

# A Critical Reflection on Decision Making Contexts and the Potential Role of Predictive Risk Models



John D. Fluke

Kempe Center, University of Colorado School of Medicine

Advancing the Science of Children's Services Through Large Data

University of Southern California, School of Social Work

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# Content

"A witty saying proves nothing." - Voltaire

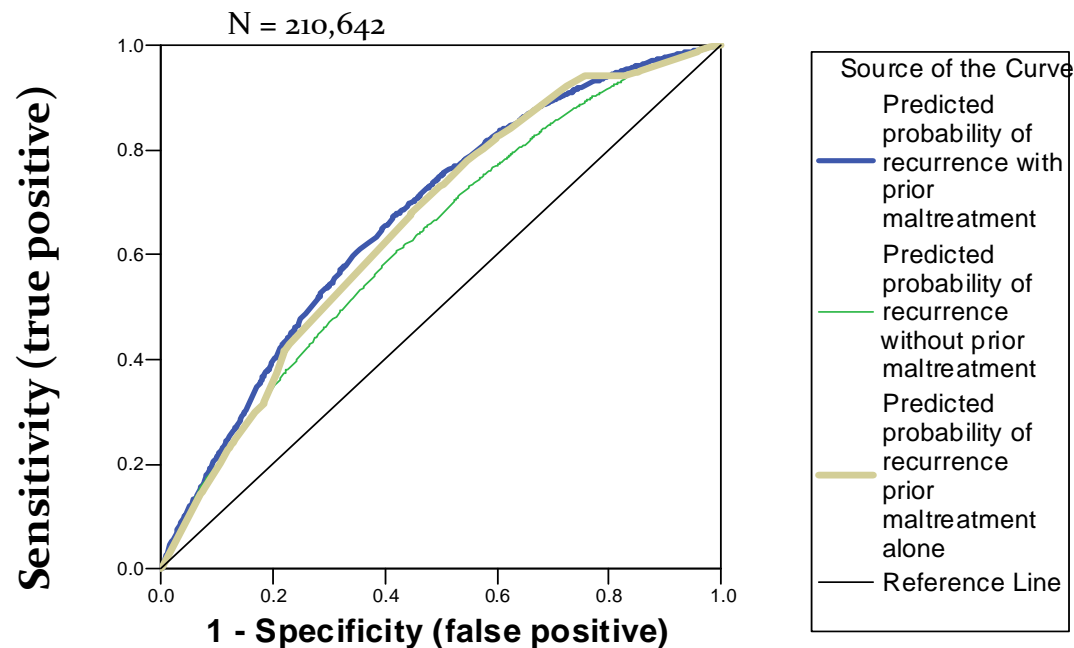
- **A Brief History of Risk Assessment Models in Child Welfare**
- **Prospects for Predictive Risk Modeling:**
- **What's Different Now?**
- **Decision Making Contexts and Predictive Risk Modeling**

# A Brief History of Risk Assessment Models in Child Welfare

- **CPS Risk Assessment Origins in the mid 1980's in US**
- **Risk Assessment Roundtables**
  - – Emergence of Actuarial Risk Assessment
  - Emergence of Safety Assessment
- **Integration into Structured Decision Making**
  - Risk Assessment Modest Predictive Capacity
  - Safety Assessment, untested

# Child Welfare and the Problem of False Positives

Accuracy of Assessment - Recurrence Example

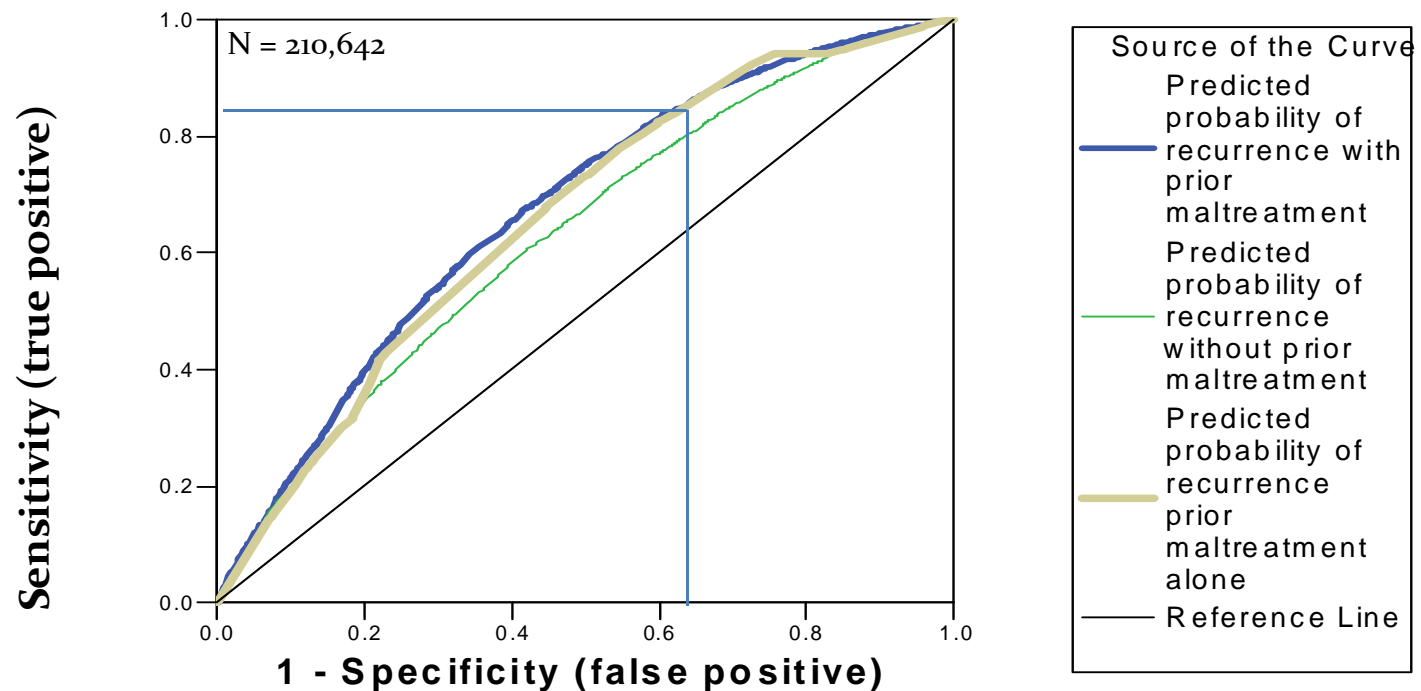


- Accuracy in assessing risk is generally not very good, and false positives are very likely
- Furthermore almost all predictive power is tied to prior occurrences

# Child Welfare and the Problem of False Positives

(assume actual prevalence is 10%)

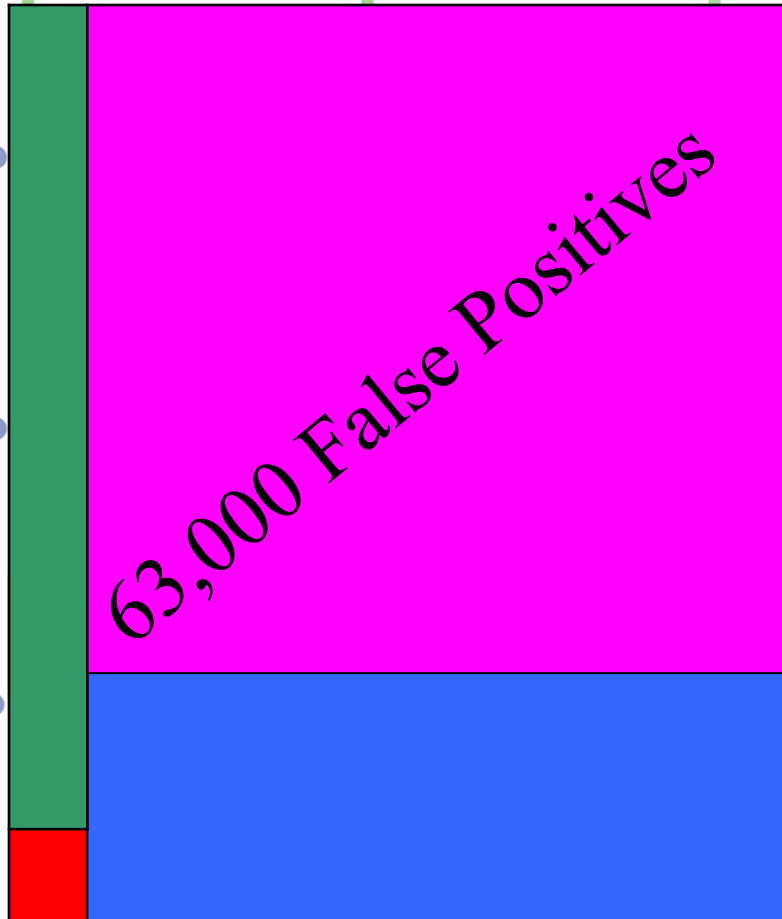
## Accuracy of Assessment - Recurrence Example



— Low threshold

# Effect of Thresholds on False Positives

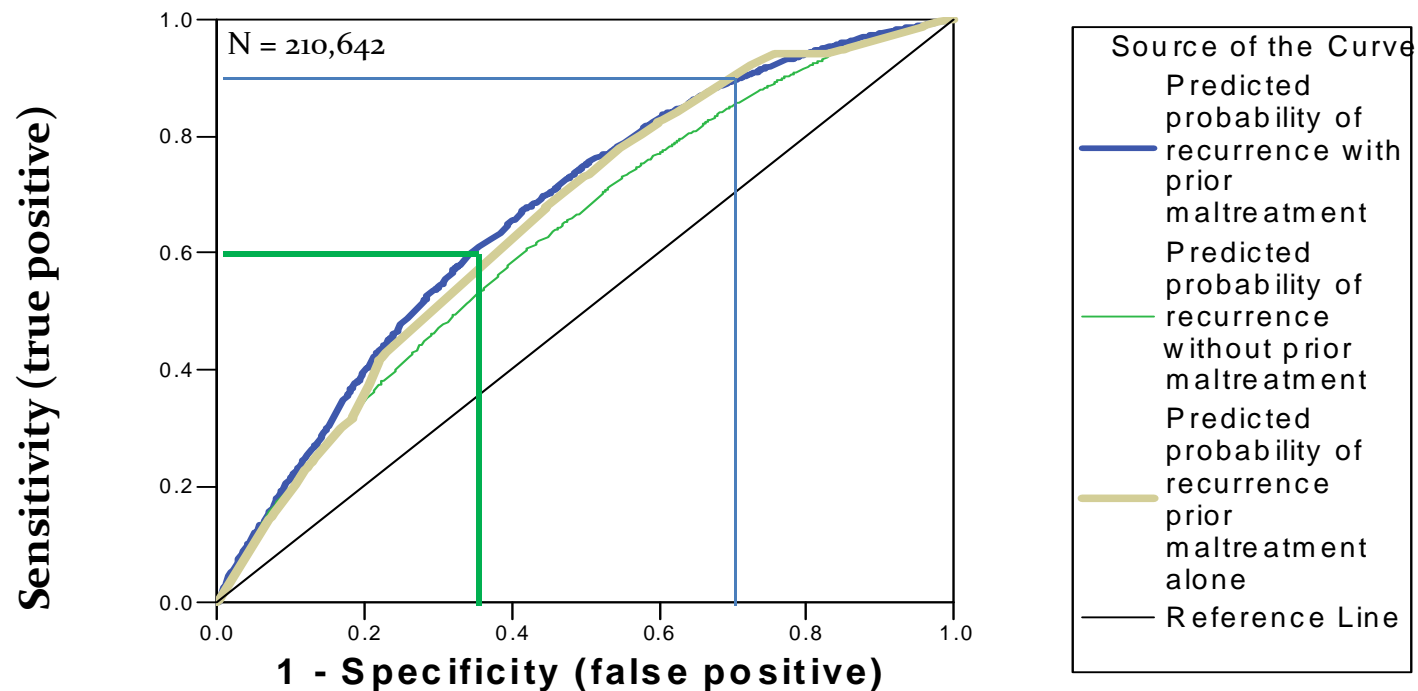
The assessment has an Area Under the Receiver Operator Curve = 63%:  
Prevalence assumed to be 10%: Applied to 100,000 children



**LOW THRESHOLD**

# Child Welfare and the Problem of False Positives

## Accuracy of Assessment - Recurrence Example



High threshold

Low threshold

# Effect of Thresholds on False Positives

The assessment has an Area Under the Receiver Operator Curve = 63%:  
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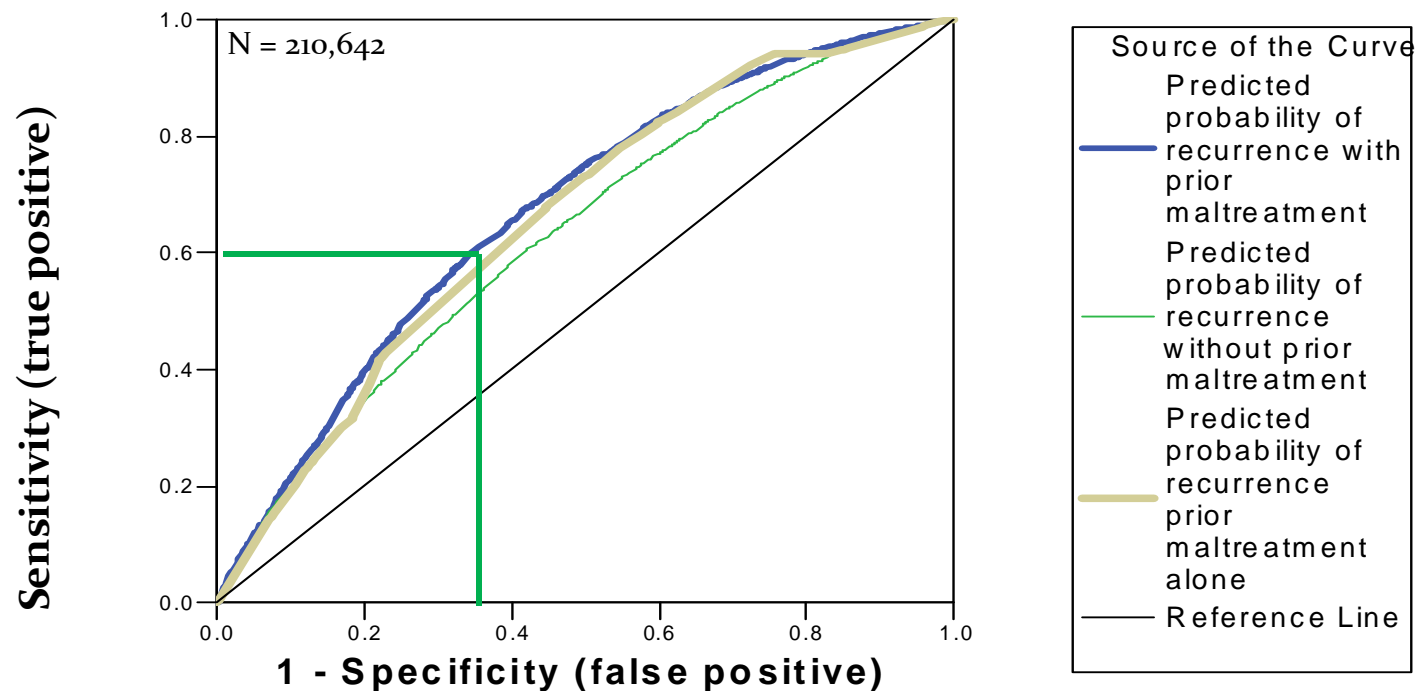
34,000 False Positives

**HIGHER THRESHOLD**



# Child Welfare and the Problem of False Positives

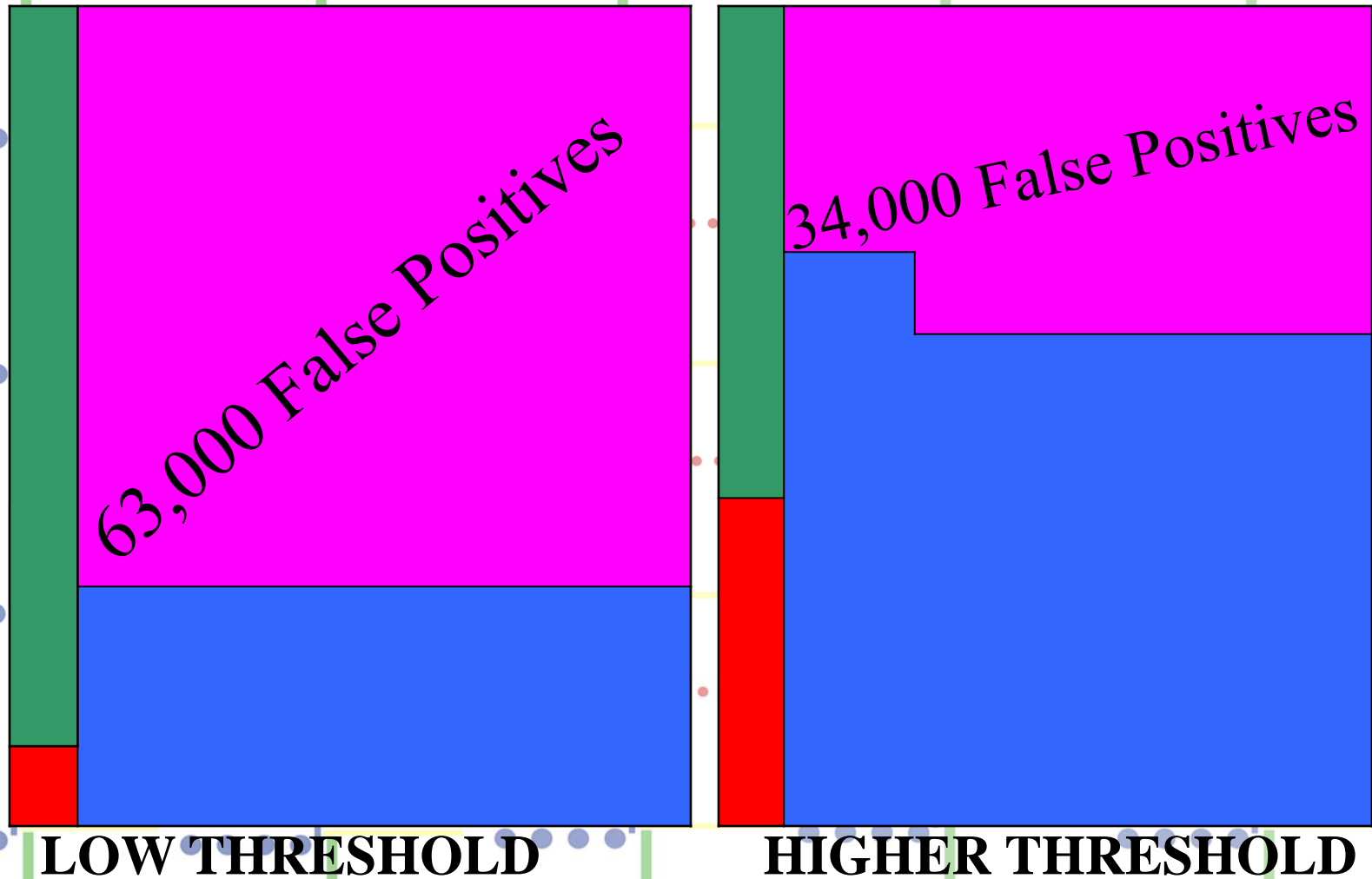
Accuracy of Assessment - Recurrence Example



High threshold

# Effect of Thresholds on False Positives

The assessment has an Area Under the Receiver Operator Curve = 63%:  
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# Prospects for Predictive Risk Modeling(PRM): What's Different?

- **Linked Data**

- Prior approaches to risk assessment development relied on data from child welfare only

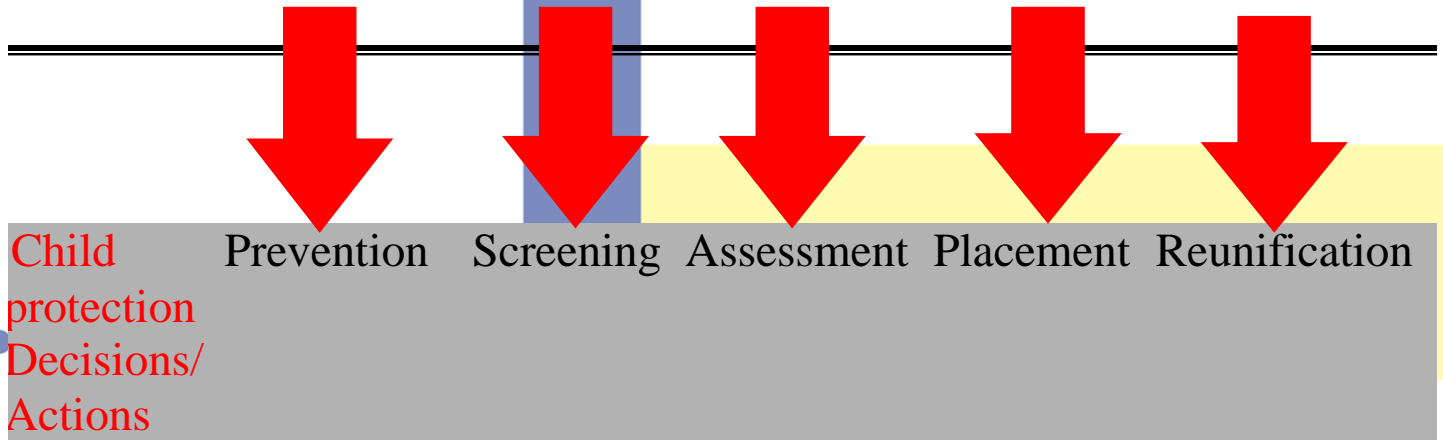
- Linked data can help to clarify risk factors as opposed to risk indicators

- PRM with linked data appears to produce better results

- **However, we are still faced with some difficulties**

# The Continuum of Intervention

ASSESSMENT



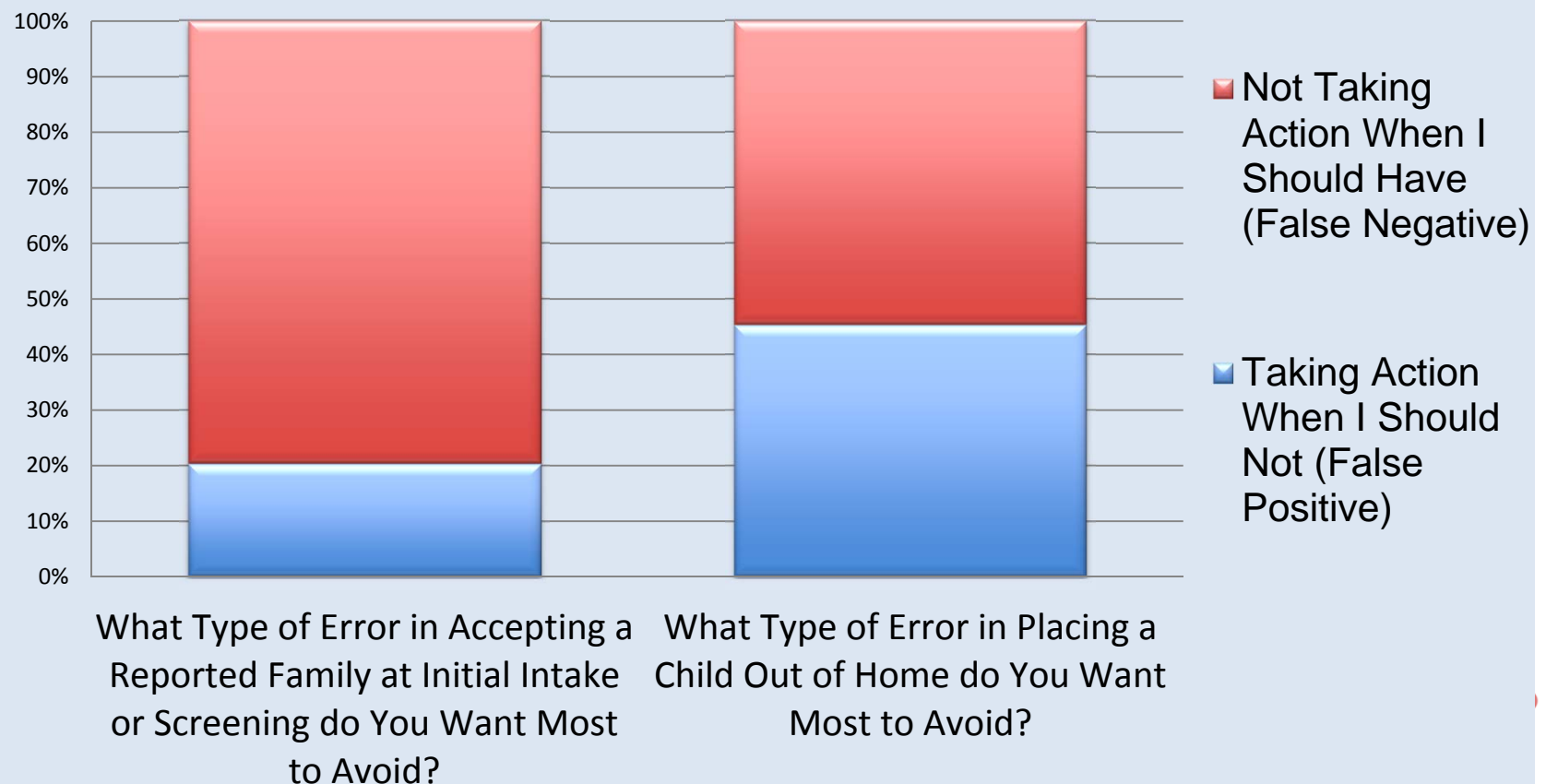
- Assessments and decisions are made at key points along the child protection continuum
- Each key decision point requires a specific assessment and action

# A QUICK SURVEY ON DECISION POINTS

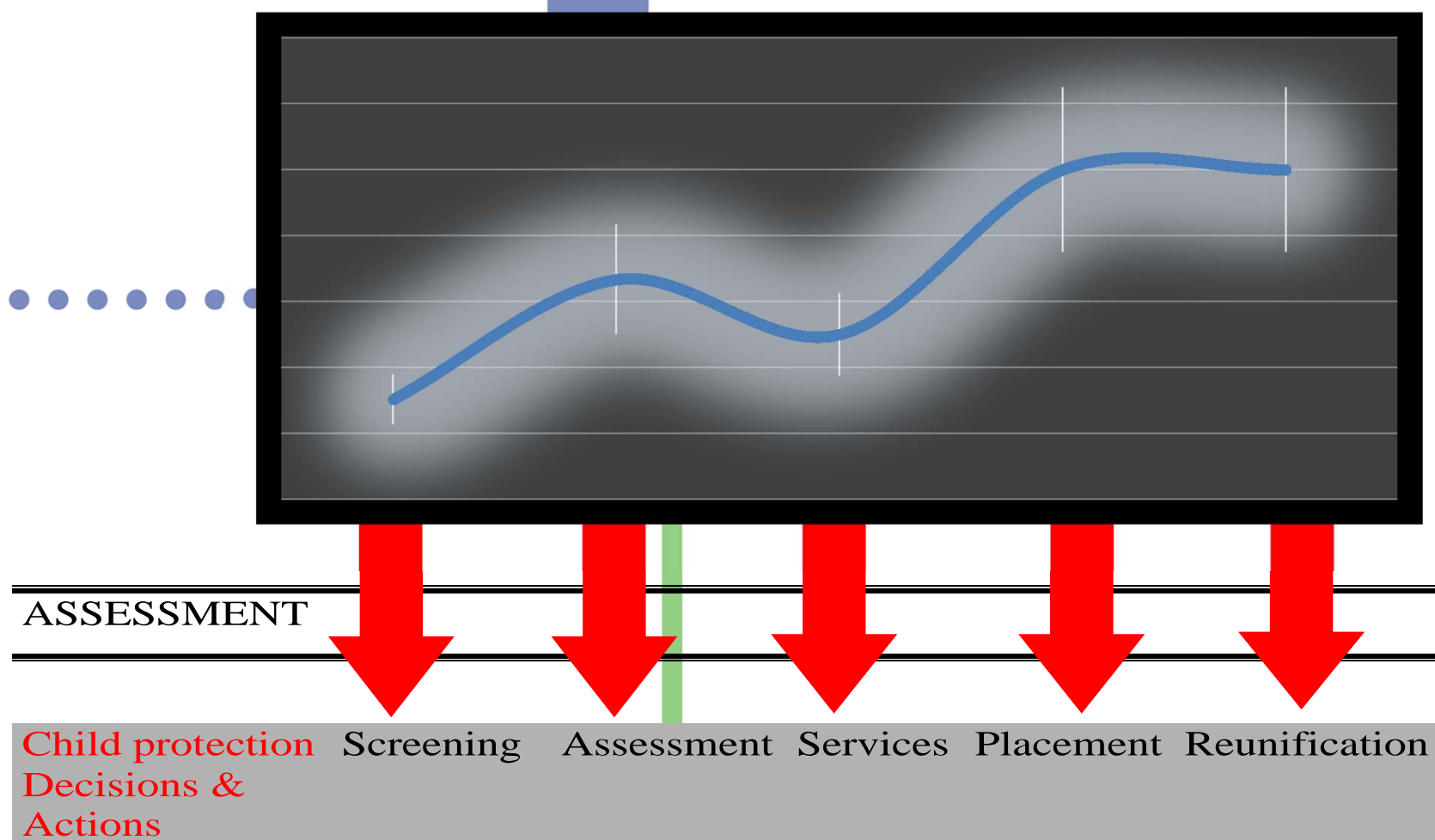


# All Along the Continuum

## Child Welfare Decision Making Continuum: What Error Do You Want Most to Avoid? (n=172)



# The Continuum of Intervention and Hypothesized Threshold Structure



# Decision Making: Classification

- **Decision Making under certainty**

- The decision maker knows what will happen
- Cause and effect are clear

- **Decision-making under risk**

- the decision maker is informed about the probabilities of different events;
- the objects of choice are probability distributions / lotteries

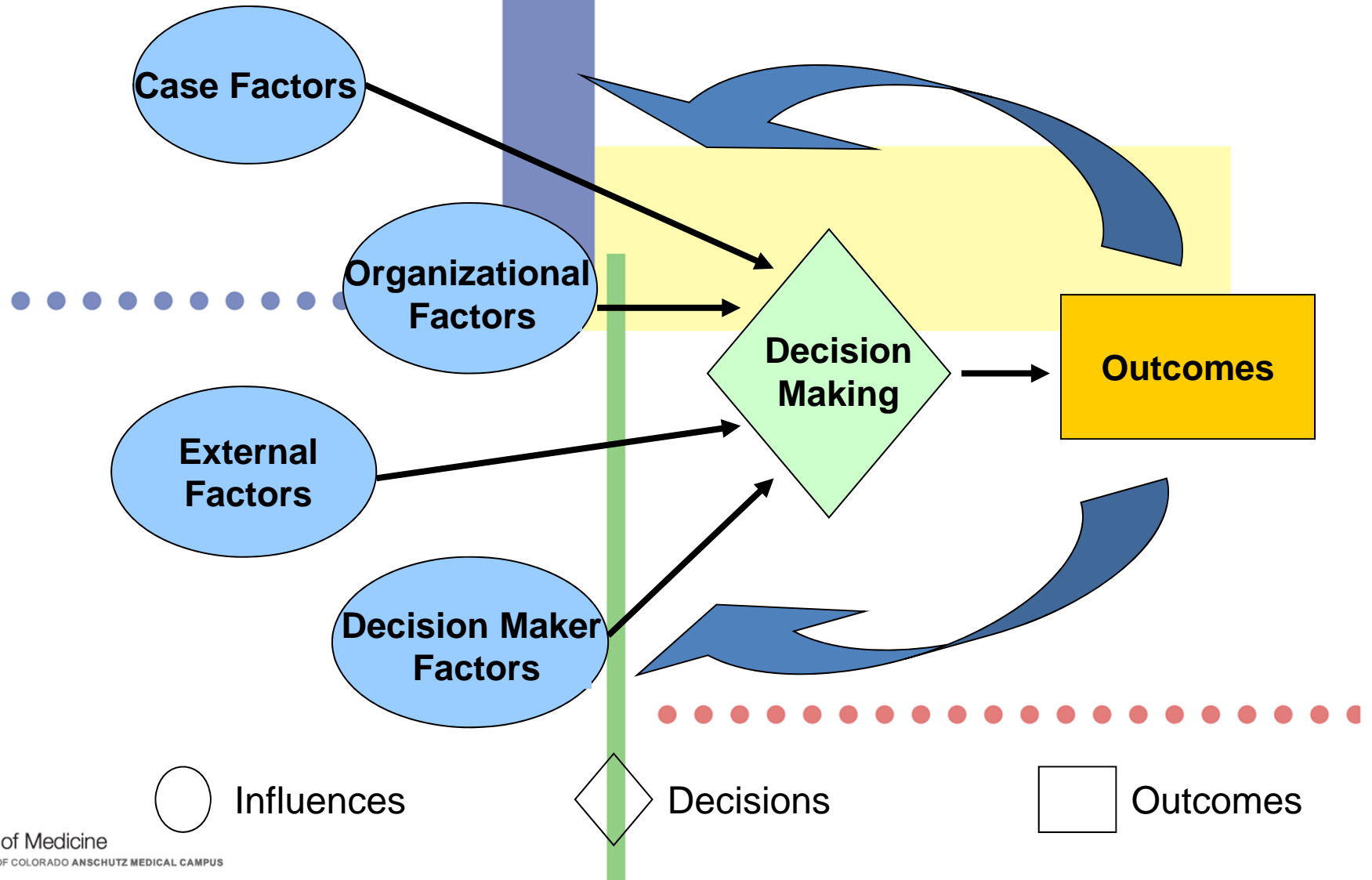
- **Decision-making under uncertainty**

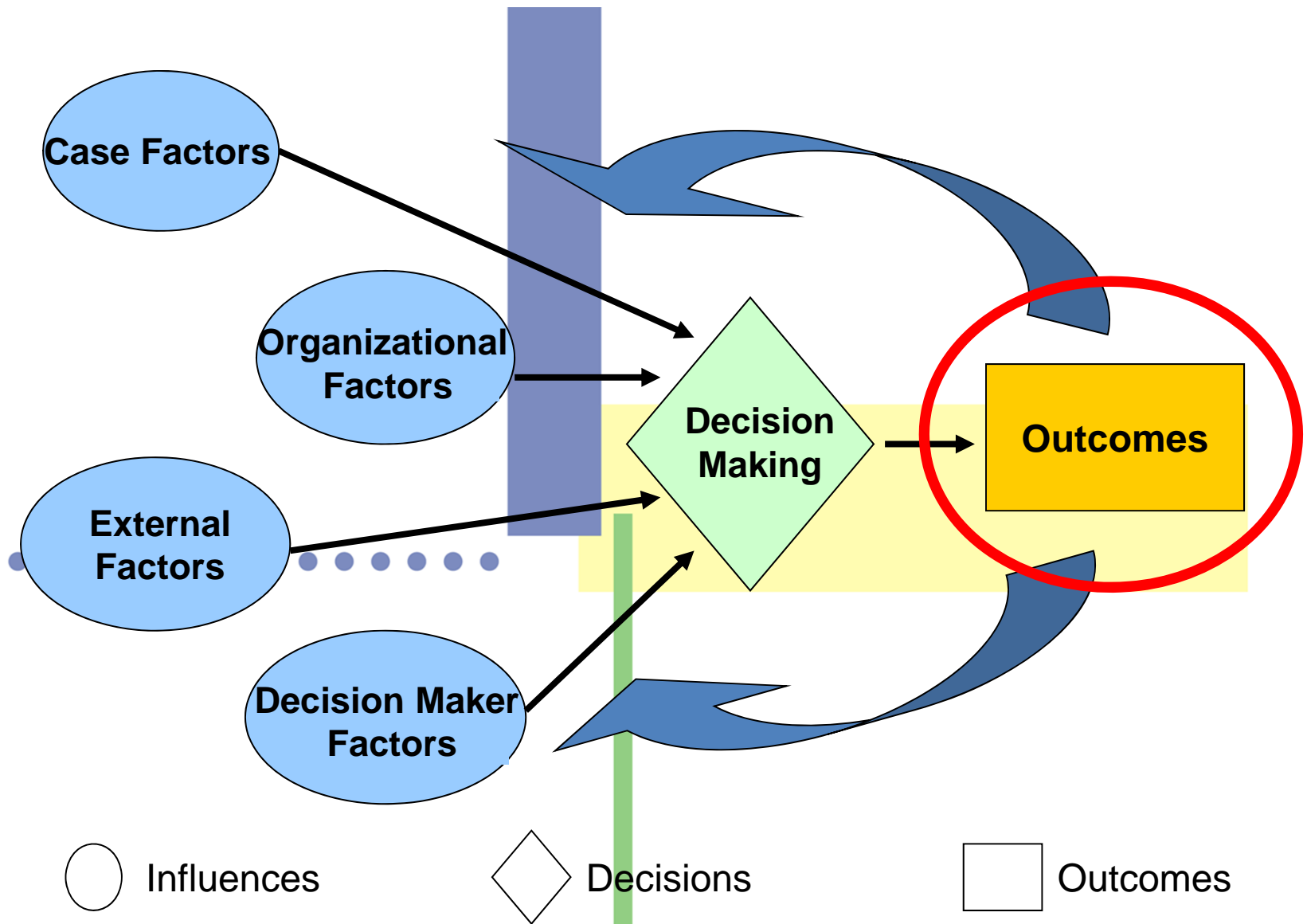
- Decision making under risk is a special case of decision making under uncertainty
- the decision maker has no information about the probabilities of different events;
- the objects of choice are state-contingent acts (e.g, context).



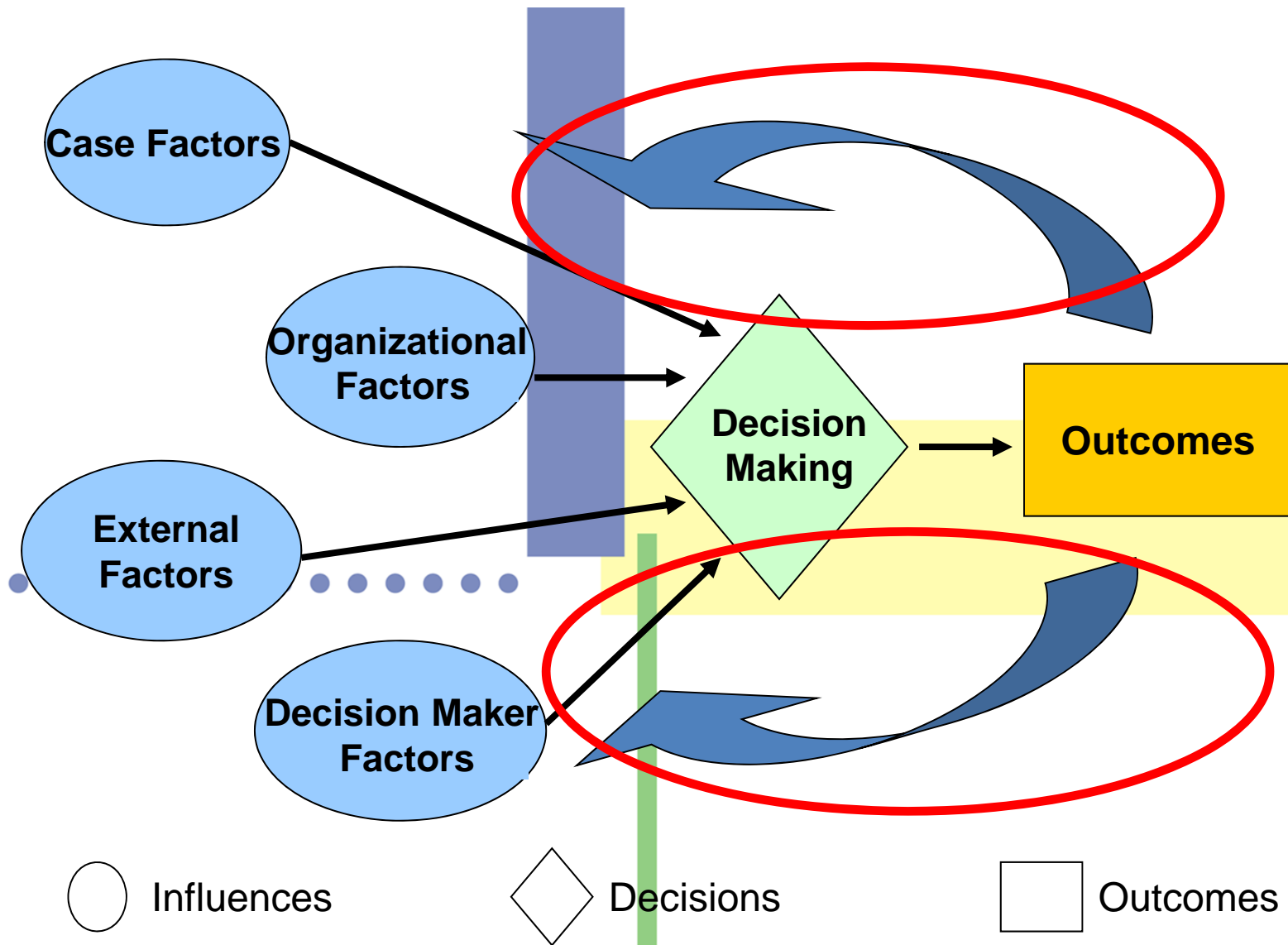
# Decision Making Ecology

(Baumann, Dalglish, Fluke & Kern, 2011)





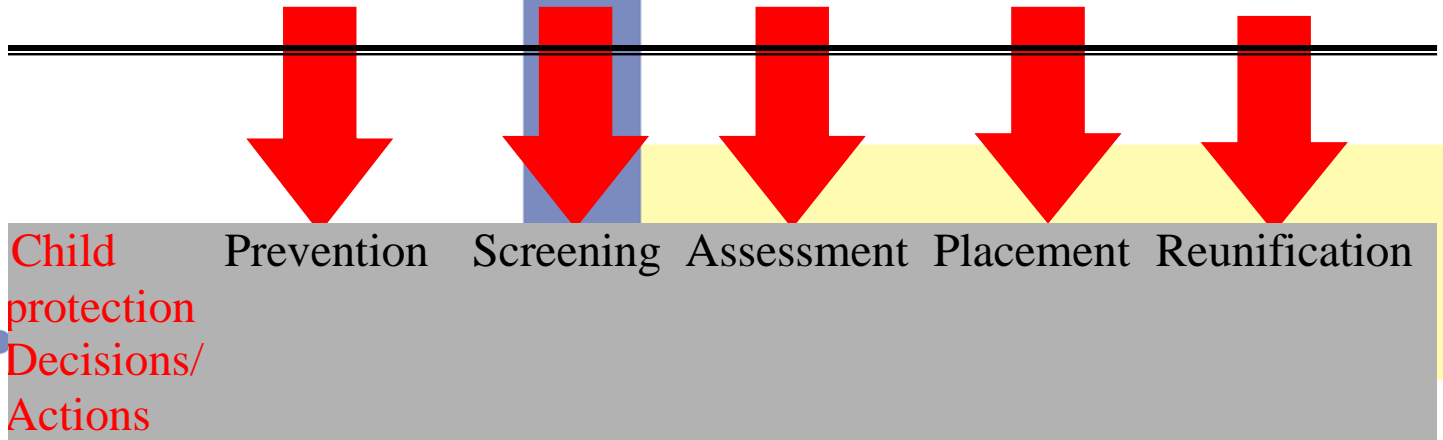
# Decision Making Ecology



# Decision Making Ecology

# The Continuum of Intervention: Decision Classification

ASSESSMENT



Decision Making Under Risk

Decision Making Under Uncertainty



# Determining Decisional Error: Moving from Uncertainty to Risk

- Is a reasonable scientific understanding and capacity to evaluate child welfare errors beyond our reach?
  - Limit the conditions under which real world tests are needed with simulation
  - Integrate administrative data to develop longitudinal studies to assess “distal” outcomes
  - Consider conducting random trials and take advantage of “naturally” occurring conditions (e.g., wait lists)

# Modifications to Child Protection Decision State Space: Some Questions

- **The Meaning of Decisions in Child Welfare**
  - What are reasonable criteria for what is meant by a child welfare decision point?
  - Can decision making under uncertainty be transformed to decision making under risk?
- Placement
- Reunification
- **Applying Classification: Mediating Uncertainty**
  - Should we consider PRM as classification policy drivers, or as the basis for decisions at the individual level?
  - Can the child welfare Decision Making Continuum be redefined: (e.g., Tied to Case Classes)?

Child Welfare – It's not rocket science, I'm  
thinking it's more like quantum mechanics

## A FEW CONCLUDING REMARKS



# Summary

- PRM modeling with linked data appears to yield better results than risk models that rely on a single data source
- PRM will continue to be problematic for decision making under uncertainty
- Efforts to determine probabilities of decision making errors are necessary, and until we address this, major improvements in our decision making capacity will continue to be elusive
- Nevertheless, linked data may be helpful in providing information to understand context and to produce models that may improve classification under conditions of uncertainty



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- Fluke, J.D., Baumann, D.J., Dalgleish, L.I., and Kern, K. D. (2014). Decisions to Protect Children: A Decision Making Ecology. In J. Korbin and R. Krugman (Eds.). [Handbook of Child Maltreatment](#) (pp. 463-462). New York, NY: Springer.

