



## Info-Gap Analysis of Preparedness and Response to Bio-Terrorism

### § The problems of uncertainty:

- Design or decide.
- Robustness to noise and info-gaps.
- Opportuneness: exploit windfall.
- Satisfice or optimize.

### § Information-gap uncertainty:

- Uncertainty is a limitation of knowledge.
- Uncertainty is a gap between what is known and what could be known.
- Surprises and ignorance.

### § Models:      • Characterize reality.      • Attributes of model correspond to attributes of reality.

### § Model-based decision: adapt decision to attributes of model.

### § Optimal model-based decision: Use best model to choose decision with best outcome.

### § Fallacy of optimal model-based decision:

- Severe uncertainty:
  - Best model errs seriously.
  - Some model attributes are **correct**.
  - Some model attributes **err greatly**.
- Best-model optimization:
  - Exploits **all model attributes** to the extreme.
  - Vulnerable to model error.

### § Resolution: robust-satisficing.

- Trade performance for robustness.
- Satisfice performance.      • Optimize robustness to uncertainty.

### § Robust-satisficing syllogism:

- Adequate performance must be attained.
- High reliability of adequate performance preferred over Low reliability of optimal performance.
- Max reliability of adequate performance is best.

### § Trade-off:      • Robustness vs. performance.      • Pareto efficiency.

### § Preference reversal: robustness curves may cross.

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