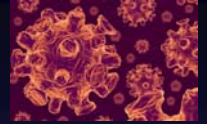


## Enhancing cross-disciplinary problem-based biosecurity research

Gabriele Bammer

National Centre for Epidemiology and Population Health

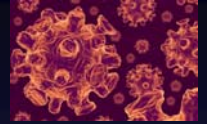


Two key elements of biosecurity research are

1. Collaboration across disciplines
2. Collaboration between research and practice

In order to:

- Combine knowledge
- Combine uncertainties and ignorance
- Assist decision making and change



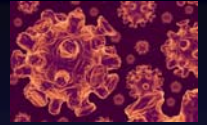
## This presentation:

- Principles for collaboration
- New ways of thinking about uncertainty

Not covered

Ideas for research impacts on decision making and change

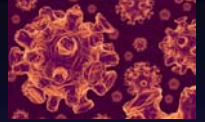
New cross-cutting discipline –  
Integration and Implementation  
Sciences (I2S)



# Principles for Collaboration...1

Collaboration is about harnessing difference:

- Integrating the positive
  - problem framing
  - boundary setting
  - integration concepts and techniques
  
- Managing the negative



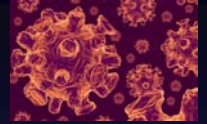
## Principles for Collaboration...2

Problem framing

ie How we conceive or structure the problem

Eg Biosecurity attacks

- Disaffected individuals
- Organised networks

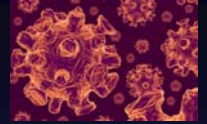


## Principles for Collaboration...3

### Boundary setting

- Which disciplines to include
- Which practice areas to engage with

Can never do everything, so there's an issue of what is included, excluded and marginalised

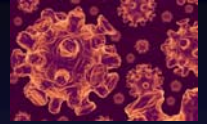


# Principles for Collaboration...4

## Integration ...1

Need systematic consideration of 6 questions:

1. For what and for whom?
2. Of what?
3. By whom?
4. How?
5. Context?
6. Impact?

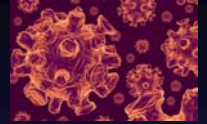


# Principles for Collaboration...5

## Integration ...2

6 classes of integrative methods:

1. Dialogue-based
2. Model-based
3. Product-based
4. Vision-based
5. Common metric-based
6. Action research

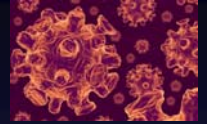


## Principles for Collaboration...6

Managing conflict:

Productive 'conflict' that contributes to understanding the problem eg in values, epistemologies

Unproductive conflict that gets in the way of working together eg personality clashes, interests



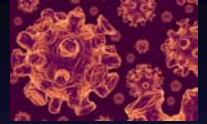
## Principles for Collaboration...7

In terms of problem framing, boundary setting and integration:

Fundamental difference between multi-disciplinary and transdisciplinary research

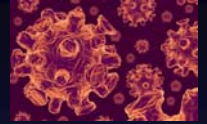
Multi-disciplinary – leave it till the end

Transdisciplinary – does it up front



## Principles for Collaboration...8

	Multidisciplinary	Transdisciplinary
Problem framing	Each does own	Agreed up front
Boundary setting	Easier to add new	Agreed up front
Integration	Harder but opens up wider range of considerations	Agreed up front

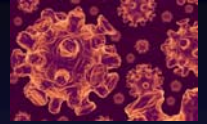


## Principles for Collaboration

Further reading:

Bammer, G. (2008) 'Enhancing research collaboration: Three key management challenges', *Research Policy*, in press

Integration Insights series: [www.anu.edu.au/iisn](http://www.anu.edu.au/iisn)



This presentation:

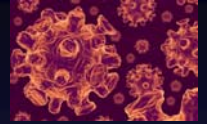
- Principles for collaboration
- **New ways of thinking about uncertainty**



Not covered

Ideas for research impacts on decision making and change

New cross-cutting discipline –  
Integration and Implementation  
Sciences (I2S)



# New ways of thinking about uncertainty...1

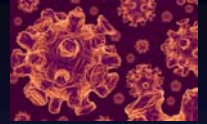
Focus is on what we know

What we don't know is more important

Various disciplines and sectors deal with uncertainty differently

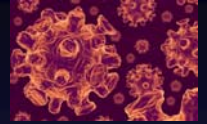
Some uncertainties are irreducible

Sometimes we don't have enough time and money



## New ways of thinking about uncertainty...2

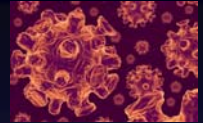
Known knowns	Unknown knowns (tacit knowledge)
Known unknowns (conscious ignorance)	Unknown unknowns (meta-ignorance)



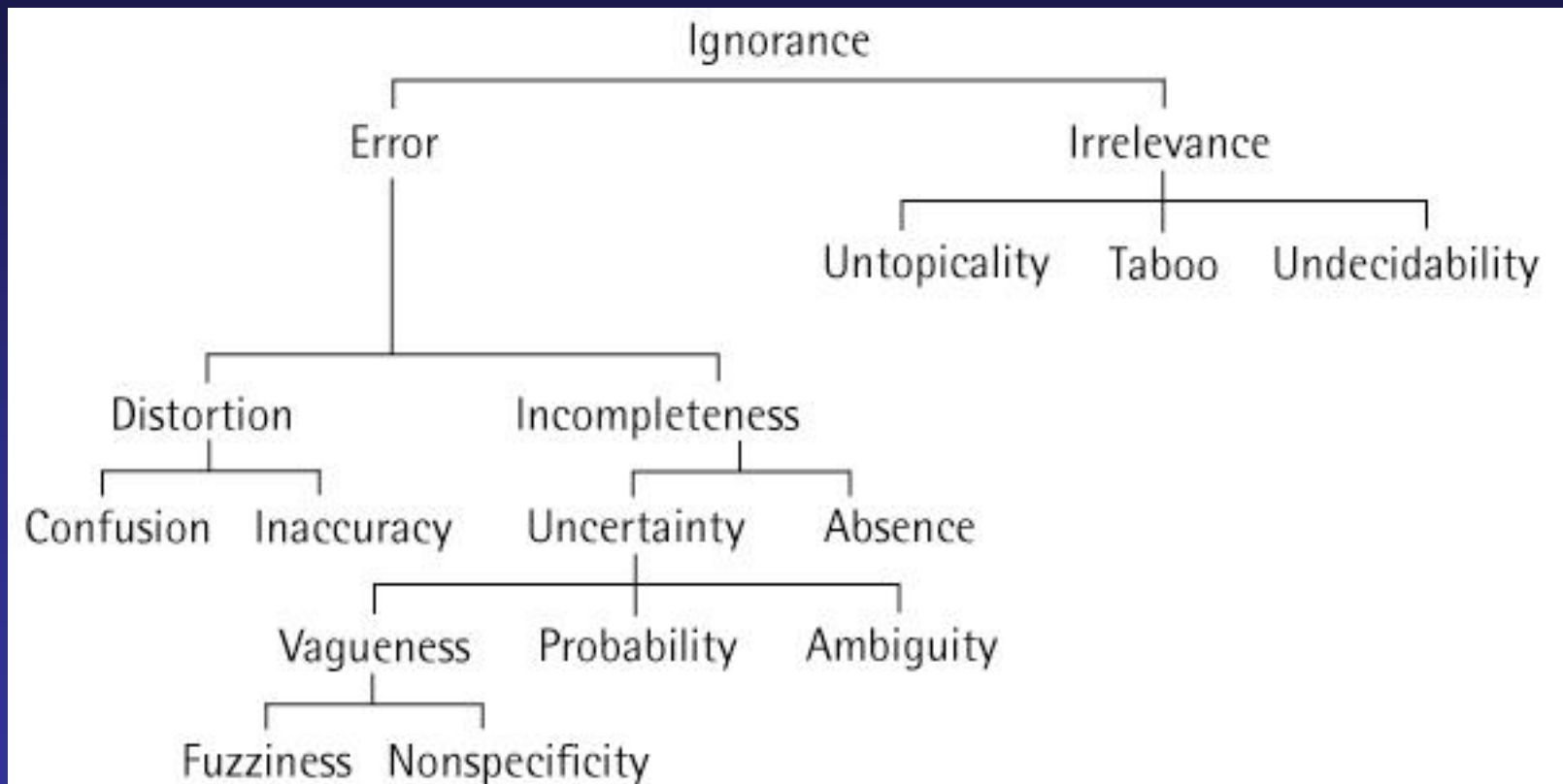
## New ways of thinking about uncertainty...3

### Responses to conscious ignorance:

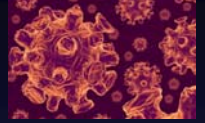
- More research
- Confidence intervals and other statistical techniques
- Managing cognitive bias etc
- Hedging
- Precaution
- Etc – depends on the type of ignorance



# New ways of thinking about uncertainty...4



Typologies eg Smithson, M. (1989) *Ignorance and Uncertainty: Emerging Paradigms*, Springer Verlag, New York



# New ways of thinking about uncertainty...5

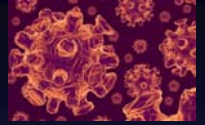
Managing unknowns unknowns:

Can identify them

- In hindsight
- In other people

Strategies:

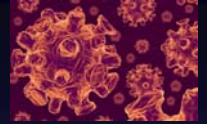
- Foresight or futures studies
- Collaboration



## New ways of thinking about uncertainty...6

Further reading:

Bammer, G. and M. Smithson (eds) 2008 *Uncertainty and Risk: Multi-Disciplinary Perspectives*, London: Earthscan.



# Integration and Implementation Sciences

[www.anu.edu.au/iisn](http://www.anu.edu.au/iisn)

- Collaboration and integration
- Ignorance and uncertainty
- Decision support and change
- Fresh thinking on intractable problems