Evaluation of a Predictive Model
Montana's Early Warning System
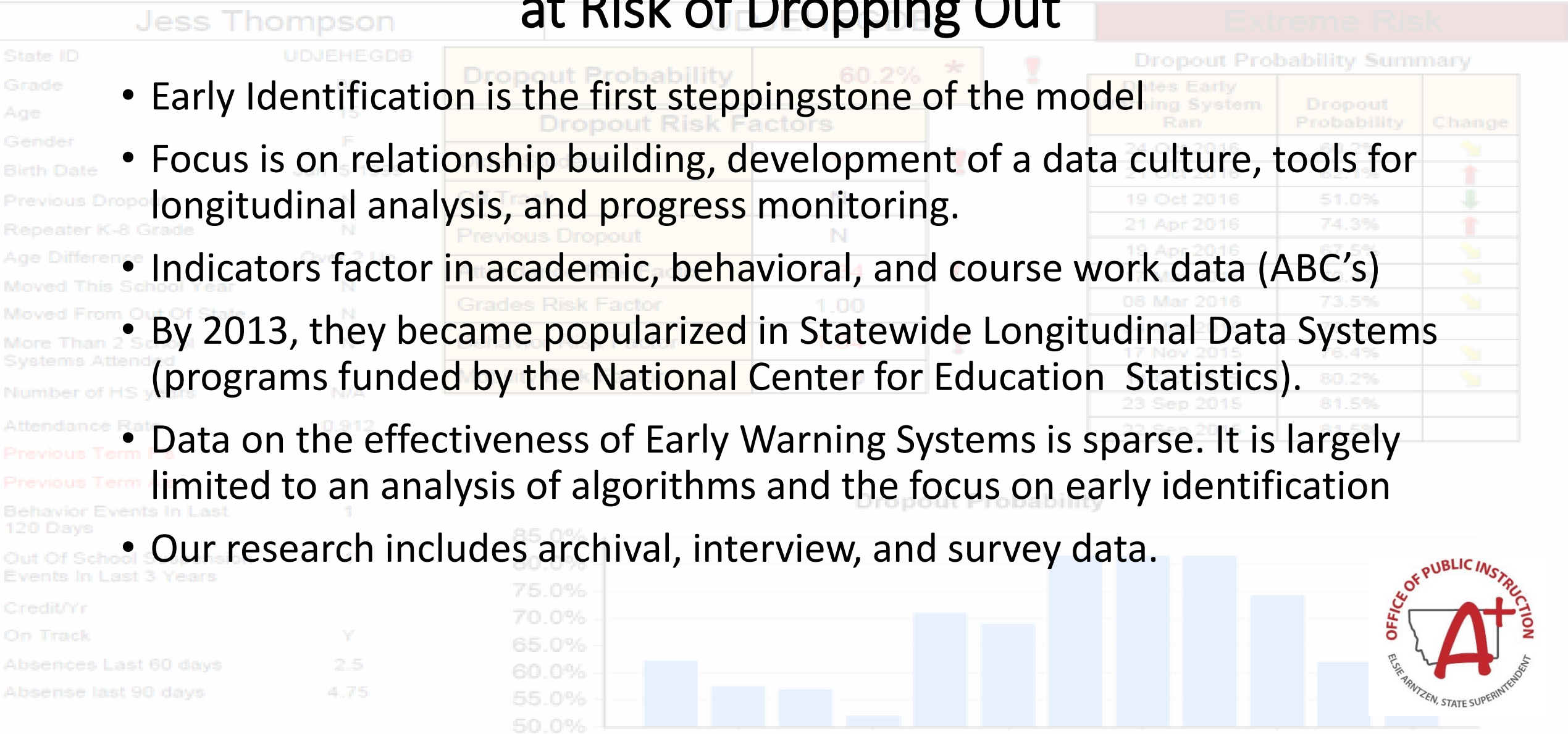
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Early Warning Systems Provide a Tool to Identify Students at Risk of Dropping Out

- Early Identification is the first steppingstone of the model

- Focus is on relationship building, development of a data culture, tools for longitudinal analysis, and progress monitoring.

- Indicators factor in academic, behavioral, and course work data (ABC's)

- By 2013, they became popularized in Statewide Longitudinal Data Systems (programs funded by the National Center for Education Statistics).

- Data on the effectiveness of Early Warning Systems is sparse. It is largely limited to an analysis of algorithms and the focus on early identification

- Our research includes archival, interview, and survey data.

Montana EWS Program

State ID	UDJEHEGDB	
Grade	08	
Age	15	
Gender	F	
Birth Date	Jun 5 1999	
Previous Dropout	N	

Dropout Probability 60.2% *

Dropout Risk Factors	
Older Student	Y
Off Track	N

Extreme Risk

Dropout Probability Summary

Dates Early Warning System Ran	Dropout Probability	Change
24 Oct 2016	60.2%	
21 Oct 2016	62.1%	
19 Oct 2016	51.0%	

Goal 1: Create and maintain a statistical model that accurately predicts the odds of a student dropping out (Development Framework)

Goal 2: Identify at-risk students before they drop out (Professional Development)

Goal 3: Help schools that opt-in to the program to identify factors that are impacting each student's dropout risk to prioritize and target interventions in line with each student's risk profile and school priorities (Professional Development)

Goal 4: Help schools understand dropout risk trends at the school level to make decisions regarding policy and programs that may influence dropout risk. (Professional Development).

The Online Tool

School level report - Summarizes data and creates visualizations for school level dropout risk, and specific trends including grades, attendance, behavior, and mobility.

Student summary report - Generates a spreadsheet containing all student data for the school, including risk rankings, percentage risk, change in risk, and odds ratios for specific risk factors.

Student detail report - Provides data and visualizations for a single student within that school, including their current dropout risk, change in risk over time, information on missing data, and predominant risk factors where interventions may be warranted.
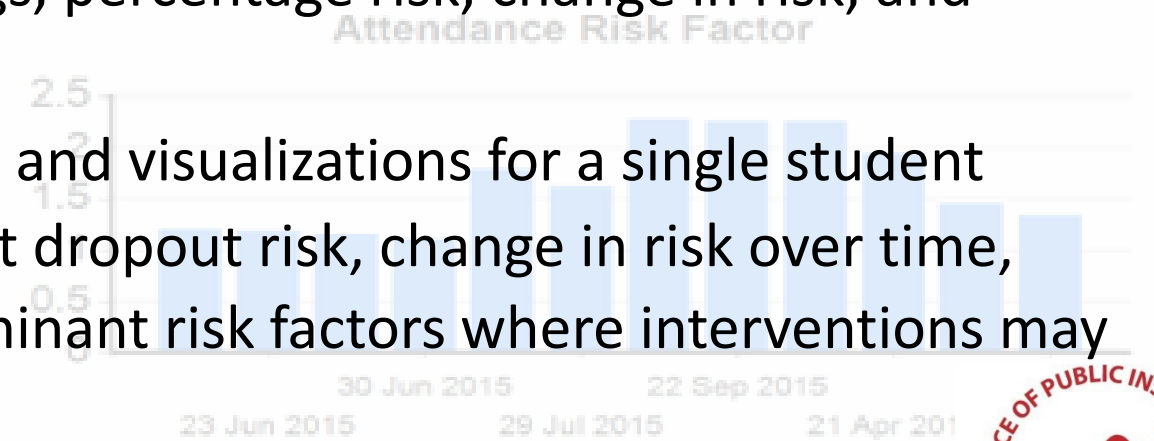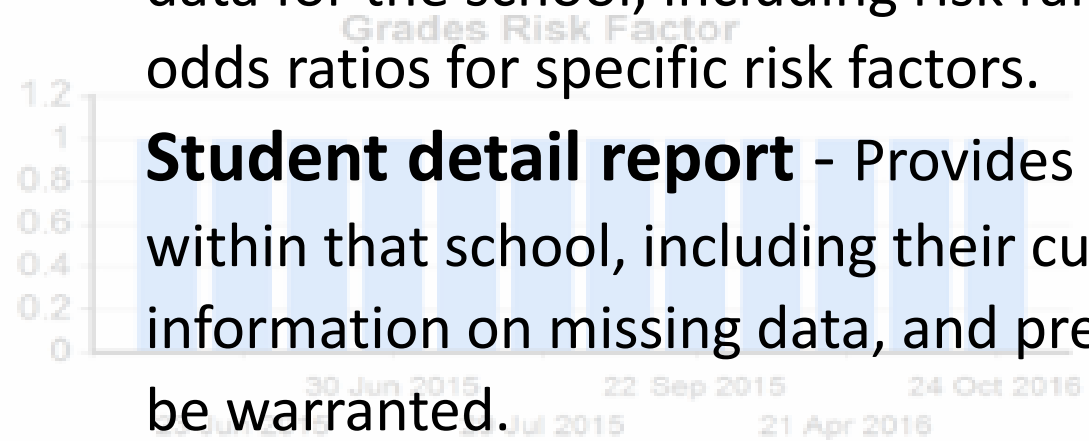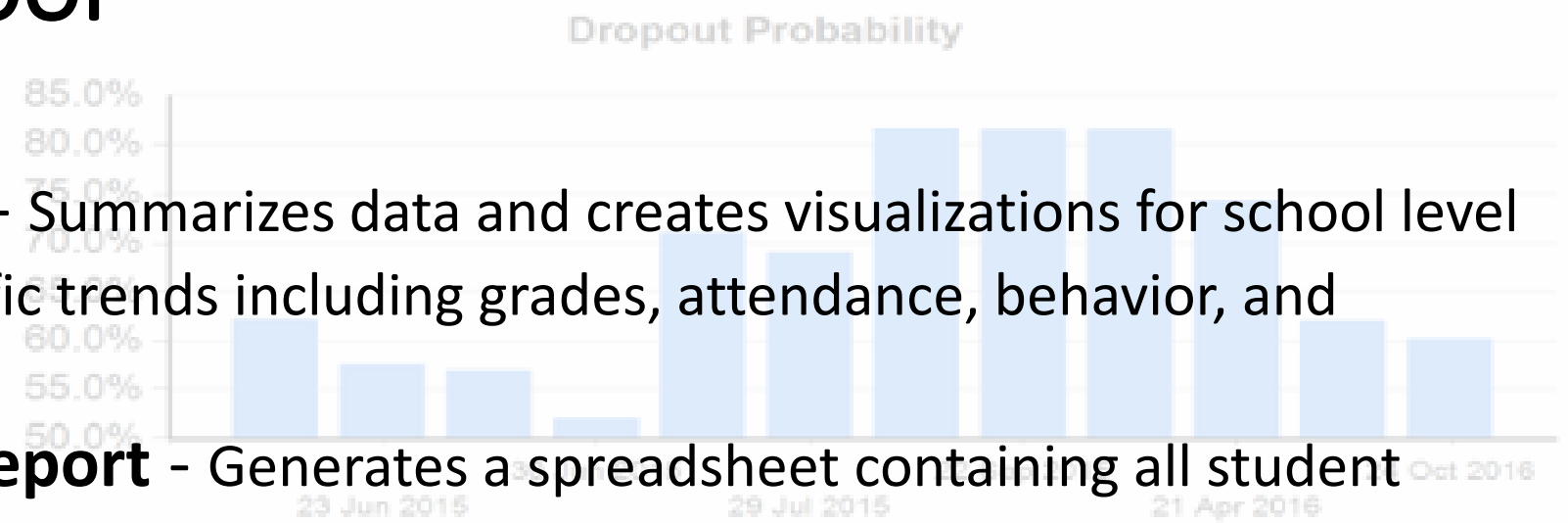
Research Procedures

- **Task 1**: We know the **ability of the model to predict dropout**. Hence, we investigate the propensity of the model to predict graduation to gauge the efficiency of the model. We look to six factors present in the model: dropout probability, grades, attendance, previous dropout risk factor, behavior, and mobility.
- **Task 2**: We investigate the degree of implementation of the model (school level). **Has access to EWS data inspired policy modifications** and increases in student supports?
- **Task 3**: We focus on how robust the student outcomes are in these schools and **the impact of dropout interventions on graduation and postsecondary enrollment.** We look to the same risk factors and gauge the viability of each to predict these two opportunities. Emphasis is placed on trends within subgroups.

School Size

	Med-High Adoption	Low Adoption	Non-Adoption
Less than 150 students	22.22%	41.68%	72.83%
151 to 400	41.11%	31.06%	21.00%
401 to 850	26.67%	21.97%	5.83%
Above 850 students	10.00%	5.30%	0.33%

Defined Need – School Context

Trends regarding the ACT Composite average are significant (p = 0.020) and show that the non-adoption group scores higher (19.54) than the low adoption schools (18.54) and medium to high adopters (18.72).

- **Cohort graduation** rates were higher (93.21%) among non-adopters in comparison to 86.50% among low adoption schools and 86.24% for medium to high adoption schools (p = .001).
- **Satisfactory Attendance** rates are also higher among non-adopters (49.24%) in comparison to low adoption schools (40.39%) and medium to high adopters (40.16%).
- The Spatially Interpolated Demographic Estimate for these schools was significant (p = .002). **In medium to high adoption schools (247.96), there is significantly more economic disadvantage** than in low adoption schools (257.50) and with non-adopters (267.60).
- Significant trends are seen with **teacher tenure** in schools (p = 0.012). Experienced teachers are a measure of the quality of instruction. Teachers in medium to high adoption schools have longer tenure than the other groups.

What may have impacted student outcomes (mediating factors)

Relationship building is frequently mentioned in the data. This process helps student engagement by providing role models (characteristic of Tier 3 interventions)

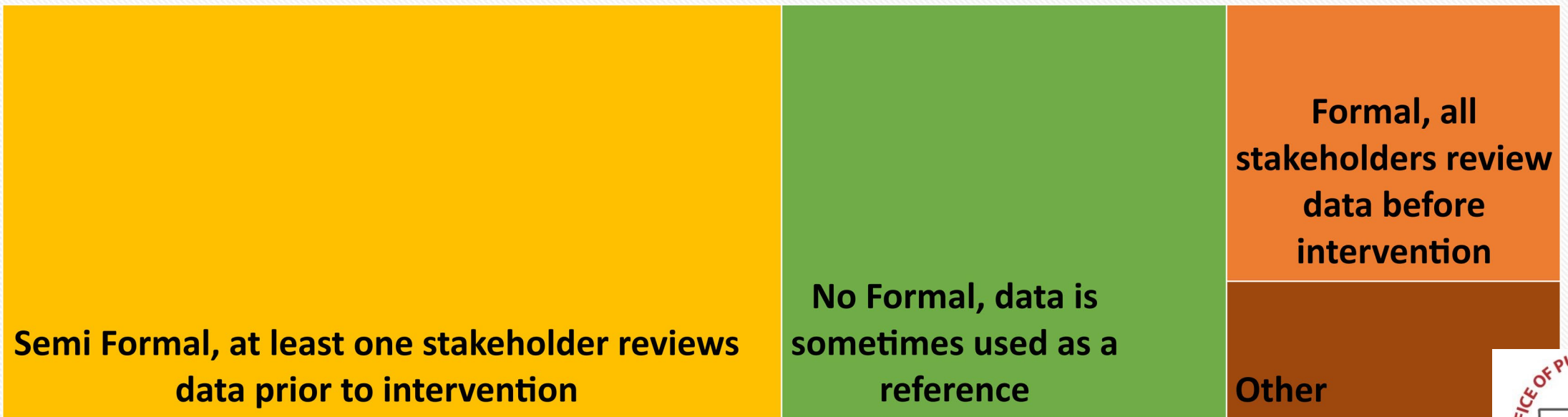*Stakeholders focus on how far tool may take you.*
High adoption schools view that they know students better given the insights of the tool.

- Ability to find spots in which the greatest impact can happen with each student.
- Vision is important, and that vision should come from a centralized source and be shared.
- Formal mechanisms, such as MTSS processes, are a characteristic of high adoption.
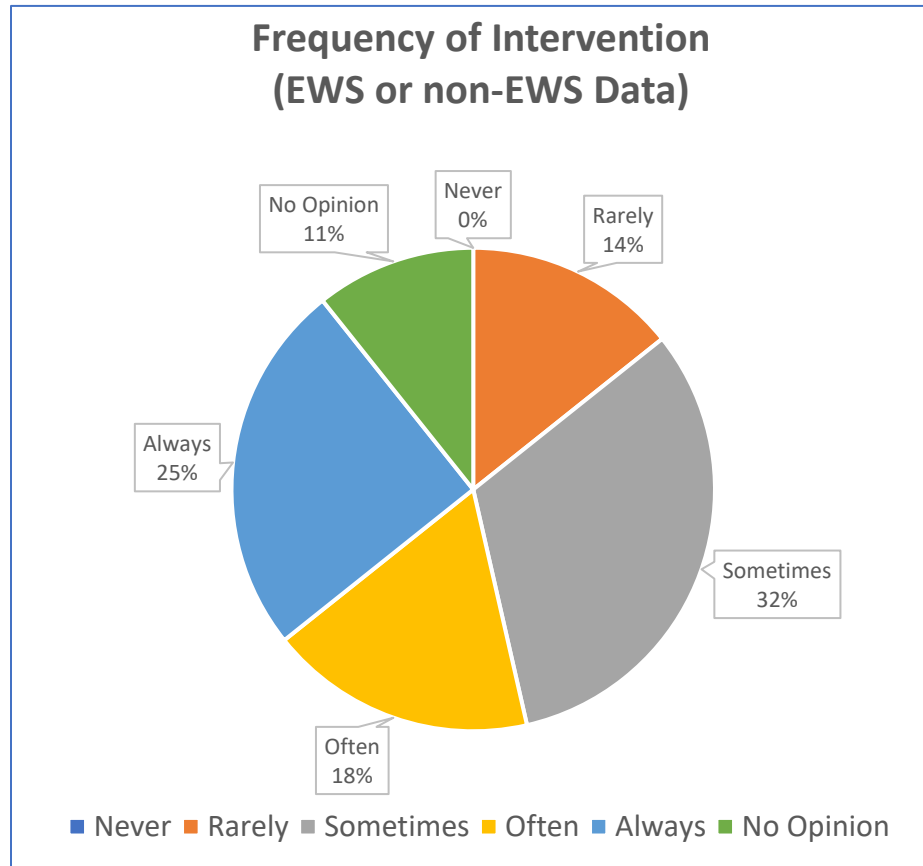
High adopters tend to disseminate EWS data to all stakeholders, including teachers. Dissemination was highly localized and in high adoption schools was designed to meet counselors and teachers' needs. Stakeholders find the tool easy to communicate and let data turn into formal and informal conversations.

Dissemination

- Formal, all stakeholders review data before intervention
- Semi Formal, at least one stakeholder reviews data prior to intervention
- No Formal, data is sometimes used as a reference
- Other

Semi Formal, at least one stakeholder reviews data prior to intervention

No Formal, data is sometimes used as a reference

Formal, all stakeholders review data before intervention

Other

Progress Monitoring and Follow-up are Key Components of EWS

Frequency of Intervention (EWS or non-EWS Data)

Pie chart segments:
- No Opinion 11%
- Never 0%
- Rarely 14%
- Sometimes 32%
- Often 18%
- Always 25%

Legend: Never · Rarely · Sometimes · Often · Always · No Opinion

- **In Montana, those schools that have been in the EWS program the longest tend to have formal procedures for follow-up.** This trend is also significantly more frequent than schools that began after 2015 (p=0.021).

- Schools focus on early identification, which shows the interest and data use about the tool.

- **Fewer districts focus on ongoing progress monitoring. Monitoring, and the ability to adjust interventions based on data, is a sign of a well-developed data culture.**

Targeting Resources: Analysis of Cost

"So much time is spent during the administrative work. EWS does it for you and the results are more consistent and insightful with a diagnostic tool that is focused and evidenced based." – MS Building Leader

The First Efficiency is Early Identification: One principal commented that **costs are minimal per student, but costs would be higher if they didn't have the EWS data or the ability to target resources.**

- Interventions cost less when students are identified early.
- Costs/student goes down.
- Overall costs stay the same as program expands (more students receiving support or intense supports).

Administrative Overhead to Collect and Manage Data Goes Down

- Schools report that they must look at over five different data systems to get a view of the same data.
- Savings from the enhanced communication among staff drive costs down

Conclusions: Processes

We conclude that the EWS model did work as intended. The degree of EWS implementation is localized and based on multiple interrelated factors. *The core of these factors is how the district finds value in the data and what they decide to do with the data.* Given the scope of these factors, OPI support was seen as a catalyst to school level change.

The rollout of the program reflected a staged process which focused on professional development for high adoption schools in addition to the online tool. The design of the tool was found to be adequate, like online tools associated with the MAPS test administration. The tool was found to be accurate among users.

Scale should meet identified need and capacity for the program to be successful. Some schools do not have a defined need for the program, others do not have the priorities. *At the state level, the scope of the program (access to tool among all kinds of adopters) has eclipsed.* This allows us to focus on existing schools (Professional Development).

Scale, capacity, and priorities will continue to inform school level implementation and information future rollout of the EWS program.

Thank you for your interest!

Please address questions/comments to:

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