University of Stavanger

Terje Aven

Communicating risk and uncertainty: How can risk science help?

Should risk and uncertainty be communicated?

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Absolutely, as risk and uncertainty exist and are important

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Absolutely, as risk and uncertainty exist and are important

If risk and uncertainty are ignored or concealed, the communication is not honest and open, and the result is quickly lack of trust

Things are not so simple –
there are dilemmas

A medical treatment is safe

The probability that you will experience serious side-effects is very small

And the evidence and knowledge supporting this are very strong
And here it is

The probability that you will experience side-effects is very small

And the evidence and knowledge supporting this are very strong

If you cannot express statements like this, should the treatment be used?

Probability of an event A
is less than or equal to 0.01

Probability of an event A is less than or equal to 0.01

Frequentist probability

Representing variation

Knowledge-based, subjective probabiility

Expressing uncertainty

Subjective/knowledge-based probability

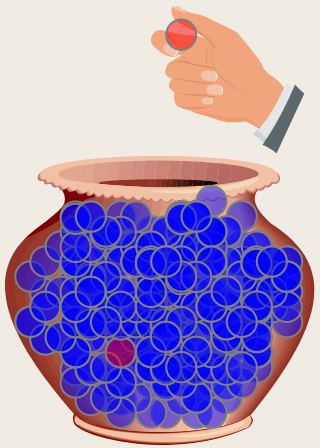
Probability of an event A is less than or equal to 0.01:
$P(A|K) \leq 0.01$

K: Supporting knowledge

Subjective/knowledge-based probability

Probability of an event A is less than or equal to 0.01:
$P(A|K) \leq 0.01$

The assessors compare their uncertainty (degree of belief) about the event A to occur (be true) with drawing a red ball from an urn that contains 100 balls where 1 or 0 is red



K: Supporting knowledge

Risk is more than probabilities

The probability that you will experience serious side-effects is very small

And the evidence and knowledge supporting this are very strong

The probability that you will experience serious side-effects is very small

And the evidence and knowledge supporting this are very strong

Surprises, the unforeseen ???

Communicating risk and uncertainty: How can risk science help?

Prof Ragnar Löfstedt,

King’s College London

ESREL/SRAE 2025 , Stavanger, Session 9, Tuesday 17 June 13:00-14:15

Problem at a glance

1. Confusion among key actors and agencies: uncertainty in need of conceptual clarity
2. Limits of uncertainty communication = innovation dead end
3. Risk communication as way forward
4. Applying a more rigorous decision tools – e.g. risk-risk trade-offs
5. Start a discussion a highest level: how should policy makers and regulators best tackle scientific uncertainty going forward? Not to avoid risk but to handle it better.

UNCERTAINTY IS ABOUT RISK

Reducing risk to probability and effect (Knight 1921) is antiquated.

Values and preferences need to be factored in (Renn 2024)

> “Risk Analysis is actually uncertainty analysis (…). If risk analysis means handling precise bounded conditions – i.e. the outcomes are known along with the probabilities – then it only applies to dice rolls and coin tosses “ (Osman 2024)

We therefore need risk communication science (Renn 2024)

Recommendations

1- The Ministry should consider setting up a Department of Risk Communication;

2. The Ministry should be encouraged to set up a risk communication advisory board composed of leading academics;

3. The Ministry should capture best practice risk communication with regard to the energy transition-eg the Netherlands is not the only country in Europe that is undertaking such an energy transition;

4. Further down the line the Ministry should consider hosting an International Risk Communication Summit in either the Hague or possibly in Brussels;

Possible other issues to be considered-(Trust building risk communication)

1. Address knowns/unknowns systematically and routinely
2. Verifiable information
3. Public interest needs to be spelt out
4. Respect opinions of third parties
5. Respect opinions of local decision makers
6. Be open and clear about those uncertainties that will remain and those that will be eliminated, and what gaps in knowledge may stay.
7. Use proven techniques to involved citizens in design of policy options
8. Clear timelines
9. Less lawyers who don’t like uncertainty
10. Less consultants who like making it more uncertain

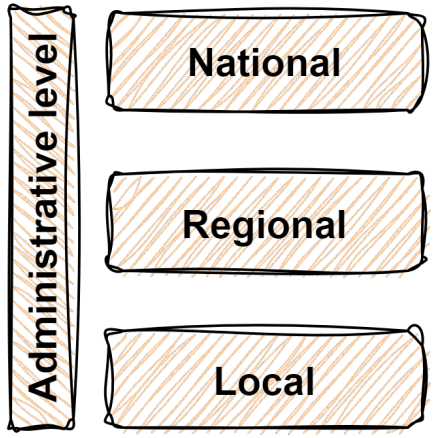
Communicating risk and uncertainty: How can risk science help?

HENRIK TEHLER
DIVISION OF RISK MANAGEMENT AND SOCIETAL SAFETY
LUND UNIVERSITY, SWEDEN

Communicating risk and uncertainty

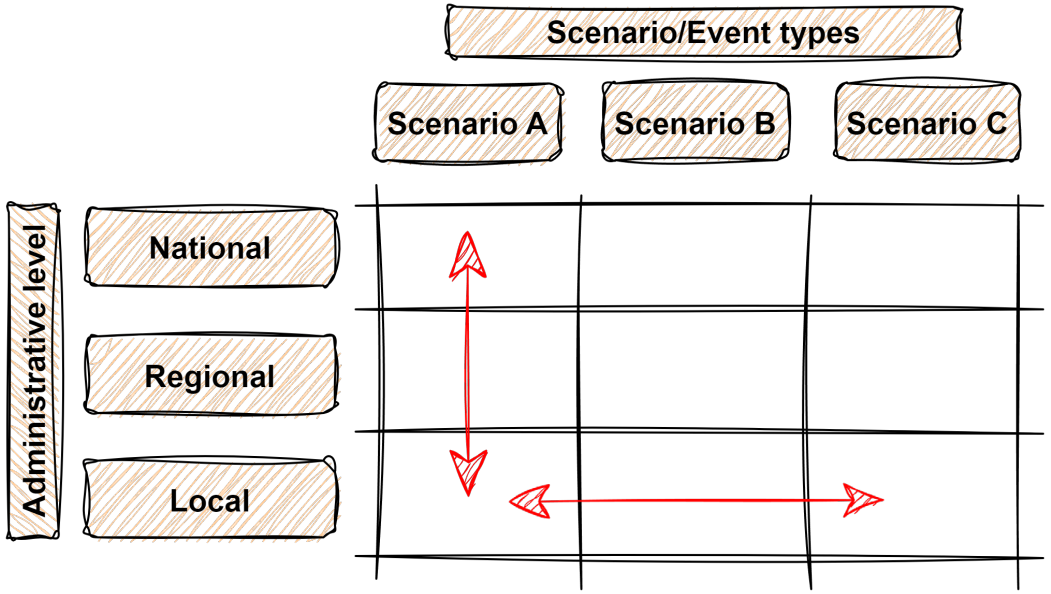
My point of departure

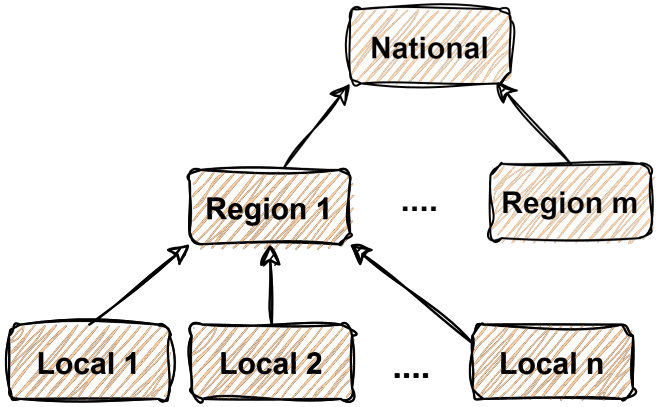
- Professional to professional (assessments)
- Sweden (risk- and vulnerability assessments)
- Disaster events (low likelihood)



Communicating risk and uncertainty

How to deal with uncertainty





- Risk science can help by
  - » Providing **recommendations** for how to communicate uncertainty **to facilitate the analysts' task**
    - Ex. Problem om aggregation

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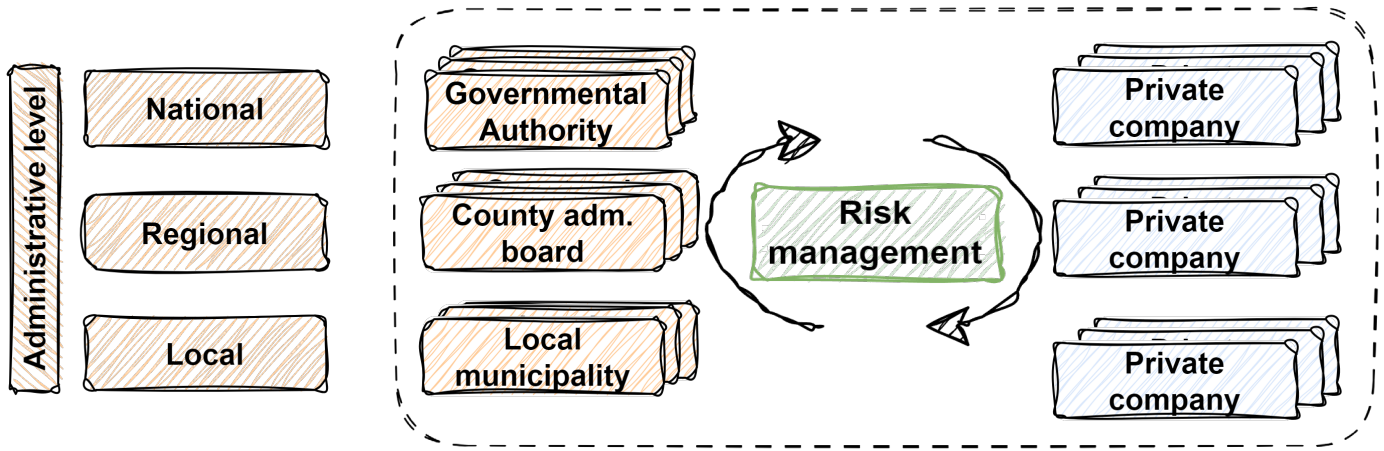
Communicating risk and uncertainty

How to deal with differences in values

- Effective risk management relies on the active collaboration of multiple stakeholders.
  - » Differences in vales might make it difficult to communicate effectively.



- Risk science can help by
  - » Providing normative support for communication that facilitates **alignment of values**, **collective actions**, and **avoids suboptimization** and promotes **effective multi-actor risk management.**

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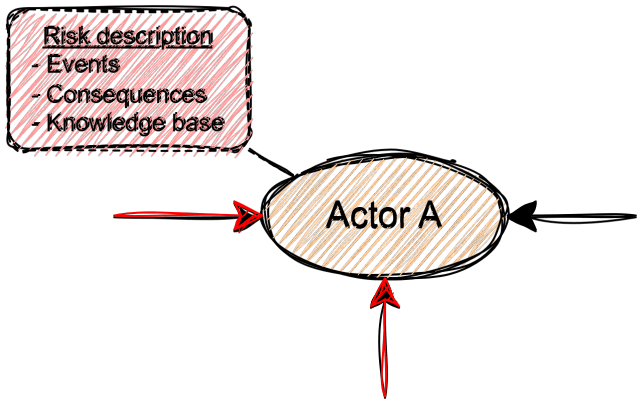
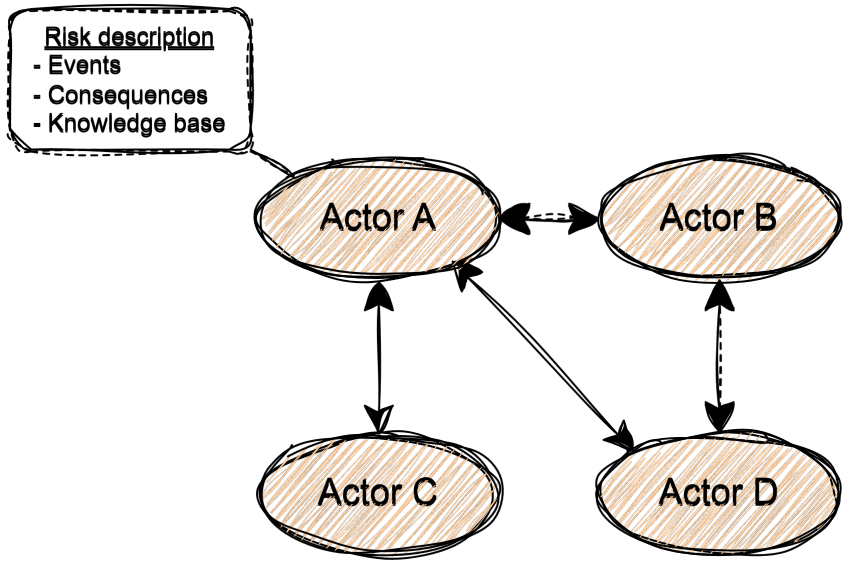
Communicating risk and uncertainty

How to deal with challenges of misinformation





- **Classified information**
  - » Reduced **knowledge base**?

- Risk science can help by
  - » Asking both **theoretical/conceptual** and **empirical** questions focusing on information quality and its influence on the effectiveness of risk management in multi-actor settings.

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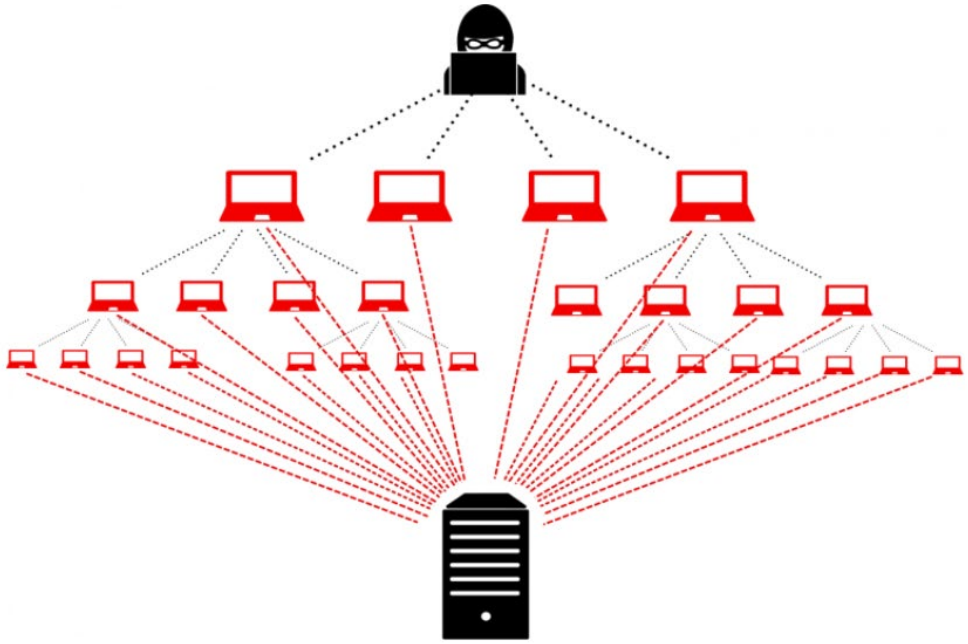
The challenge of misleading risk and crisis communication

Magda Osman

UNIVERSITY OF CAMBRIDGE
Judge Business School

Case study



AUGUST 2016

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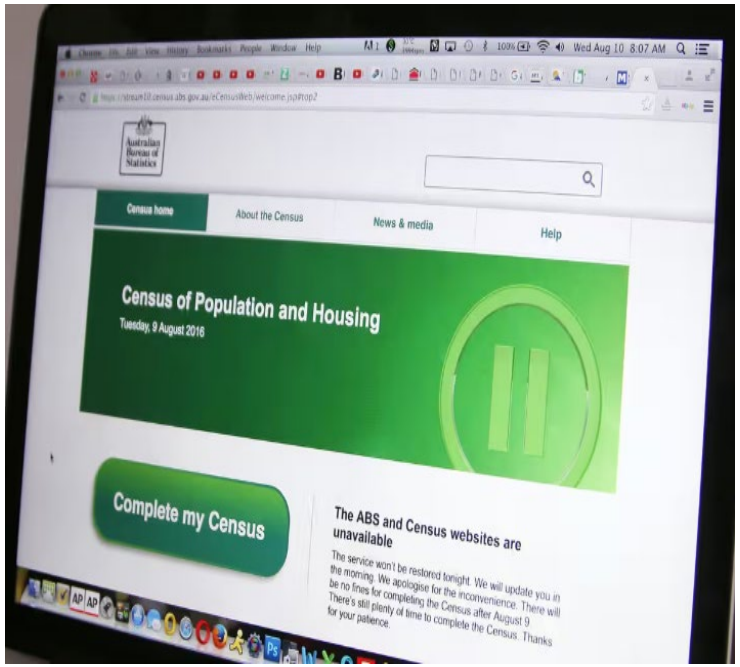
28	29	30	31			



9th of August 2016. 19.30

9th of August 2016. 22.30

Thank you for participating in the Census. The system is very busy at the moment. Please wait for 15 minutes before trying again. Your patience and cooperation are appreciated. [code 9]

10th of August 2016. 10:30

Thank you for participating in the Census. The system is very busy at the moment. Please wait for 15 minutes before trying again. Your patience and cooperation are appreciated. [code 9]

10th of August 2016. 22:30

Thank you for participating in the Census. The system is very busy at the moment. Please wait for 15 minutes before trying again. Your patience and cooperation are appreciated. [code 9]

11th of August 2016. 10:30

Thank you for participating in the Census. The system is very busy at the moment. Please wait for 15 minutes before trying again. Your patience and cooperation are appreciated. [code 9]

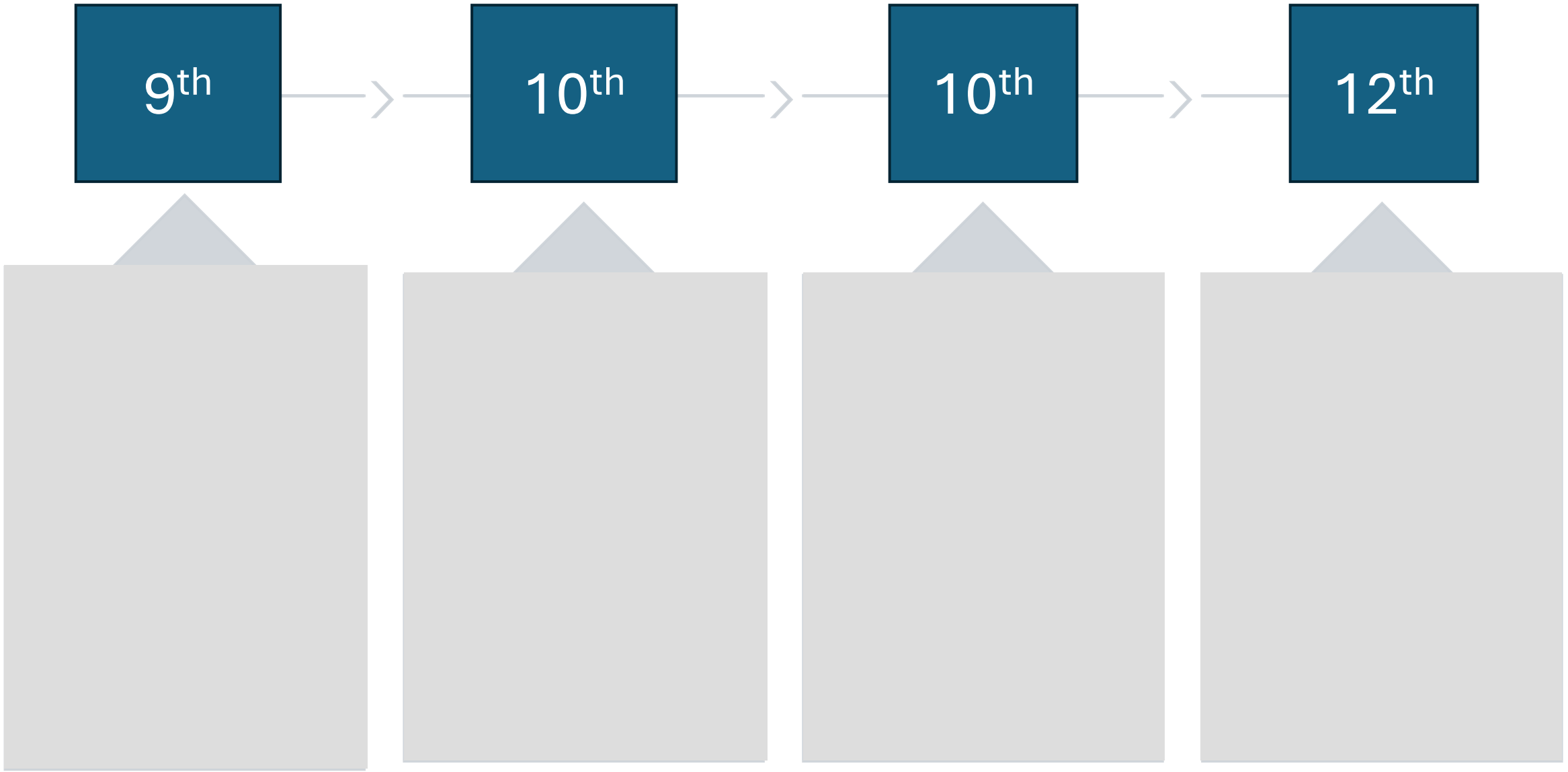
11th of August 2016. 14:30

Thank you for participating in the Census. The system is very busy at the moment. Please wait for 15 minutes before trying again. Your patience and cooperation are appreciated. [code 9]

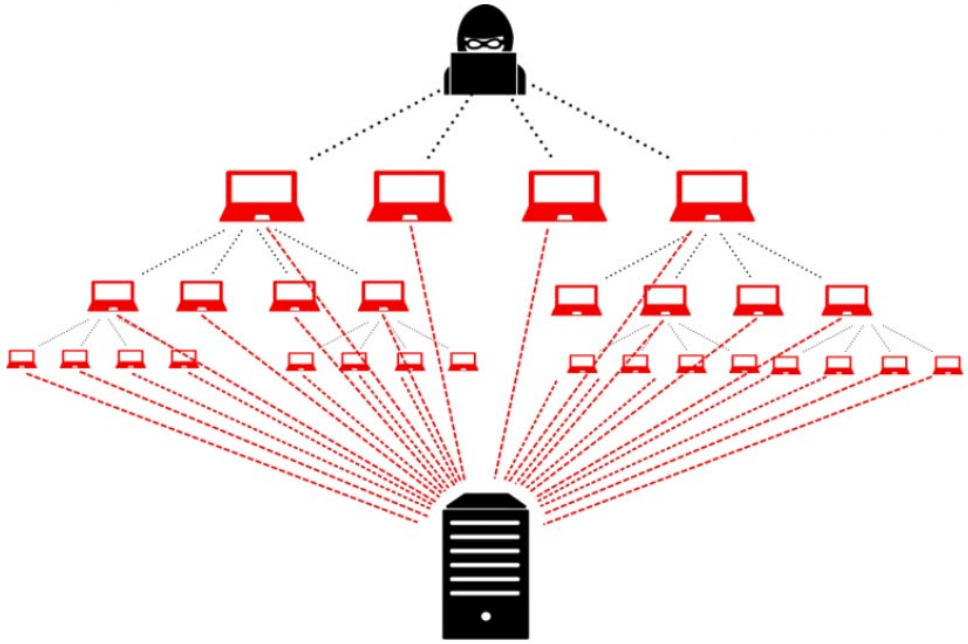
On August 2016, the Australian Bureau of Statistics (ABS) closed the 2016 Census website for **40 hours.**

Here is the accompanying communication from those in authority…

Timeline of misleading risk and crisis communication



Case study



March 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
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15	16	17	18	19	20	21
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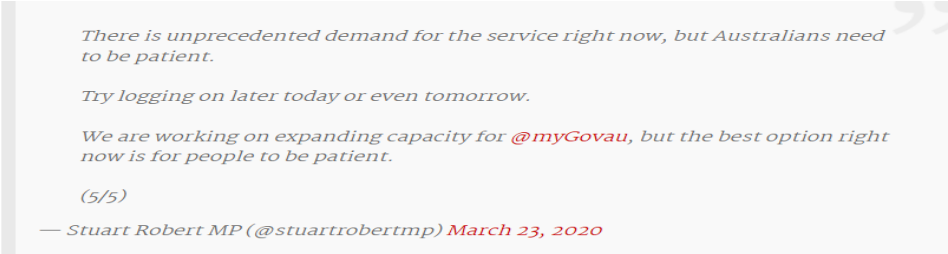
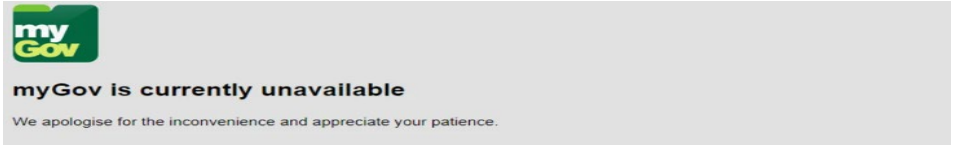
23rd of March 2020. 08:58

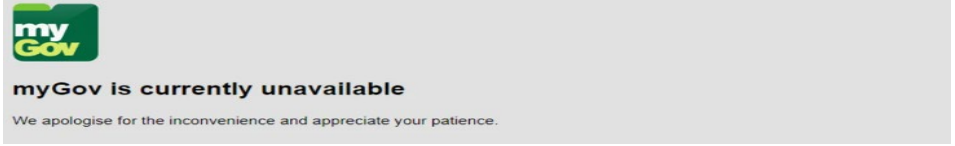
23rd of March 2020. 10:00



24th of March 2016. 08:15



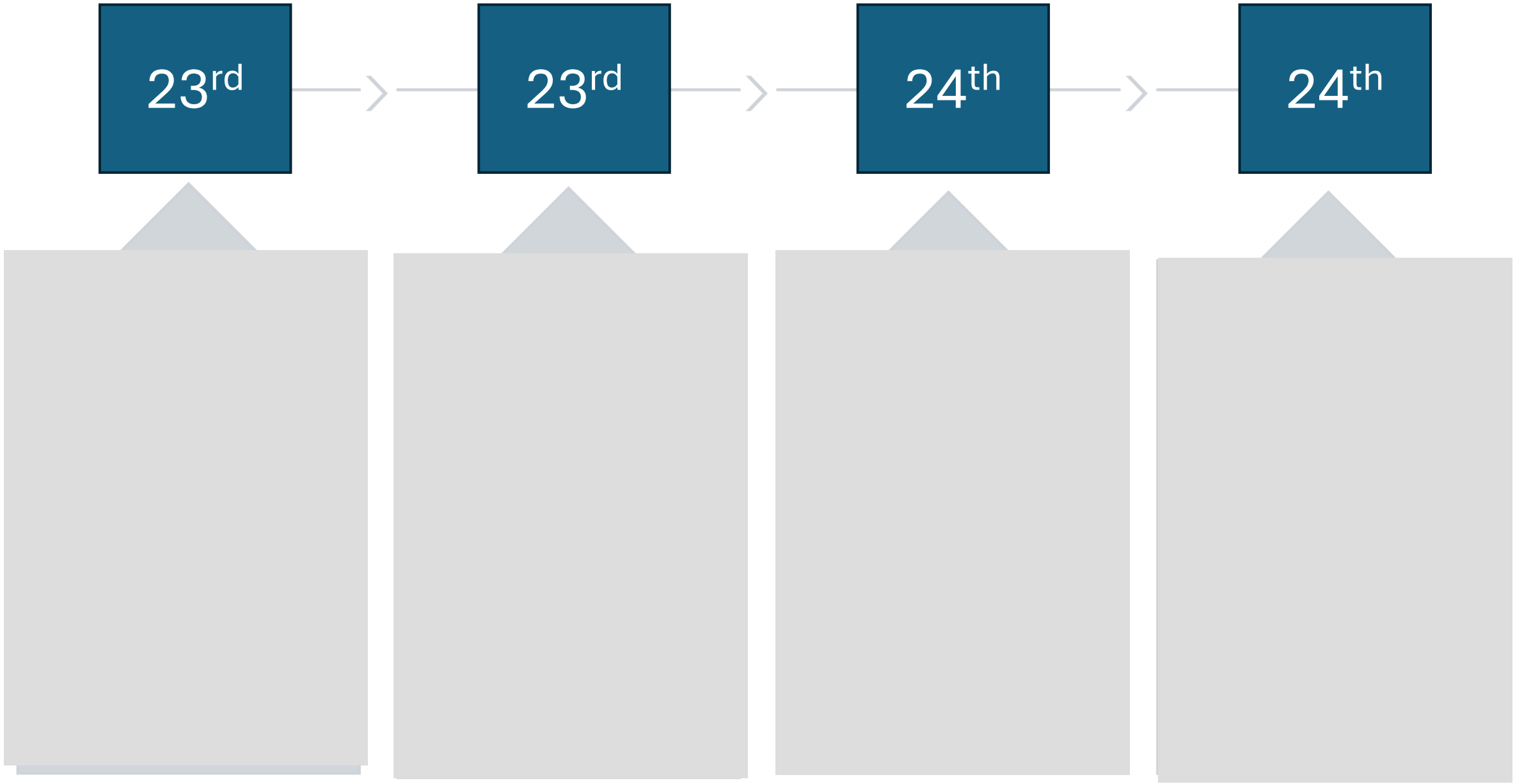
24th of March 2016. 21:00



On March 22rd 2020, the Australian Government announced relief packages to support citizens, which could be accessed via MyGov, but the online system was shut down on March 23rd and was slow to resume days later.

Here is the accompanying communication from those in authority…

Timeline of misleading risk and crisis communication



So?

- There is at least 45 year's worth of research that establishes basic principles of risk and crisis communications.
- Misleading communications and their impact are already subsumed into a long tradition of research in risk communications which examines how to respond to them
- The examples presented are a reminder that the source of misleading and false claims can come from authority figures, and gross errors still occur that could easily be avoided if the basic principles of risk and crisis communications are implemented
- We need to understand why there continues to be a disconnect between practitioners (i.e. comms teams) and researchers which:
  - likely explains why gross errors such as those illustrated continue to happen,
  - and which in turn likely contribute to eroding trust in our institutions.

Risk Communication is Risk Science

Dr. Robyn S. Wilson

Professor of Risk Analysis and Decision Science

School of Environment and Natural Resources

The Ohio State University

Columbus, Ohio, United States

Rarely is policy implementation without communication sufficient.

If the risk has been amplified or attenuated in society, management action without communication or deliberation may backfire.

The “science” must be carefully framed for maximum impact and diverse publics.

Just sharing knowledge or the “truth” is rarely sufficient for broad understanding or action – it must appeal to emotions, values, etc.

Communities at-risk may need more than carefully framed communication.

When there is no clear best action for an individual or community, or perceptions deviate from assessments, participatory decision-making processes are needed.

Communication may be insufficient, requiring broader insights from the social sciences.

Building support for policy, or public action for acceptable risk is one thing, but behavior change may require more than strategic information sharing.