

# The intelligence game.

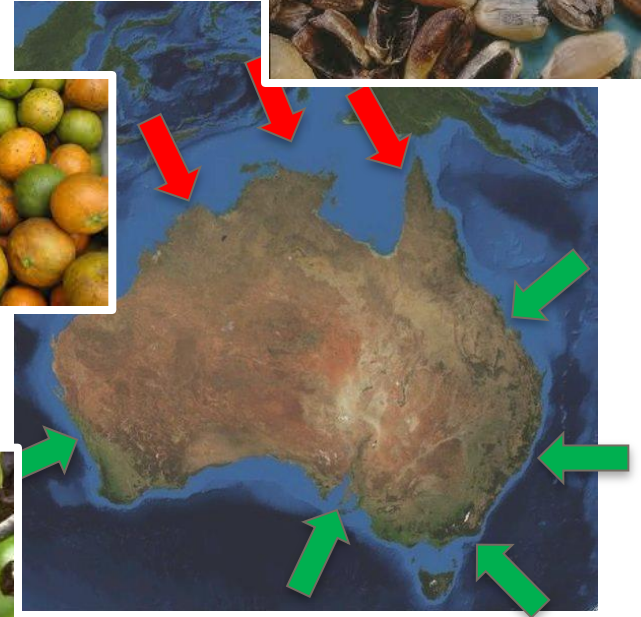
Mark Burgman, Brian Manning, Marissa McBride,  
Fiona Fidler, Steven Mascaro, Louisa Flander,  
Bonnie Wintle, Aidan Lyon, Charles Twardy

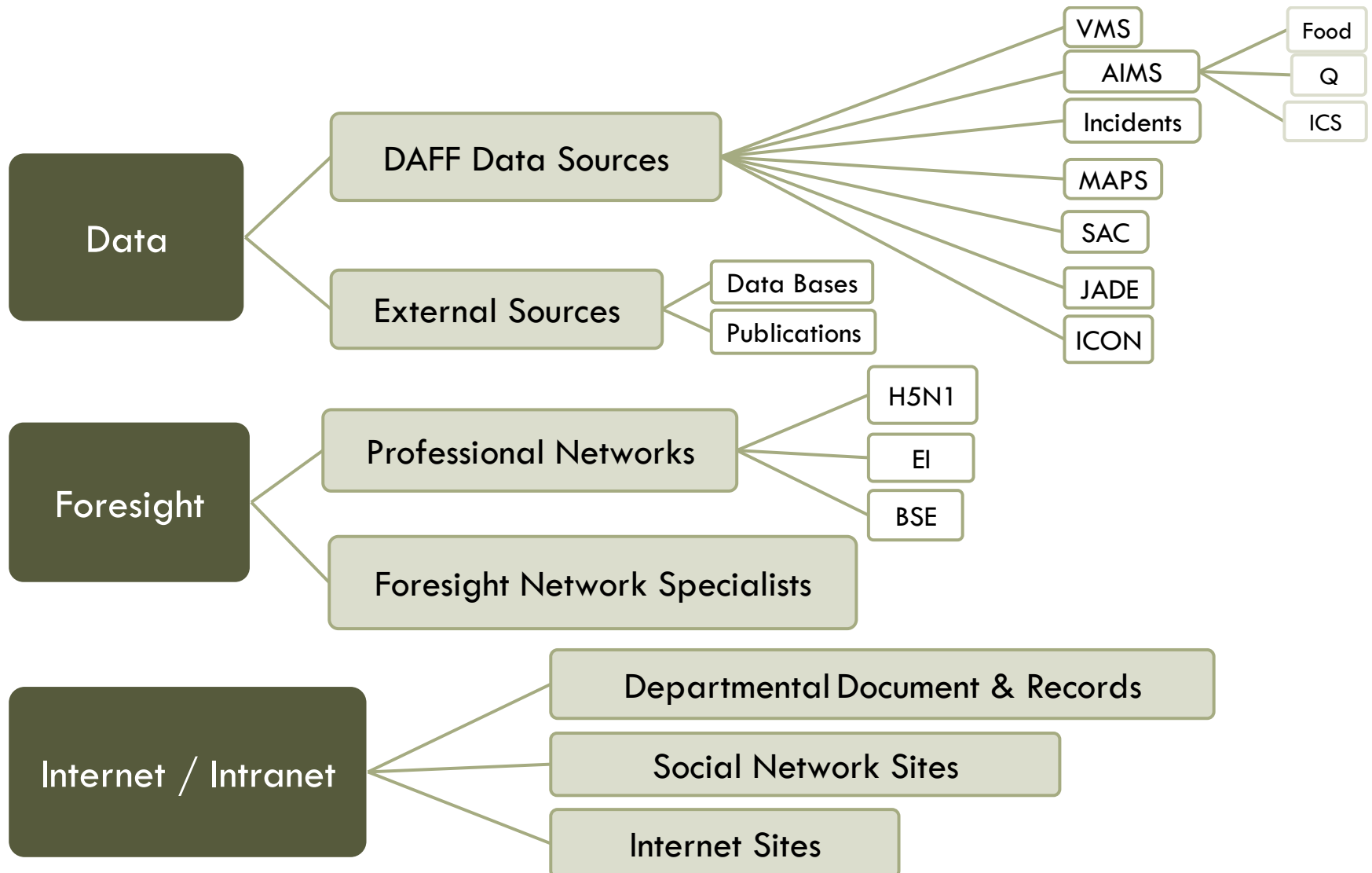
Strathclyde  
April 2014



## Government's view of biosecurity

- Unique ecology
- Clean / green market image
- Agriculture, fisheries and forestry (2011–12 estimates)
  - gross value of production \$53.3 billion
  - ~70% of agricultural production is exported
  - value of agricultural exports \$38.4 billion
- Influential primary production sector





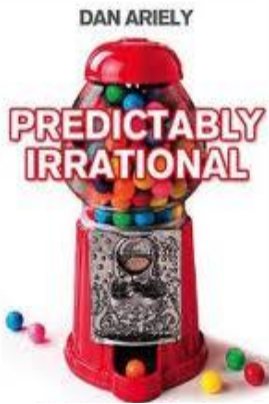
## Pest risk analysis

key knowledge on pests/diseases

- Pathways and pests
- Likelihood to:
  - enter
  - establish
  - spread
- Consequences
- ‘Measures’, if risk exceeds ALOP
- Mainly qualitative
- Evidence connecting:
  - viable pest/disease
  - susceptible hosts
  - conducive environment

<b>P[EES]</b>	<b>High</b>	Negligible	Very low	Low	Moderate	High	Extreme
<b>Likelihood of pest or disease agent entry, est. and spread</b>	<b>Moderate</b>	Negligible	Very low	Low	Moderate	High	Extreme
	<b>Low</b>	Negligible	Negligible	Very low	Low	Moderate	High
	<b>Very low</b>	Negligible	Negligible	Negligible	Very low	Low	Moderate
	<b>Extremely low</b>	Negligible	Negligible	Negligible	Negligible	Very low	Low
	<b>Negligible</b>	Negligible	Negligible	Negligible	Negligible	Negligible	Very low
		<b>Negligible</b>	<b>Very low</b>	<b>Low</b>	<b>Moderate</b>	<b>High</b>	<b>Extreme</b>
		<b>Overall consequence rating of pest or disease agent entry, establishment and spread</b>					





# FUTURE BABBLE

Why Expert Predictions Fail — and Why We Believe Them Anyway

**Dan Gardner**  
Bestselling author of *Risk*

"Future Babble is genuinely amusing, and should be required reading for journalists, politicians, academics, and anyone who listens to them."  
—STEVEN PINKER, author of *How the Mind Works*

A NEW YORK TIMES BUSINESS BESTSELLER  
"An entertaining and thought-provoking as *The Tipping Point* by Malcolm Gladwell... *The Wisdom of Crowds* ranges far and wide."  
—*The Boston Globe*

# THE WISDOM OF CROWDS

**JAMES SUROWIECKI**

WITH A NEW AFTERWORD BY THE AUTHOR



PHILIP E. TETLOCK

# EXPERT POLITICAL JUDGMENT



*How Good Is It? How Can We Know?*

# WRONG

Why Experts Keep Failing Us — And How to Know When Not to Trust Them

Scientists, finance wizards, doctors, relationship gurus, celebrity CEOs, high-powered consultants, health officials and more

**DAVID H. FREEDMAN**

author of *THE UNDERCOVER ECONOMIST*

# ADAPT

WHY SUCCESS ALWAYS STARTS WITH FAILURE

**TIM HARFORD**

"Harford presents complex arguments with unfailing clarity and wit"  
*Sunday Times*

Harnessing the Power of Counterintuition

# THINK TWICE

MICHAEL J. MAUBOUSSIN

The New York Times Business Bestseller

# SUPER CRUNCHERS

HOW ANYTHING CAN BE PREDICTED

—STEVEN D. LEVITT, *co-author of Freakonomics*

**IAN AYRES**

2008  
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# SUPER CRUNCHERS

HOW ANYTHING CAN BE PREDICTED

—STEVEN D. LEVITT, *co-author of Freakonomics*

**IAN AYRES**

CROWD SOURCING

WHY THE POWER OF THE CROWD IS DRIVING THE FUTURE OF BUSINESS

**JEFF HOWE**

# Being Wrong

Adventures in the Margin of Error

# blink

By the author of *THE TIPPING POINT*

The Power of Thinking Without Thinking

**Malcolm Gladwell**

The Power of Organizing Without Organizations

# HERE COMES EVERYBODY

How the Power of Organizing Without Organizations is Changing the World

**CLAY SHIRKY**

WITH AN AFTERWORD BY THE AUTHOR

# Predictocracy

Market Mechanisms for Public and Private Decision Making

**MICHAEL ABRAMOWICZ**

SECOND EDITION

WITH A NEW SECTION: "ON ROBUSTNESS & FLEXIBILITY"

NEW YORK TIMES BESTSELLER

# THE BLACK SWAN

The Impact of the Highly Improbable

"The most prophetic writer of all!"  
—*WSJ*

**Nassim Nicholas Taleb**

DOUGLAS W. HUBBARD

# THE FAILURE OF RISK MANAGEMENT

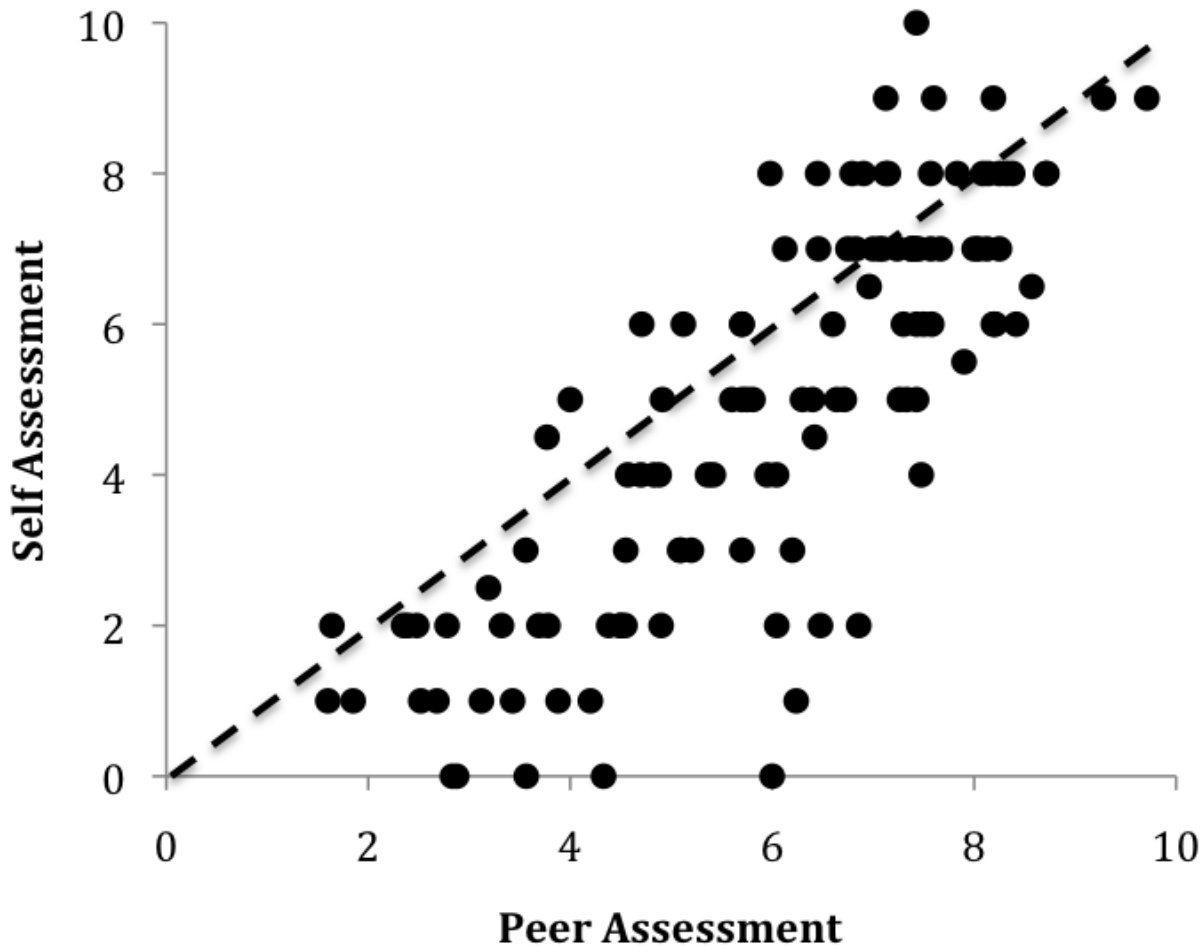
Why It's Broken and How to Fix It

# ON BEING CERTAIN

Believing You Are Right Even When You're Not

**ROBERT A. BURTON, M.D.**

# Peer versus self assessments

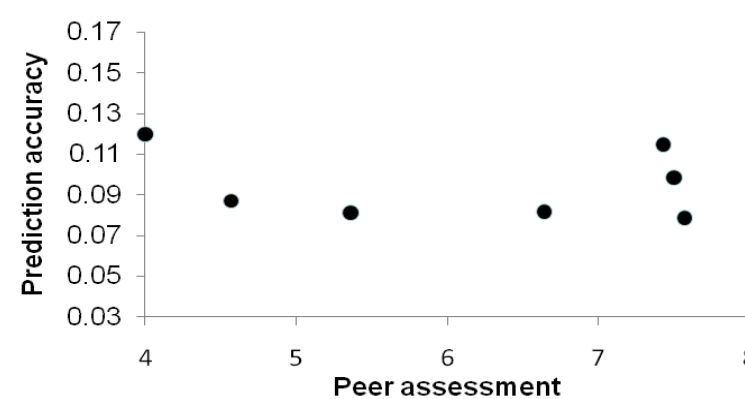
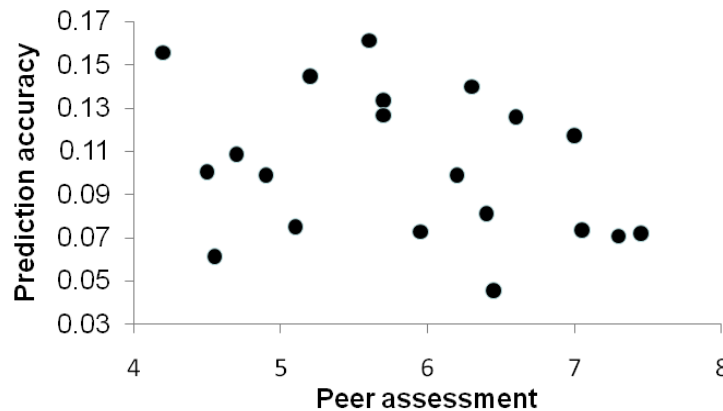
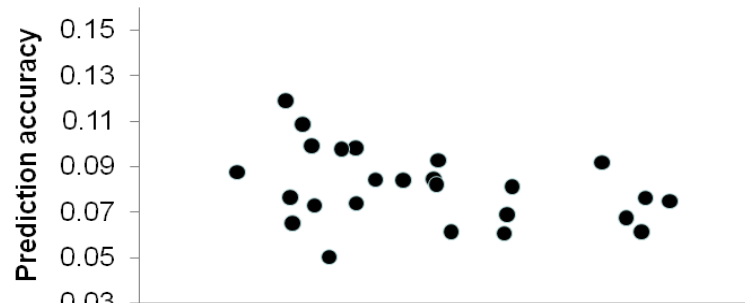
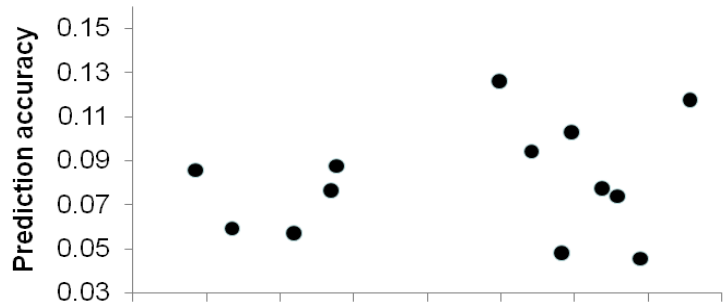
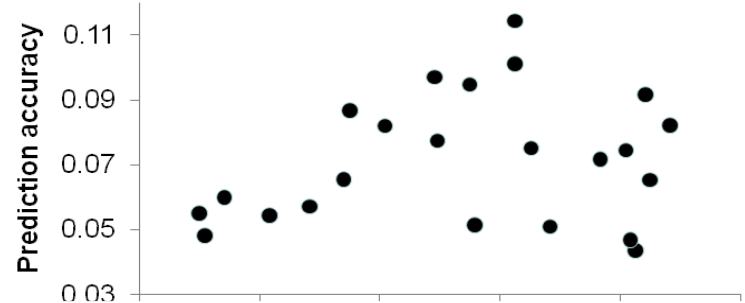
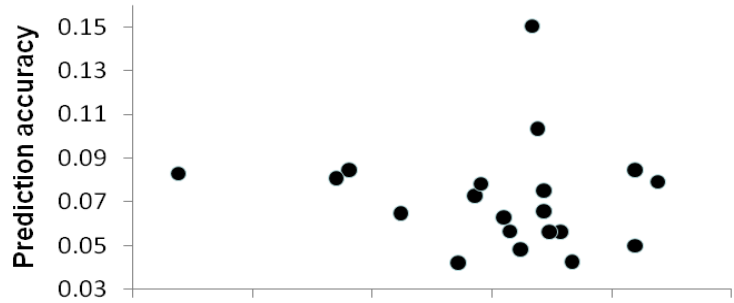


$r = 0.85$

*Range across  
workshops  
[ 0.675 to 0.944 ]*



# Do peer assessments correlate with performance?





# 3-step question format...

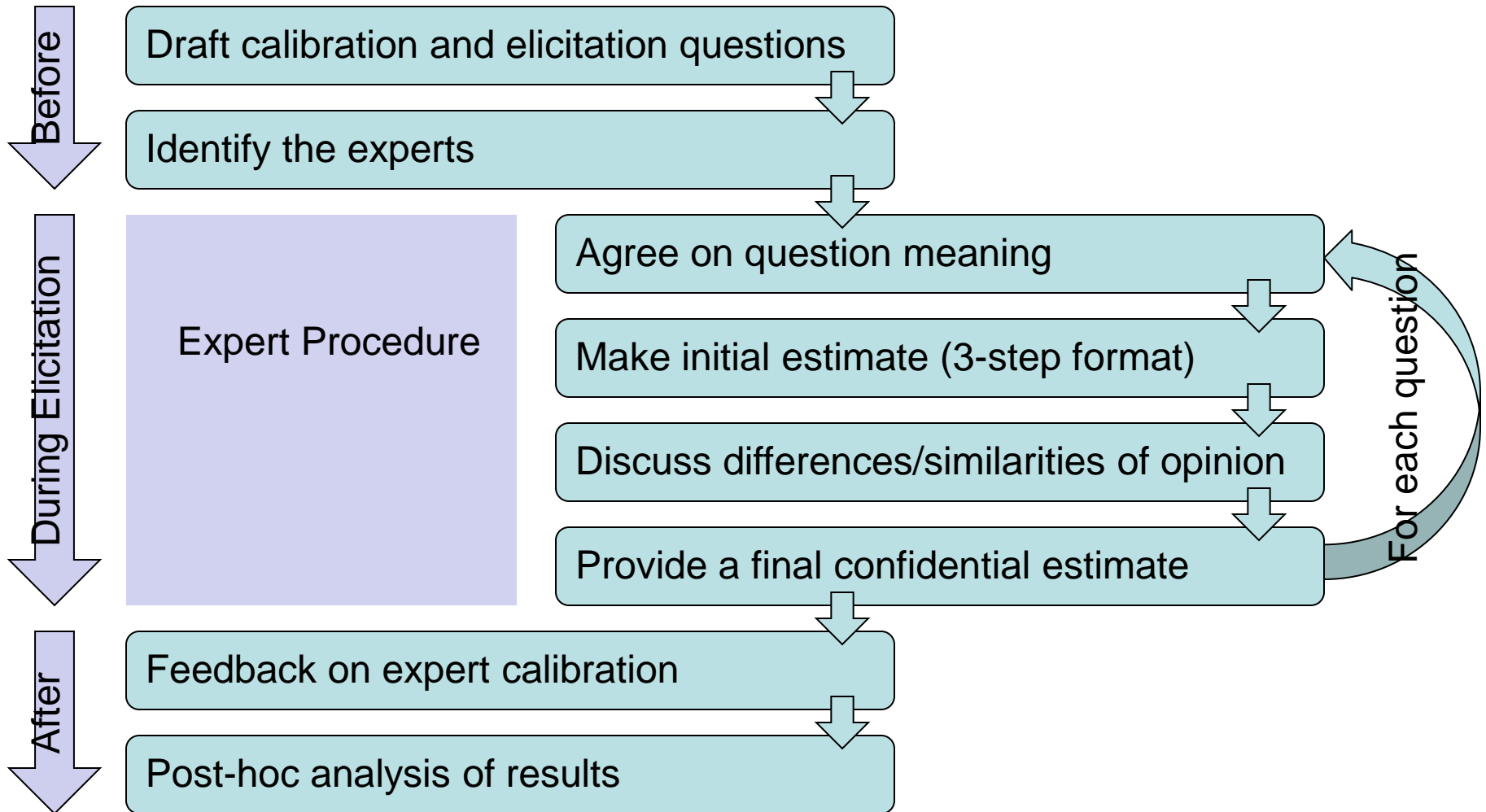
1. Realistically, what do you think the lowest plausible value is?

2. Realistically, what do you think the highest plausible value is?

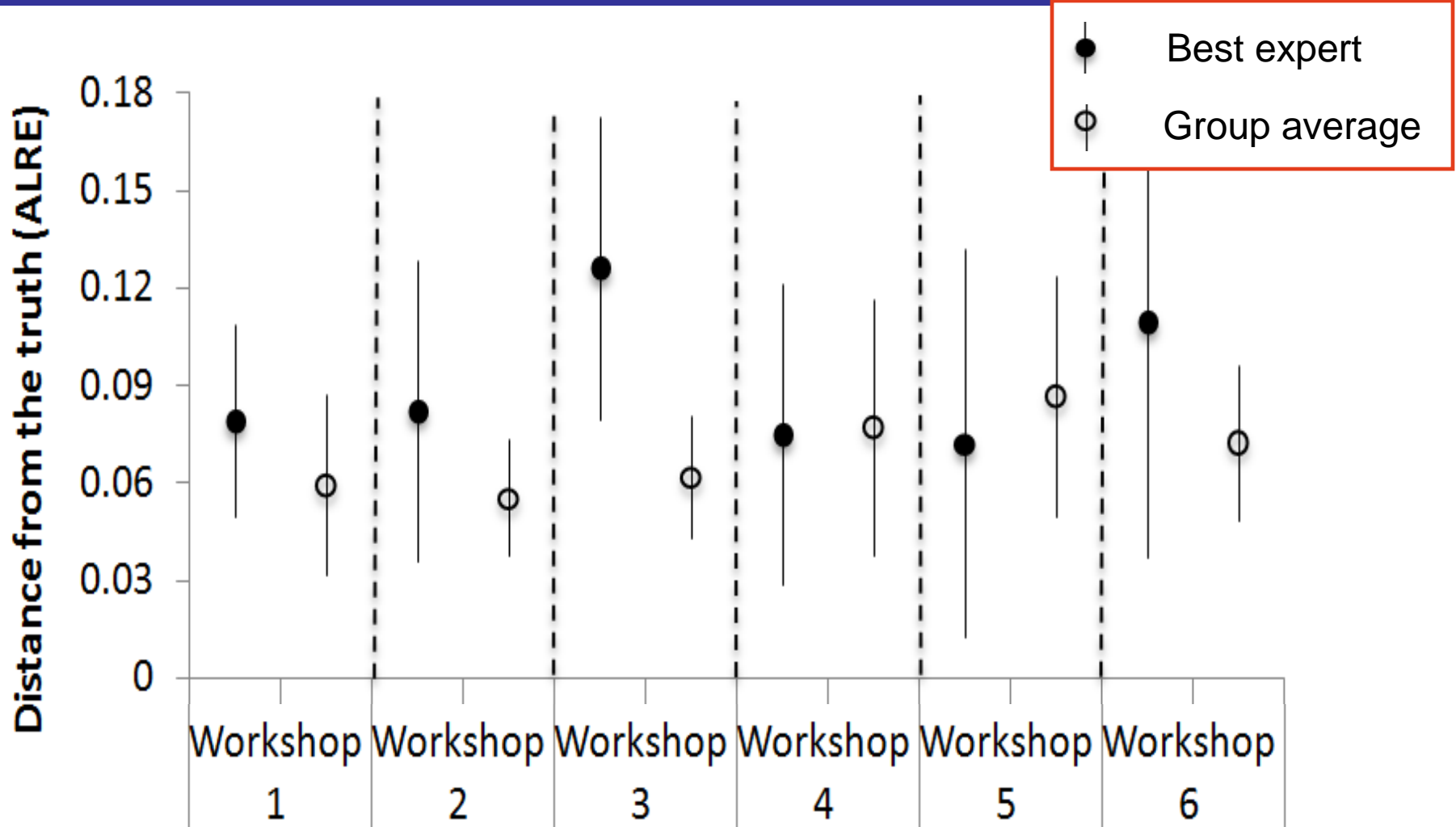
3. Realistically, what is your best estimate?



# Cooke's expert procedure (structured Delphi) process



# 'Best' expert versus the group





## George Mason University (Mason)

- Charles Twardy (PI), Kathryn Laskey (Co-PI), Robin Hanson



## Australian Center of Excellence for Risk Analysis

Gold Brand Software

*And a supporting cast of thousands....*

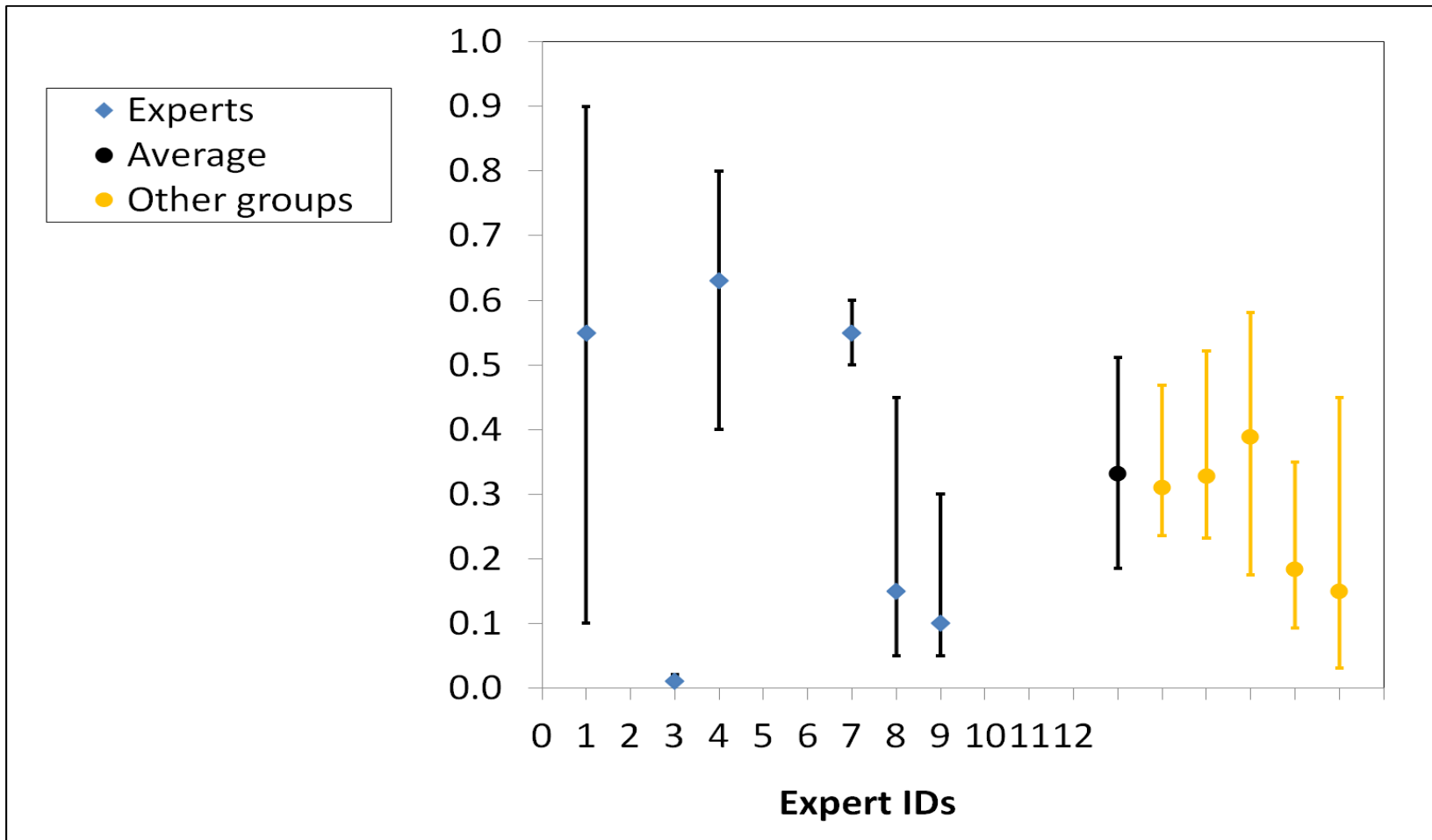


## Intelligence Advanced Research Projects Activity

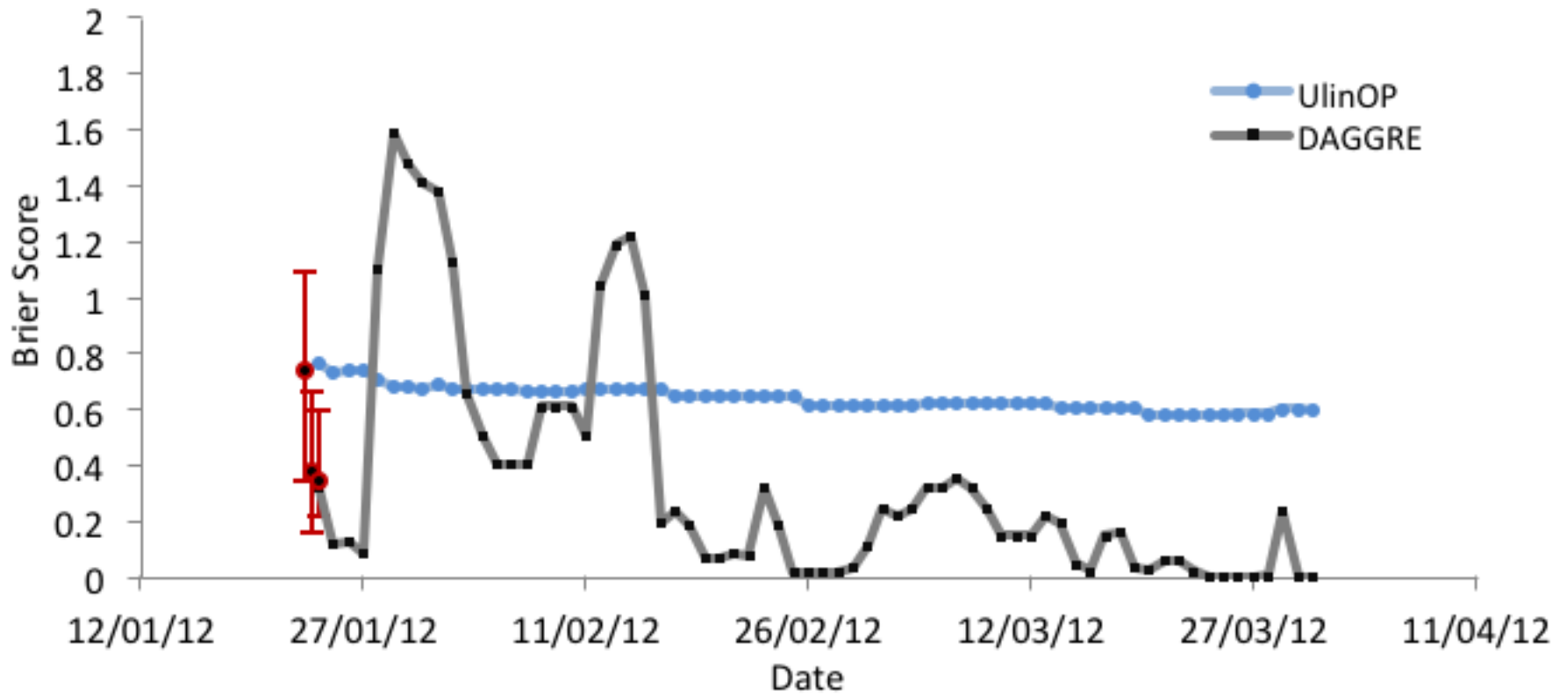
(IARPA) invests in high-risk/high-payoff research programs that have the potential to provide our nation with an overwhelming intelligence advantage over future adversaries



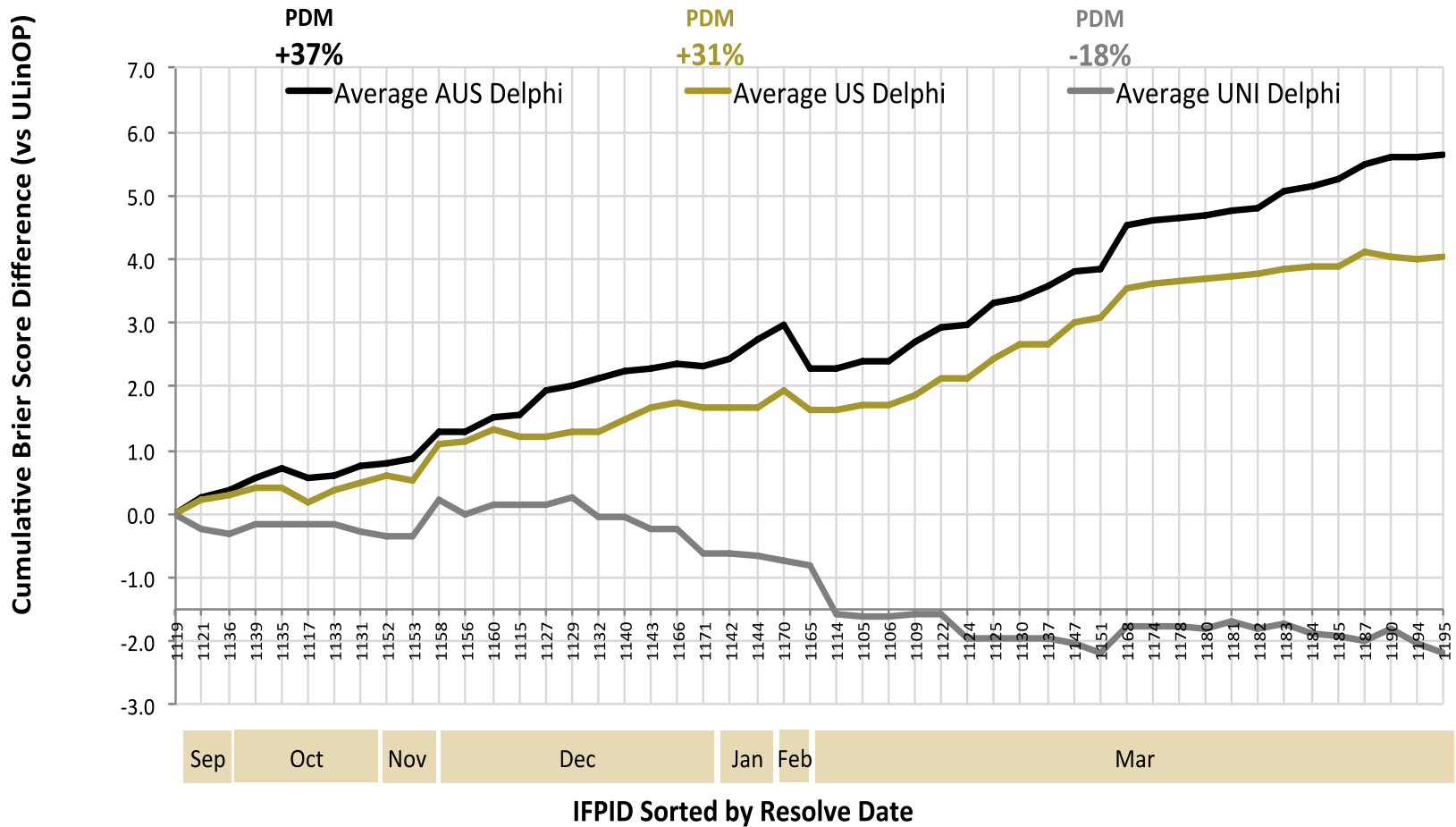
# Will Australia sell uranium...?



The screenshot shows the 'The Intelligence Game' website. The header features the 'acera' logo (Australian Centre of Excellence for Risk Analysis) and the title 'The Intelligence Game (beta)' with the tagline 'Engaging groups to forecast the future'. A navigation menu includes 'Question List', 'About', 'How to Play', 'Question Format', 'Background', 'Our Publications', 'Help', and 'Admin'. On the left, a user profile for 'steven' (Group 2, admin) is shown with statistics: 2 links viewed, 0 links rated, and 0 comments. Links for 'My Activity', 'My Profile', 'My Group', and 'Logout' are provided, along with a 'Switch User' dropdown menu currently set to 'steven'. The main content area is titled 'The Question List' and includes a 'News' section with a date 'Jul 23, 2012' and a paragraph of text. Below this is a 'Continuous Questions' section with a sub-header 'These are questions that are always open for you to answer (until resolved)'. A question card is displayed: 'Will Japan officially become a member of the Trans-Pacific Partnership before 1 April 2013?' with a status of 'Open'. A 'Print this Month's Questions' button is visible. The 'This Month's Questions' section follows, with a sub-header 'All rounds completed. View results by clicking questions below.' and a question card: 'Will the Palestinian group Islamic Jihad significantly violate its cease-fire with Israel before 30 September 2012?' with a status of '-'. The page is framed by a blue border.

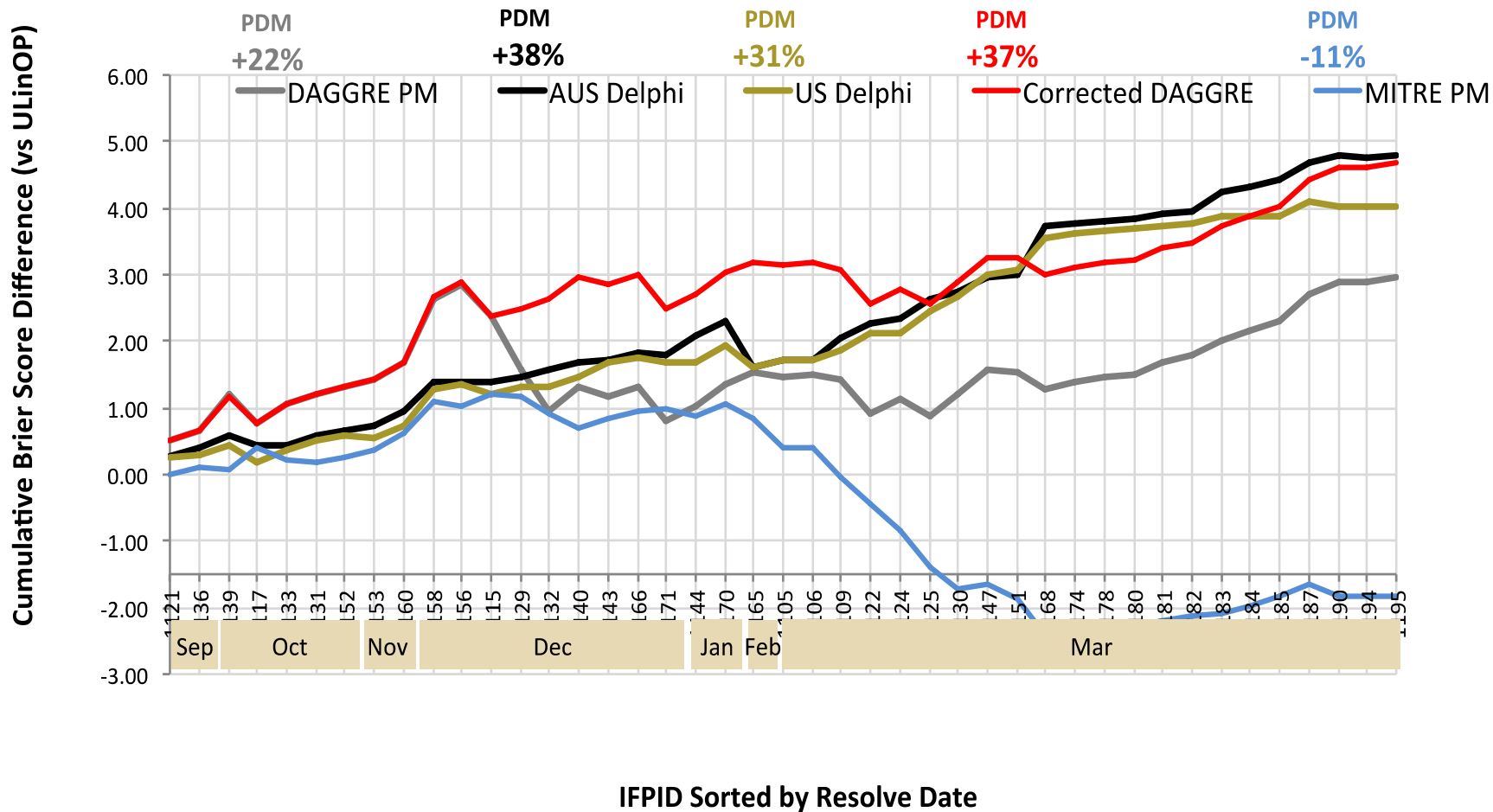


## Average performance (cumulative gain over ULinOp)

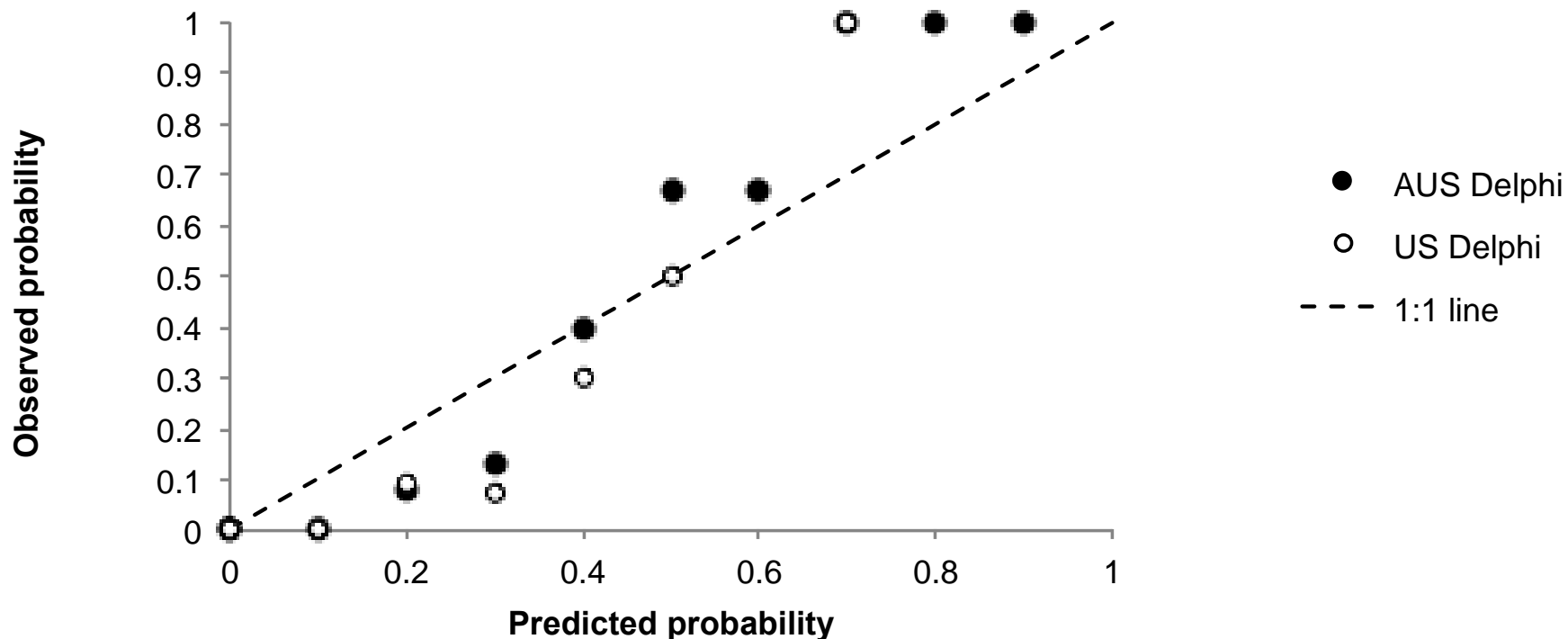




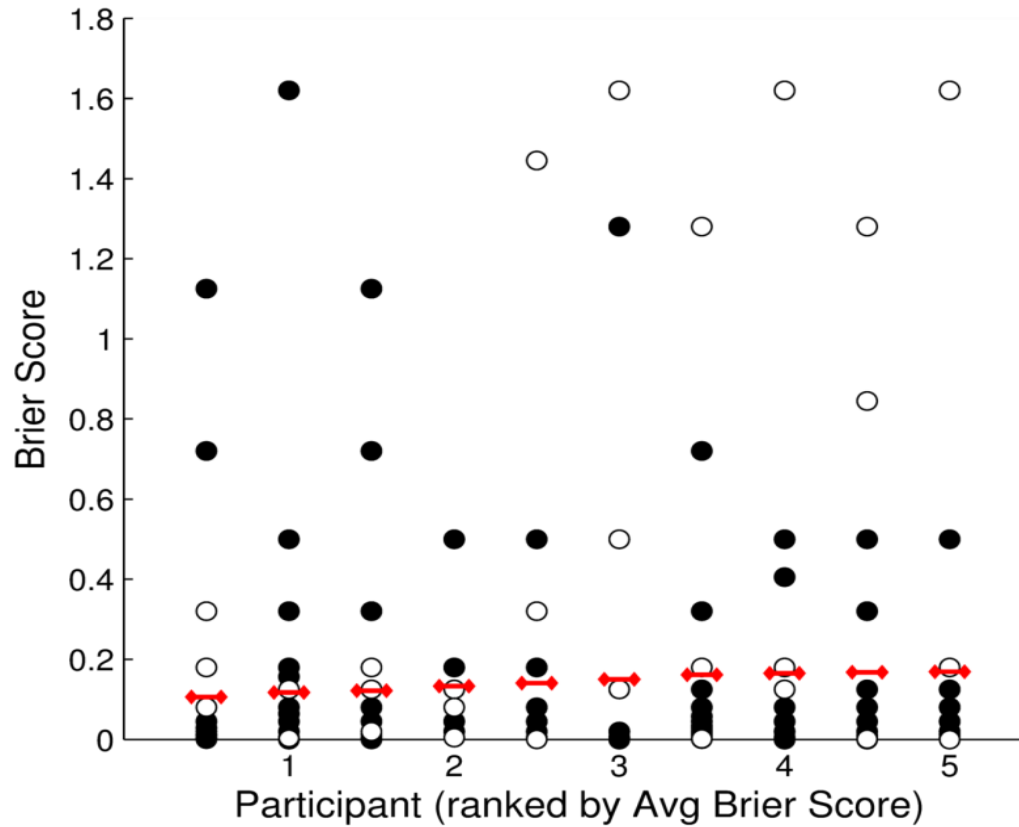
## Averages + MITRE PM



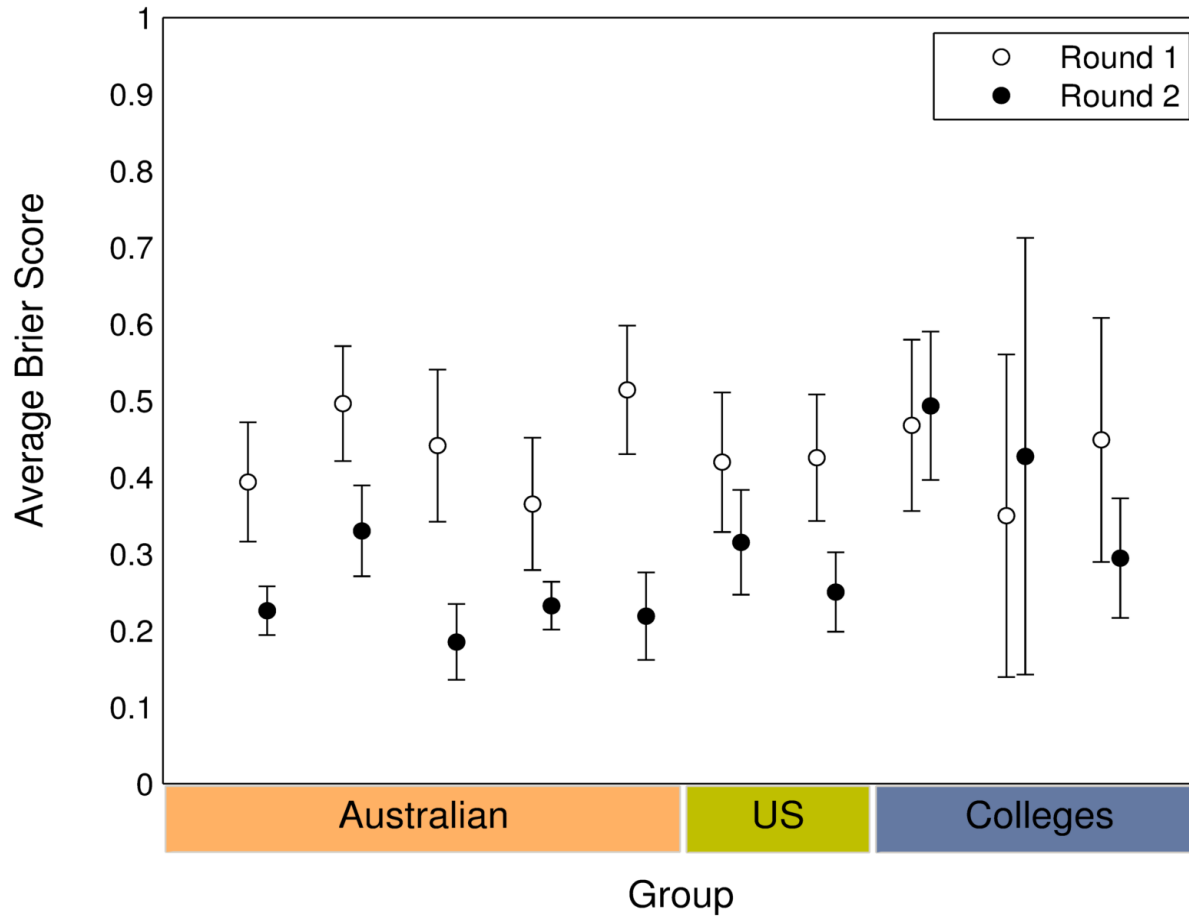
## Calibration curve: untransformed responses



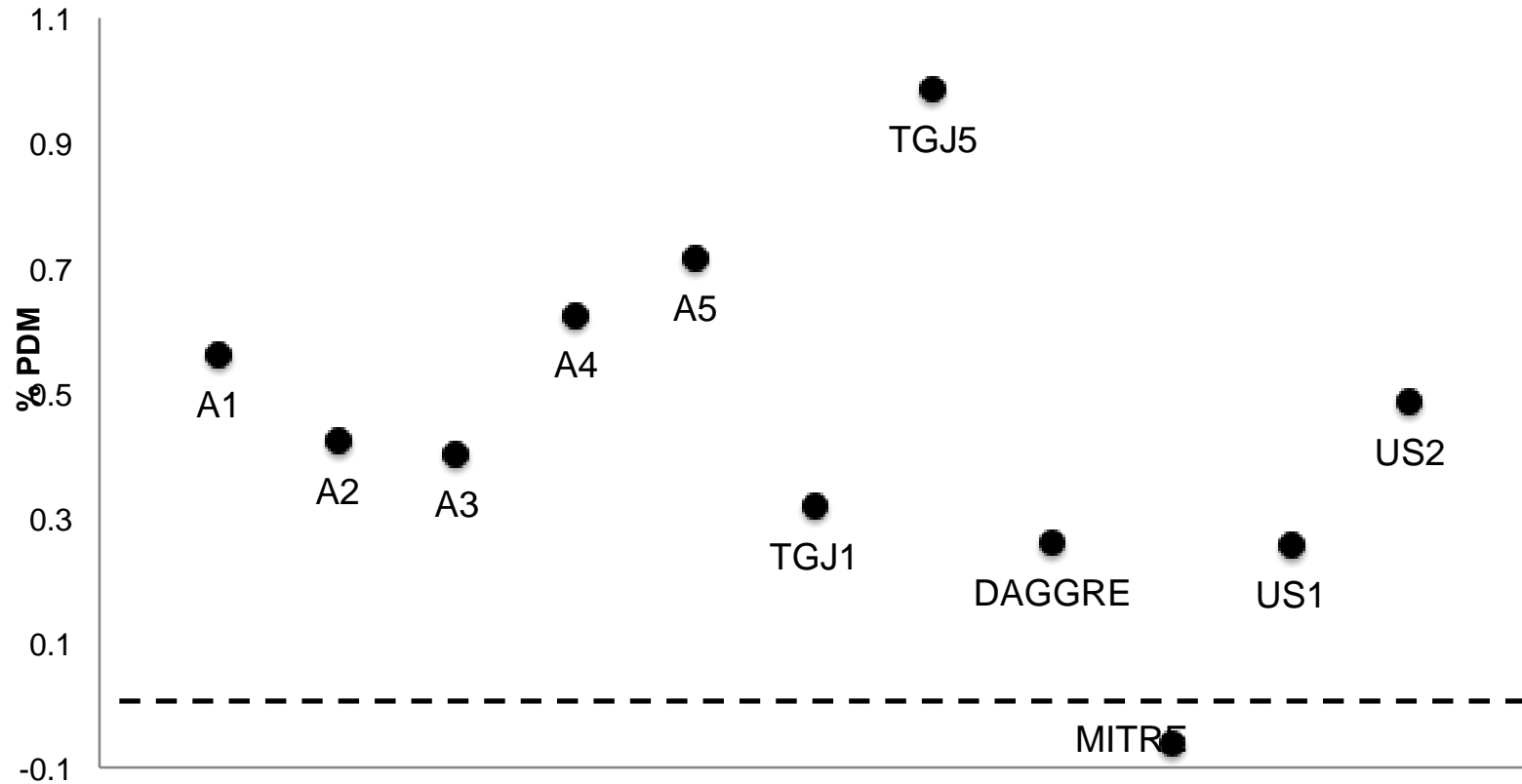
# Best performing individuals



# Looking / talking help



# The final result - 2013



## *Relying on individuals...*

- overconfidence, hindsight bias
- framing
- availability bias
- reference group, base rate neglect
- using the person who (everyone believes) knows the most: the status effect
- undetected linguistic uncertainty

## *Relying on naïve groups...*

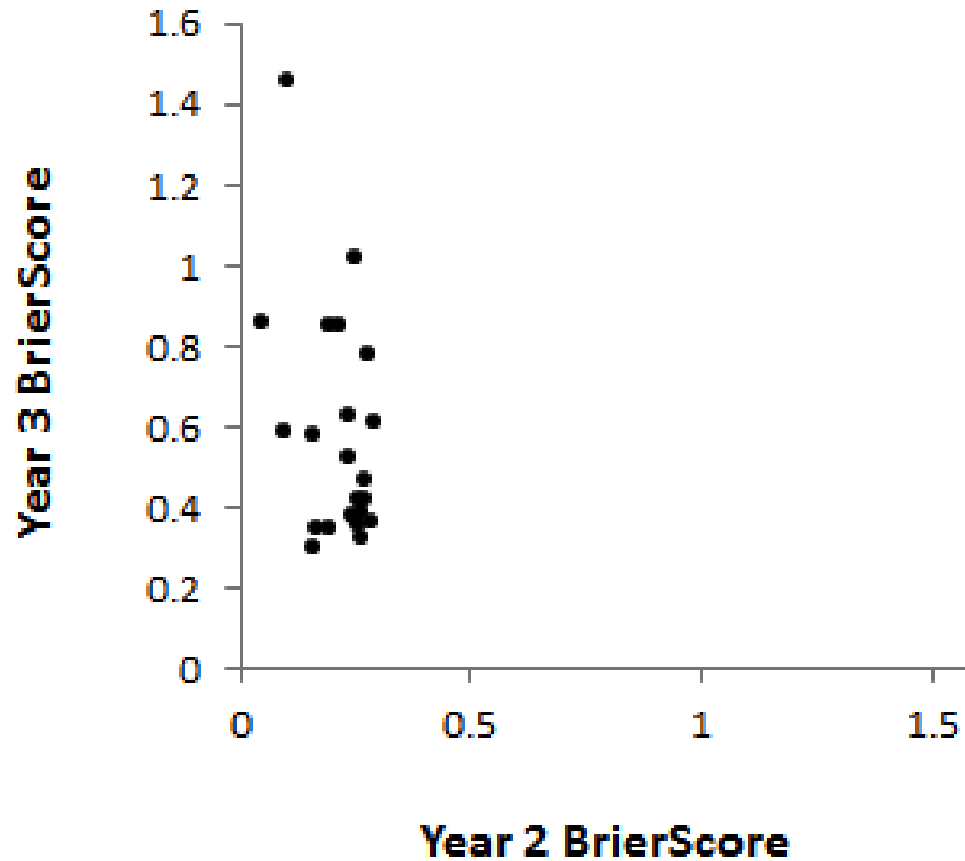
- naïve question formulation: linguistic uncertainty
- unstructured discussion
- dominance, group-think
- common data sources / lack of independence
- uniformity in context, culture, styles of reasoning

## *Ask individuals to...*

- Consider counter-arguments
- Answer the same question in different ways (lowest, highest, most likely)
- Indicate confidence
- Examine estimates made by other people (feedback)
- Revise original estimates after feedback
- Anticipate issues with conditional probabilities, base rates, ...

## *Then, don't rely on individuals...*

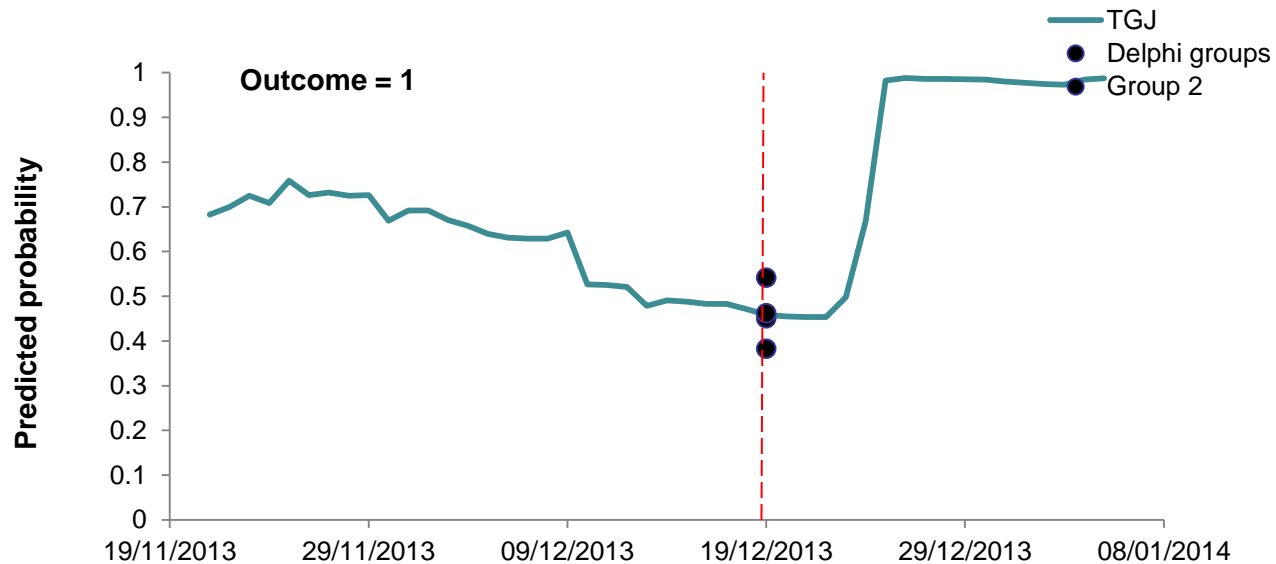
- Discuss questions to eliminate linguistic uncertainty
- Make groups diverse—age, gender, background and cognitive style
- Encourage groups to discuss and revise question meaning
- Avoid group think— Delphi / independent data / anonymity in judgments





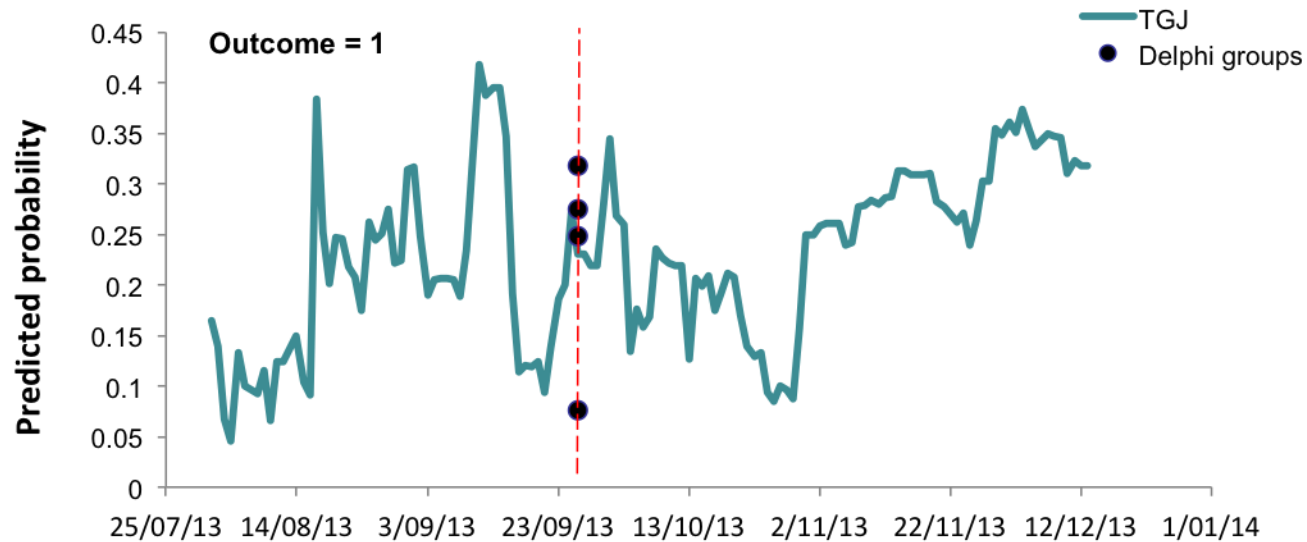
## 1319

Will Russia file a formal World Trade Organization (WTO) anti-dumping dispute against the European Union (EU) before 31 March 2014?



## 1220

Will Chinese armed forces or maritime law enforcement forces attempt to interdict or make physical contact with at least one U.S. government naval vessel or airplane or Japanese government naval vessel or airplane that it claims is in its territorial waters or airspace, before 1 May 2014?



## 1269

Will the Organization for the Prohibition of Chemical Weapons (OPCW) complete its initial on-site inspections of Syria's declared chemical weapons sites before 1 December 2013?

