



Exploring Child Welfare's Frontier - Issue 1
Predictive Analytics in Child Welfare

What is Predictive Analytics, and more importantly what ISN'T predictive analytics?

While not an especially earth-shattering idea, it is widely believed that much of life's confusion occurs because of poor communication. This is true when talking about data in general, and especially predictive analytics (PA). So before we walk too far down the scary statistics path, let's clarify exactly what we're talking about.

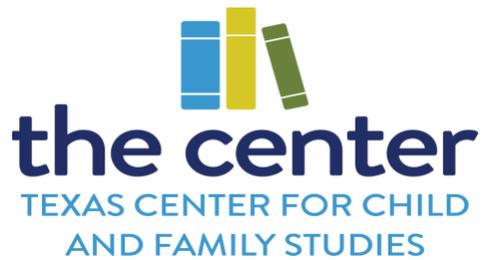
Dryly defined, predictive analytics is the statistical analysis of large quantities of data and then using that analysis to assign a probability to a predefined outcome. It's use of these types of buzzwords that further complicate the issue. Let's boil it down in plain language.

Another way to think of it is that predictive analytics uses your statistics class from college to whittle down huge data sets to tell how likely an event (like a foster care placement that breaks down) is to happen in the future. Don't be intimidated by the words "predictive" or "analytics." The term "predictive" is a bit of a misnomer and "analytics" is just a fancy way of saying analysis. We need be neither Nostradamus nor Einstein to unleash the mighty power of data. (As an aside, don't be fooled by words like "destined," "predictions," and "forecasts." It's all probability, estimating, and odds making.....or SWAG)

The most basic difference between predictive analytics and other forms of data analysis is in how you use the final product. The more traditional forms of data analysis are integral in creating a data informed operation. They are, however, inherently reactive. For example, using data to understand how your system operates is critical, but it won't tell you how your system is likely to operate 6 months from now. Whereas predictive analytics allows decision makers to peer into the magical 8-ball at what a system is likely to look like in the future.

Below are few other key terms you'll hear bandied about by experts. Don't let these terms deter you from pursuing analytics.

- *Algorithm* – Think of this as the step by step mathematical formula that gives you an event's likelihood of occurring.
- *Accuracy (aka validity)* – This is simply the ability of your algorithm to get it right. Since no model is 100% accurate, we try to minimize the following:
 - *False Positives* – The model tells me someone IS going to abuse, but they WON'T.
 - *False Negatives* – The model tells me someone IS NOT going to abuse, but they WILL.



- *Precision (aka reliability)* – This is simply the ability of your algorithm to get it right consistently. It's one thing to hit the target once. It's another to hit the target 9 times out of 10.
- *"Garbage in – Garbage out"* – The quality of the data you put into your algorithm equals the power of your model. If you eat McDonald's 3x day and never run, don't expect to finish a marathon.

How is Predictive Analytics currently used in child welfare?

In the private sector predictive analytics is EVERYWHERE. It's how Netflix knows how to develop such binge-worthy original content (looking at you Unbreakable Kimmy Schmidt). But is it being used in child welfare? While relatively new, the answer is a resounding yes! Predictive analytics is being used in three primary ways in our industry:

- *Estimating risk* – In this instance predictive analytics helps determine the likelihood of a bad event. Examples include maltreatment, placement disruptions, or recidivism.
- *Understanding interactions between systems* – In this instance predictive analytics seeks to understand how involvement in one system (i.e. child protection) predicts likelihood of involvement in another system (juvenile justice). This use of PA can be especially useful given the system crossover in the populations we serve.
- *Improving operations*: From turnover to caseloads to funding, child welfare agencies (public and private) face a bevy of operational challenges. PA is used to improve organizational functioning.

Why is Predictive Analytics such a hot topic?

While predictive analytics is admittedly a nerdy topic, it's also one that provokes a lot of heated discussion within the child welfare community. Some see it as a panacea that will cure many (if not all) the ills that have plagued our field for decades. Others see it as nothing more than fool's gold that distracts us from improving our clinical skills or use of independent judgement. As you might expect, the truth lies somewhere in the middle. Remember, we're talking about *predictive analytics*, which is different from being *data informed*.

The potential *positive of impact of predictive analytics* cannot be ignored:

- PA can strengthen a staff's ability to make decisions by allowing them to quickly examine large amounts of information.
- PA can bring consistency to decision making by reducing biases in screening or providing services.
- When an agency commits to utilizing predictive analytics, it must improve data systems, internal data analysis capabilities, and strategic planning.
- Agencies can use PA to more effectively allocate resources like staff or prevention services.

However, there are *substantial risks in using predictive analytics* that we must acknowledge:

- When agencies utilize predictive models, they are hoping to minimize the screening bias, not the referral bias. Biases often occur at the point of initial referral to a child protection system.
- Biases are oftentimes built into the model itself. The variables put into models can be proxies for race or poverty, which actually increase bias.
- Staff at all levels may not understand the science behind the model they're using. This creates multiple issues, not the least of which is being able to justify decisions during a legal hearing.
- Predictive analytics can tell staff which family/individual is at risk of a negative outcome. It will not tell staff how to effectively engage with that family.
- Very few (if any) models in child welfare are highly accurate and highly precise. Therefore, agencies are forced to decide between one or the other. The consequences of this tradeoff can be huge.

What if I wanted to use this in my work?

Kudos!! As mentioned above, predictive analytics can have many positive impacts on our work. However, before you dive in head first, I recommend thinking through a few basic questions:

- Clearly define what problem you're trying to solve. Does it require a predictive analytics solution?
- Do you have the in-house expertise to develop a strong model? Or the money to contract with the expertise needed?
- Do you have access to needed data? Is it high quality? Can you get it regularly or in real-time?
- Clearly define your tolerance for errors. How much are you willing to sacrifice accuracy for precision? Or precision for accuracy?
- Are you willing to invest in training your staff at all levels to understand your model?
- Are you willing to invest in ongoing Continuous Quality Improvement to ensure your model remains current?

And finally, be transparent, acknowledge biases and limitations, and constantly strive to minimize them. Intellectually honesty in the age of Big Data is the best way to use these powerful tools to serve the children and families we work for.

Resources for further exploration



Predictive Analytics - An Introduction
Admin - An Assessment Curricu



Predictive Analytics
- An Assessment Curricu