

# Leveraging Modern Data Science for Child Welfare

Leveraging multiple data sources to quickly assess changes and risk for children currently in Child Welfare Case Management Systems



# Leveraging Modern Data Science for Child Welfare: A White Paper by Thrive Inc. and WellCheck AI

**Title:** Leveraging Modern Data Science for Child Welfare

**Subtitle:** Preventing Child Abuse through Proactive Data Sharing and Analysis

**Authors:** James Lilly, Kerry Baugh, John Oliver, Mike Doane, Min Jin, Arthur Wasilewski

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## Executive Summary

Child abuse remains a critical issue, particularly within socially and economically disadvantaged populations. Thrive Inc., a non-profit organization focused on abuse prevention, and WellCheck AI, a health and human services data-focused startup, are collaborating to harness modern data science for preventing child abuse. This white paper discusses the problem of fragmented data across agencies, the solution provided by Thrive Inc. and WellCheck AI's CaseBook Risk Assess, and the benefits of a proactive approach to child welfare.

## Introduction

### Background

Children within socially vulnerable populations often suffer from inadequate preventative social work, particularly concerning childhood sexual abuse. Despite various programs addressing learning disabilities, autism, and vaccine management, the focus on sexual abuse remains reactive rather than preventative. Thrive Inc. aims to change this by leveraging public data to assess risk and prevent child sexual abuse.

### Purpose

This white paper introduces Thrive Inc. and WellCheck AI's innovative application, CaseBook Risk Assess, and its approach using data science to proactively prevent instances of child sexual abuse, in alignment with Thrive Inc.'s mission.

### Scope

The paper will cover the problem of data fragmentation, the proposed solution by Thrive Inc. and WellCheck AI, and the potential benefits of this approach.

## Problem Statement

Key events impacting child welfare are often known to various agencies but not shared between agencies, preventing timely intervention. Overloaded social workers lack the necessary data integration to prioritize urgent cases and sometimes important events are not identified.

## Evidence

Separate agencies hold crucial data, such as missed wellness checks, school absences, address information on sex offenders, and arrests, but these events are not visible to caseworkers within their established processes and applications. As a result, caseworkers remain uninformed of escalating risk indicators based on events known to indicate possible abuse situations, subsequently leading to tragic outcomes. These events are well documented by the United States Federal Government, Child Welfare organizations such as From Darkness to Light and Thrive Inc., and even international research.

## Real-Life Example

The following tragic case highlights the consequences of fragmented data. Despite multiple agencies being aware of data that are significant risk factors, the lack of data sharing prevented Child Protective Services from intervening in time, resulting in the death of a young girl.

The Example Case in Table 1 below is a real-life example in which a child, Sally Doe, has numerous interactions with government services, including Child Protective Services, but because the different systems do not communicate, the Child Protective Services case worker has not been informed or alerted to the changing environment. This Example Case illustrates the timeline of events and associated data logged by government agencies.

Table 1. Real-Life Example Case			
TIME	EVENT	DATA LOG	AGENCY
Summer 2015	First call to Children Youth and Families, causing creation of a case file.	Child Welfare Case Management System Database	Children Youth and Families Department
Fall 2015	Boyfriend, registered sex offender, moves into an apartment with a single mother and child.	Sex Offender Registry, Parole System, Unemployment, Medicaid	Department of Public Safety, WorkForce Solutions, Medicaid
Spring 2016	Report of domestic partner (boyfriend) kissing child.	Child Welfare Case Management System Database	Children Youth and Families Department

Spring 2016	Repeated absences from school.	Internal School System logging 10 days or more. State System and City System	Department of Public Education. City Public Schools
Spring 2016	Boyfriend, registered sex offender, accused of trying to kidnap a child.	City Police system data log	City Police
Spring 2016	Missed Wellness Check.	Medicaid Provider Pay	Medicaid
Spring 2016	Boyfriend moves out.	Sex Offender Registry, Parole System, Unemployment, Medicaid	Department of Public Safety, WorkForce Solutions, Medicaid
End of Spring 2016	No Child Care Credits Used.	No activity on account	Early Childhood Education and Care
Early Summer 2016	Mother arrested for illegal drug usage. Children Youth and Families is notified to come get the child. Child is instead released to the mother's parents. Child returned to mother's home.	City Police system data log, Child Welfare Case Management System Database	City Police, Children Youth and Families
Early Summer 2016	Man on parole moves in with mother.	Parole System, Unemployment, Medicaid	Department of Public Safety, WorkForce Solutions, Medicaid
Mid-Summer 2016	Relative of man on parole who is also living in the home is released from jail and gives this home as a new address.	Parole System, Unemployment, Medicaid	Department of Public Safety, WorkForce Solutions, Medicaid
Mid-Summer 2016	Body of child found.	City Police system, Child Welfare Case Management System Database	City Police, Children Youth and Families

In the above series of interactions, the data clearly shows an alarming series of events, and numerous opportunities are presented for various agencies to pass critical information to Child Protective Services to increase awareness of an escalating situation. However, the opportunities for alerts are missed repeatedly and instead Sally Doe is left relying on a case worker to be able to carve out time from an already overloaded schedule to be aware through an interview or to manually contact these other agencies to learn of the events.

## Solution

### WellCheck AI's Approach

WellCheck AI, in partnership with Thrive Inc., has developed CaseBook Risk Assess, a solution that integrates and analyzes data from multiple agencies. This system automatically alerts

caseworkers to changes in a child's environment that indicate increased risk, allowing for timely and prioritized intervention. In order to enable rapid data integration without making changes to the existing case management system, noSQL database technology (MarkLogic) and MultiParty Computation and Homomorphic Encryption (Algemetric) is leveraged.

## Case Studies/Examples

### Example Case with WellCheck Interaction

A real-life example illustrates how WellCheck AI's system could have changed the outcome. By providing timely alerts about key risk factors, caseworkers could have intervened earlier, potentially preventing the child's death. This use case is applicable in all states and agencies and could be easily and quickly deployed.

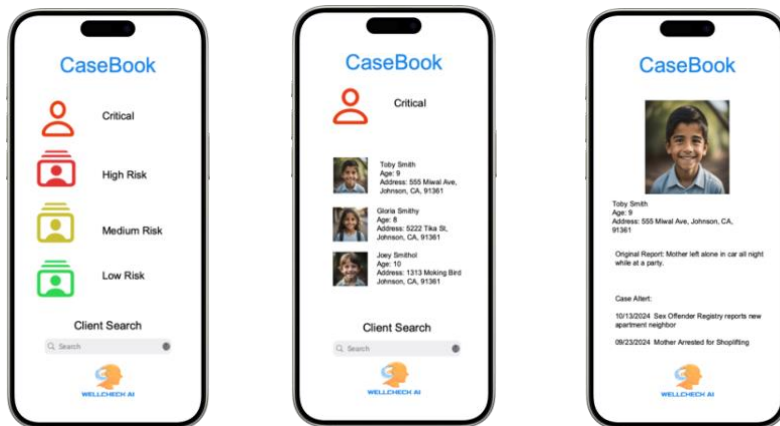
With these interactions, the timeline in Table 2 with alerts being presented to the Child Welfare Worker is possible.

Table 2. Example Case with WellCheck AI's CaseBook Risk Assess Interaction				
TIME	EVENT	DATA LOG	AGENCY	WellCheck AI CaseBook Risk Assess Interaction
Existing Data Points	Financial Assistance, Food Assistance, Medical Care, Employment Assistance	Temporary Assistance to Needy Families (TANF), Supplemental Nutrition Assistance Program (SNAP), Medicaid, Unemployment	Human Services, Human Services, Medicaid, WorkForce Solutions	All
Summer 2015	First call to Children Youth and Families, causing creation of a case file.	Child Welfare Case Management System Database	Children Youth and Families Department	Case Established in CaseBook Risk Assess.
Fall 2015	Boyfriend, registered sex offender, moves into apartment with single mother and child.	Sex Offender Registry, Parole System, Unemployment, Medicaid	Department of Public Safety, WorkForce Solutions, Medicaid	CaseBook notifies Child Protective Services that an additional adult is living at the address. Alert risk is now Medium.
Spring 2016	Report of domestic partner kissing child.	Child Welfare Case Management System Database	Children Youth and Families Department	CaseBook raises alert risk to Critical.

Spring 2016	Repeated absences from school.	School system logging 10 days or more. State System and City System	Department of Public Education. City Public Schools	<i>CaseBook</i> keeps alert risk raised to Critical to ensure a home visit is prioritized.
Spring 2016	Boyfriend, registered sex offender, accused of trying to kidnap a child.	City Police system data log	City Police	<i>CaseBook</i> keeps alert risk raised to Critical to ensure a home visit is prioritized.
Spring 2016	Missed Wellness Check.	Medicaid Provider Pay	Medicaid	<i>CaseBook</i> keeps alert risk raised to Critical to ensure a home visit is prioritized.
Spring 2016	Boyfriend moves out.	Sex Offender Registry, Parole System, Unemployment, Medicaid	Department of Public Safety, WorkForce Solutions, Medicaid	<i>CaseBook</i> notes the change in household members and based on custom rules the risk might be lowered.
End of Spring 2016	No Child Care Credits Used.	No activity on account	Early Childhood Education and Care	Notification sent to caseworker that Sally has not been using Child Care Credits.
Early Summer 2016	Mother arrested for illegal drug usage. Children Youth and Families is notified to come get the child. Child is instead released to mother's parents. Child returned to mother's home.	City Police system data log, Child Welfare Case Management System Database	City Police, Children Youth and Families	Risk Profile changes based on custom configuration of <i>CaseBook</i> .
Early Summer	Man on parole moves in with mother.	Parole System, Unemployment, Medicaid	Department of Public Safety, WorkForce Solutions, Medicaid	<i>CaseBook</i> receives address change data and notifies caseworker and raises risk score.
Mid-Summer 2016	Relative of man living in home is released from jail and gives this home as a new address.	Parole System, Unemployment, Medicaid	Department of Public Safety, WorkForce Solutions, Medicaid	<i>CaseBook</i> receives address information and notifies caseworker, who makes home visit.
Mid-Summer 2016	Body of child found.	City Police system, Child Welfare Case Management System Database	City Police, Children Youth and Families	Tragedy avoided

## Implementation

WellCheck AI's technology aggregates data from various sources and applies a customizable risk assessment algorithm. Alerts are sent to caseworkers via a mobile app or integrated case management system, ensuring critical information is not overlooked. This risk assessment algorithm is based on the above-mentioned research and is fully customizable by the Child Welfare Agency to better address their specific environment.



## Benefits

This proactive approach helps caseworkers focus on higher-risk cases, improves resource allocation, and ultimately aims to prevent child abuse. It helps transform many child welfare cases from a reactive to a proactive system.

## Technical Details

### Architecture/Design

- **Data Integration:** Utilizes MarkLogic technologies for secure data sharing with a just-in-time security approach. Algeometric Homomorphic Encryption and Multi Party Computation is used to allow customizable queries into data that must remain obscured.
- **Risk Assessment:** Customizable algorithms are used to assess and prioritize risk levels for your communities.
- **Alert System:** Automated notifications are sent to caseworkers through existing systems.

## Conclusion

### Summary

WellCheck AI's CaseBook Risk Assess provides a proactive solution to child welfare by integrating and analyzing data from multiple agencies. This approach helps prioritize high-risk cases and apply resources more effectively.

### Call to Action

Policymakers, social services agencies, and technology partners are encouraged to adopt and support data integration initiatives like WellCheck AI's *CaseBook Risk Assess* to protect vulnerable children and prevent abuse.

### References

- Okechukwu, A. (2022). Child Maltreatment and the Ecosystem of Socioeconomic Inequities and Inequalities.
- Darkness to Light. (2019). Child Sexual Abuse Statistics.
- Annie E. Casey Foundation. (2020). Child Welfare Financing SFY2020.
- Appendix B: Technical Specifications of WellCheck AI System