near fatalities, and "critical incidents" in 2011 & 2012
  - Assigned a risk score from 1 to 1,000 with higher number equating to higher risk
  - Applied predictive model to 2013 data
  - "… if the department had used the tool in 2013, it would have "enabled a significant reduction in the number of tragic outcomes" (Heimpl, 2015)

Applications in Child Welfare Continued

- **Deloitte Model:** Designed to improve the timeliness and stability of reunifications. Focuses on *controllable* vs *uncontrollable* variables.
  - " … a caseworker, acting on factors they can control, can positively identify and impact an additional 20% of families" (Deloitte 2015)
  - **Uncontrollable Variables:** I.e. Parent's age, household size, family income, number of prior reports
  - **Controllable Variables:** I.e. Multiple caseworkers over life of case/caseworker turnover, quality and frequency of caseworker contacts, quality safety planning, regularly completed medical check ups while in care

Ohio's Plan

Eckerd Rapid Safety Feedback®

- Use historical Child Welfare (SACWIS) data to develop a Predictive Model that will identify which children are at highest risk of a negative safety outcome.
- Apply the Predictive Model to **real-time** Child Welfare (SACWIS) data.
- Develop a Quality Assurance (QA) case review tool to assess high-risk cases in **real-time**.
- Provide consultations to front line service teams in efforts to mitigate safety concerns and prevent child fatalities and near fatalities.

Rapid Safety Feedback

- **Eckerd Rapid Safety Feedback (ERSF) Model:** Designed to reduce child fatalities and near fatalities. Partnered with Mindshare Technology to use SACWIS data in order to identify children at elevated risk.
  - Developed for Hillsborough County Florida
    - Implemented January 2013
    - Response to 9 child homicides on open cases from 2009 – 2012
  - Other states using ERSF: Maine, Connecticut, Alaska, Oklahoma, and Illinois (In progress: Indiana, Louisiana, Ohio)

- **Two-Step Approach to Risk Reduction**
  - Identify high risk cases through predictive risk modeling
  - Apply a safety-focused review tool to target the most important safety factors facing the family, intervene effectively, and follow-through to risk reduction

Eckerd Rapid Safety Feedback (ERSF)

- **Conducted a Quality and Safety Review**
  - Reviewed ALL open cases in the county
    - **>1500 cases!**

- **Two distinct criteria emerged:**
  - A profile of cases with the highest probability of serious injury or death
  - Casework practices that are critical to ensuring safety for children at high risk of abuse and neglect

Group Discussion

- **Task 1:** Develop a high-risk case profile.
  - Draw upon your child welfare knowledge and experience
  - The profile should be comprised of **Uncontrollable Variables**

- **Task 2:** List Critical Casework Practices
  - These practices, when done well, will help reduce risk and when done poorly could overlook important risk factors
  - Critical Casework Practices are **Controllable Variables**

Findings of the Quality & Safety Review

- **Predictive Factors of Serious Injury or Death**
  - One or more children under the age of 3
  - Paramour in the home
  - Substance abuse/domestic violence history
  - Parent(s) in foster care as a child

- **Critical Casework Practices**
  - 9 were identified in total
  - Among these were …
    - Quality safety planning
    - Quality supervisory reviews
    - Quality and frequency of home visits

A Look at Ohio's Findings thus far…

- Top Four Attributes of Child Fatalities and Near Fatalities **
  - Number of Intakes Screened IN During the Last Six Months
  - Number of Intakes Linked to the Child's Case
  - Frequency of Intakes Over the Last 12 Months
  - Mother's Age

- Other High Ranking Attributes **
  - Number of Children in Family
  - Safety Hazards Recorded for One or Both Parents
  - Domestic Violence
  - Substance Abuse/Drug Activity
  - Age of Child

**** Accurate as of July 1, 2017 and is subject to change as algorithm is refined.**

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Case Selection & Critical Practices

- **Best Sample**: **all children in-home under age 3**.
- **Safety Plans** were not tailored to individual cases and lacked family input.
- **Background Checks/ Home Studies** were not updated to reflect changes in family circumstances.
- The core family issues bringing the child into dependency were not addressed **on home visits or in case documentation.**
- **Behavior change poorly monitored** with providers and other case participants.
- **Supervisory reviews** either failed to identify the issues or more likely repeated prior concerns without resolution.

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Review Process

- Cases reviewed for safety practice issues only.
- All cases with an identified **safety concern** are **staffed within one business day.**
- Staffings are focused on Supervision- **follow up tracked to completion.**
- Cases **reviewed while open** or until the **risk profile is reduced**
- **Accountability is key**

Progress! Completed Project Activities

- Project Kick-Off (January 2017)
- Finalized Problem Statements (March 2017)
- Completion of Initial Data Analysis (April 2017)
- Established ERSF ® Training Dates (April 2017)
  - Hamilton County – September 2017
  - Franklin County – October 2017

Our Problem Statements

- ***Assessment/Investigation Population:*** Prevent child fatalities and near fatalities for families with a pending Assessment/Investigation when at least one child resides in the home while the case is *open* and for at least 12 months following *case closure*.

- ***Ongoing Population:*** Prevent child fatalities and near fatalities for families receiving in home services (post-assessment and/or investigation) while the case is *open* and for at least 12 months following *case closure*.

Ongoing Project Activities

- **Validation of Predictive Model**
  - State and County staff testing algorithm outputs
  - Reviewing multiple predictive models
  - Making adjustments and determining best fit
- **Hiring Preparation for Quality Assurance Teams**
  - Review of Core Competencies
  - Structure of County QA teams
- **Development of Ohio's QA Tool & Practice Guides**
  - Draft Tool Completed (June 2017)
- **Planning for Ohio's ERSF® Evaluation**

Our (Draft) QA Tools

- Separate tool for the Assessment/Investigation and Ongoing population
- Tools consist of 9 questions that focus on using **Critical Thinking** when Assessing **Safety** and **Risk**
- Both tools are essentially the same, however, there are some slight language differences between the Assessment/Investigation vs. Ongoing Tool
- Each question is supported by a bulleted list of considerations to take into account when answering the question

Ethical Considerations

- **Right to Privacy** – use of personal information without individual's knowledge to generate a risk score
- **Obligatory Response** – when someone is identified as elevated risk, what are the agency's obligations to provide services? What if the family refuses services?
- **Stigmatization** – demographic and economic predictors could reinforce stereotypes

Addressing Ethical Considerations

- Be aware of the potential biases
  - Implicit vs Explicit Bias

- Paying attention to ethical considerations is the key to reducing & ameliorating ethical concerns!
  - Approach with open eyes

- The potential benefits of preventing child fatalities and near fatalities far outweigh potential risks.

Questions??

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