

# Evidence-Based Transportation Asset Management (EB-TAM)

## A Framework for Achieving Accumulated Evidence in TAM

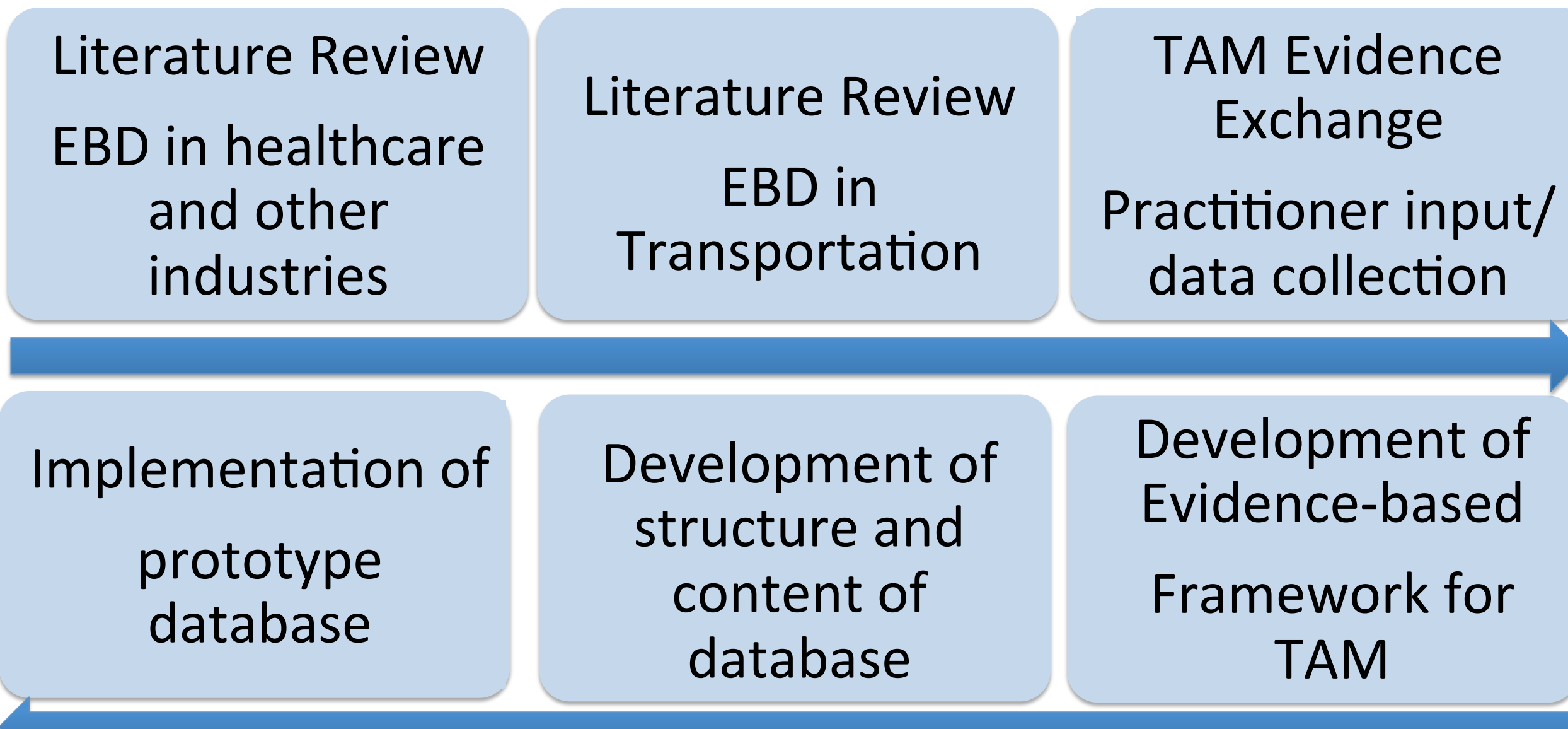
Janille Smith-Colin, P.E.; Jamie Fischer; Adjo Amekudzi, Ph.D.

### Research Objective

To develop a framework for evidence-based asset management to facilitate the use of best available evidence in transportation decision making



### Research Methodology



### EB Approach Characteristics

- Uses best available evidence; reduces bias
- Uses an accumulation of documented evidence
- Incorporates practitioner input and peer review
- Bridges gap between research and practice
- Uses rigorous “scientific” testing where feasible

### Evidence Quality Concepts

Evidence Type	Evidence Quality	Evidence Bias
Systematic study of documented case studies	Increased level of evidence ↑	Increased bias ↓
Documented case study of intervention(s) and outcome(s)		
Documented expert opinion (several practitioners)		
Documented expert opinion (one practitioner)		
Undocumented expert opinion/gut feeling		

### TAM Evidence Exchange

Case Study	Themes
Business Case Analysis (Portland Water Bureau)	Recognized nationally and internationally for successful efforts to embed business case and risk-based decision making
Asset Knowledge Development (Tillamook County Public Works)	Leader in asset risk evaluation and potential impacts on current and future level of service, developer of transportation asset knowledge
System Integration Pilot Study (Oregon DOT)	Integration of all systems with the goal of achieving strategic management vision through asset management plan
Funding and Performance Strategies (Ohio DOT)	Funding allocation based on performance guidelines rather than formula grant
Tradeoff Analysis – Preventive Maintenance vs. Reconstruction (MNDOT)	Impacts of increased preventive maintenance, tradeoff analysis, expenditure opportunity cost
AMPER Rating System (FDOT)	Developed of a tool for rating contract-based asset management performance
Business Modeling and Business Risk (Paloma County, OH)	Development of business risk model for decision making; ISO principles; reducing long term costs of investments
System Health Index (NCDOT)	Leader in scenario analysis for example tradeoffs between bridge and pavement condition, and other maintenance needs
Quality Evidence and Evidence Modeling (NYSDOT)	Demonstration of improved pavement quality following an intervention as compared with old interventions; trying to model impacts of decisions not made

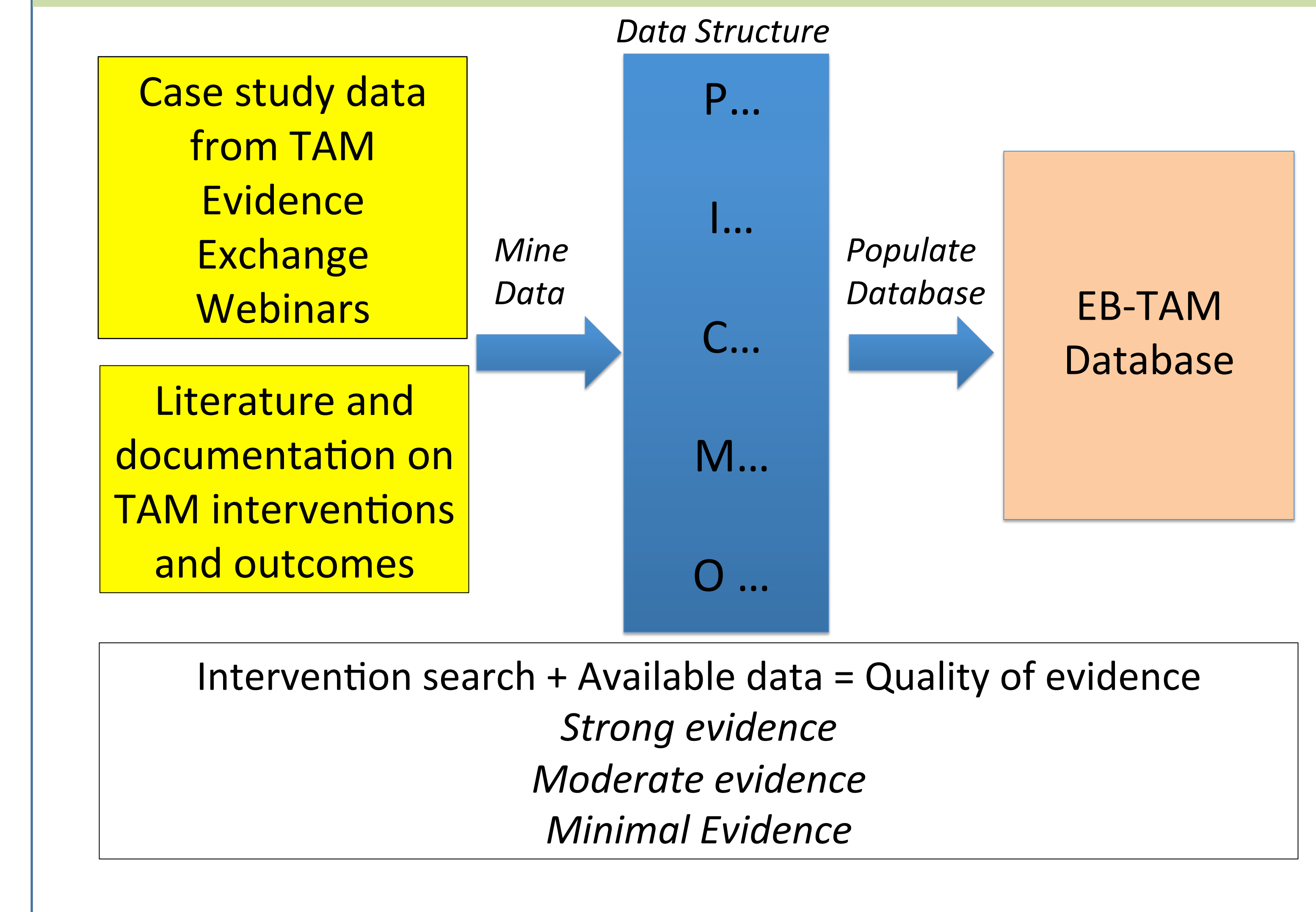
### Evidence Exchange Findings

- Agencies already use some type of evidence for their decisions but at this point it is “weak” evidence
  - Based on a limited number of observations
  - Based on gut reaction/expert opinion from individual or few practitioners
  - Limited data
- Experience in other fields suggests that a more robust body of evidence is of value and leads to more effective decisions
  - Accumulated knowledge of many agencies that document observed outcomes that result from specific interventions
- Evidence (in the form of **documented** experience) from peer organizations can inform decisions
  - As many agencies document and share experiences a more robust body of evidence will form
- A freely available database of case studies can be compiled based on a hybrid framework for EB-TAM PICMO (Problem, Intervention, Context, Mechanism and Outcome of the cases of the PICO and CIMO)
  - Informed by evidence-based management literature; hybrid of the PICO and CIMO formats

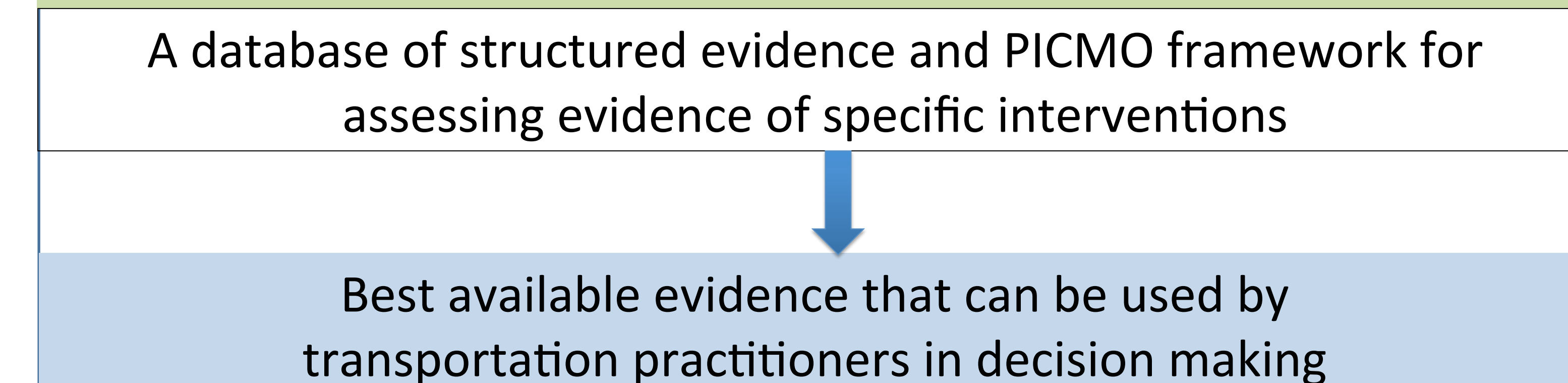
### PICMO Framework for EB-TAM

Evidence Assessment Framework	
<b>P</b> Problem	What was the problem being solved?
<b>I</b> Intervention	What was the intervention used to address the problem?
<b>C</b> Context	What other factors affect the possible observed outcomes, particular relationships, institutional settings or wider systems?
<b>M</b> Mechanisms	What are the mechanisms, or pathways, through with the intervention can impact the problem? Are they direct or indirect?
<b>O</b> Outcomes	What are the (intended or unintended) effects of the intervention? Was the intervention successful (in quantifiable terms)? How successful was the intervention?

### Development of EB-TAM Database



### Contributions to TAM Practice



### References

(1) Pati, D. (2011). A Framework for Evaluating Evidence in Evidence-Based Design. Health Environments Research & Design Journal (HERD), 4(3), 50- (2) Annette, N., & Frank, B. (n.d). Examples of evidence-based approaches in accident, September 30th - October 3rd, 2008, Crete, Greece), 1044-1049. doi:10.1016/j.j.ssci.2010.02.009 ; (3) Briner, R. B., Denyer, D., & Rousseau, D. M. (2009). Evidence-Based Management: Concept Cleanup Time? Academy Of Management Perspectives, 23(4), 19-32