Preventive measures against antagonistic use of hazardous substances in the public environment:

Strengthened professional approaches, impact assessment, and detection methods: A multidisciplinary study focusing on radiological and nuclear (RN) antagonistic events

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FOI

Swedish Civil Defence and Resilience Agency

Scope

Exposure of ionising radiation → strong psychological impact

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Special issue: Low-level radiation risks

The perception gap: Radiation and risk

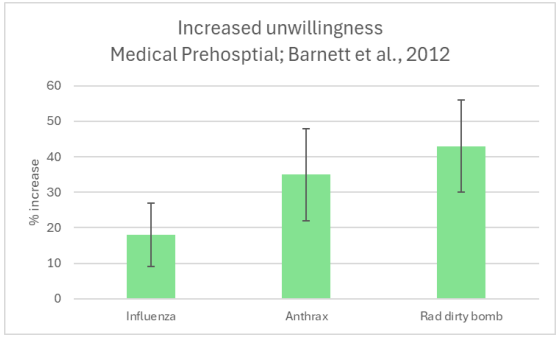
Paul Slovic

Abstract

People perceive different types of radiation risks in very different ways. Surveys of the general public in the United States and elsewhere have consistently shown that people perceive nuclear power and nuclear waste as having high risk, but perceive other sources of radioactivity—such as medical x-rays and naturally occurring radon gas—as posing much lower risk. The majority of radiation experts see things quite differently, rating nuclear power and nuclear waste as less risky than the general public does, and perceiving medical x-rays and radon as more risky than generally believed. This perception gap demonstrates that acceptance of risk is conditioned by a number of factors, such as trust in the managers of the technology and appreciation for the direct personal benefits of the technology. Risk-communication strategies that help people place the risks of nuclear power and nuclear waste in perspective by comparing them with other risks can help reduce fears of radiation. Education about radiation can also affect risk perceptions and attitudes. Although differences between the perceptions of laypersons and those of experts cannot be attributed in any simple way to degree of knowledge, it is clear that better information about radiation and its consequences is needed. There is a particularly urgent need to develop plans and materials for communicating with the public in the event of a radiological disaster. The fear, anger, and distrust following the accident at Fukushima shows that communication is still a major problem.

Slovic, 2012: https://doi.org/10.1177/0096340212444

Small or unverified releases can create large fear → Radiation may be interesting case study of the broader CBRNE-domain



Adverse effects of the perceived threat

Worried-well → overburdoned medical care

Rumors and misinformation → escalation of disruption

Reduced willingness to respond → Inadequate remedial action

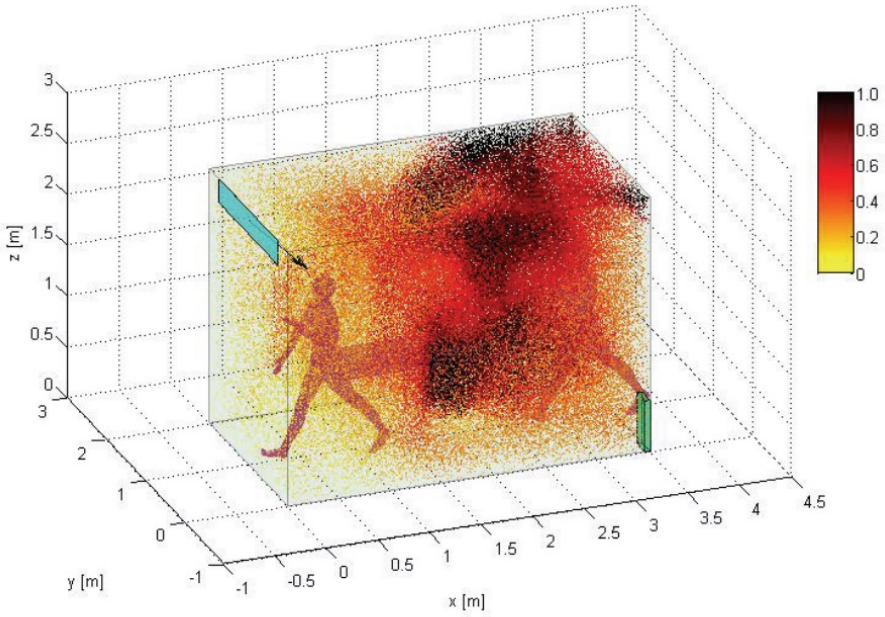
Physics
Psychology and
communicative processes

Objectives

Exposure assessment in representative scenarios

Detection capabilties (including improvised dosimetry and public dosemeters)

Understanding of the percieved threat among first responders



Main delivarable

Action strategy → MCF development of risk communication strategies and risk management associated with CRBNE-attacks

Expected outcomes

Improved protective capability against CBRNE threats

Deterrence, by reducing the effectiveness of fear-based attacks

Enhanced risk communication for emergency services

Strengthened societal resilience to antagonstic use of CRBNE

Subprojects

Örebro University
School of Humanities, Education & Social Sciences

Sub-project 1 – Knowledge review (Örebro University)

Sub-project 2 – Consequence assessments (FOI-Umeå)

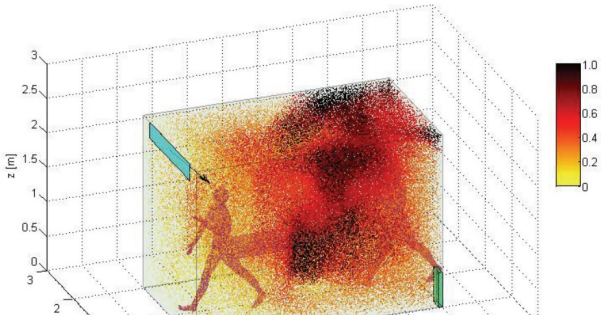
Sub-project 3 – Public dosimetry and sensors (Lund University)

Sub-project 4 – Attitudes among first responders (Örebro University)

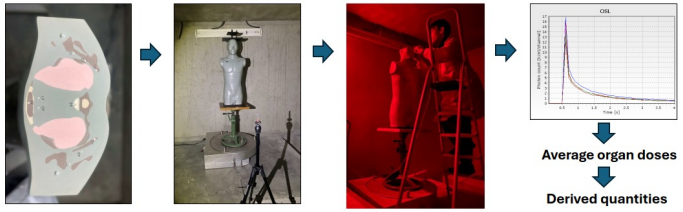
Sub-project 5 Action strategies and risk communication (All participants)

Scared or prep

A narrative literature revie
preparedness of the emer
involving CBRN(E) threats

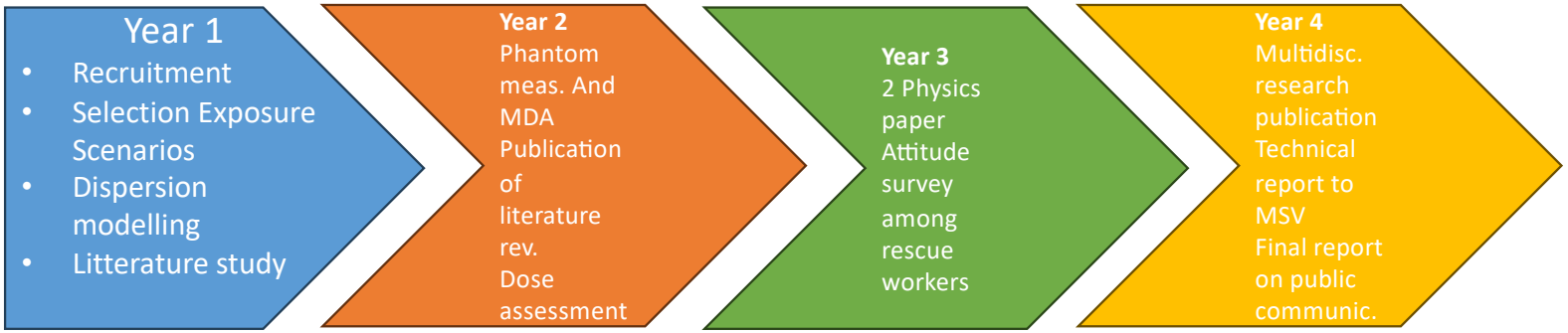


Preliminary measurements –
AP-irradiation with Cs-137



The goal is to produce **practical recommendations** for MSB and emergency services.

Timeline and expected output



Start
1 September 2024

Preliminary results – Subproject 1

4 resilience challenges (Örebro University)

1. Capability and willingness of first responders is often undermined by a lack of training and resources

2. Existing emergency plans frequently underestimate CBRNE-specific demands;

3. Institutional fragmentation hinders joint action

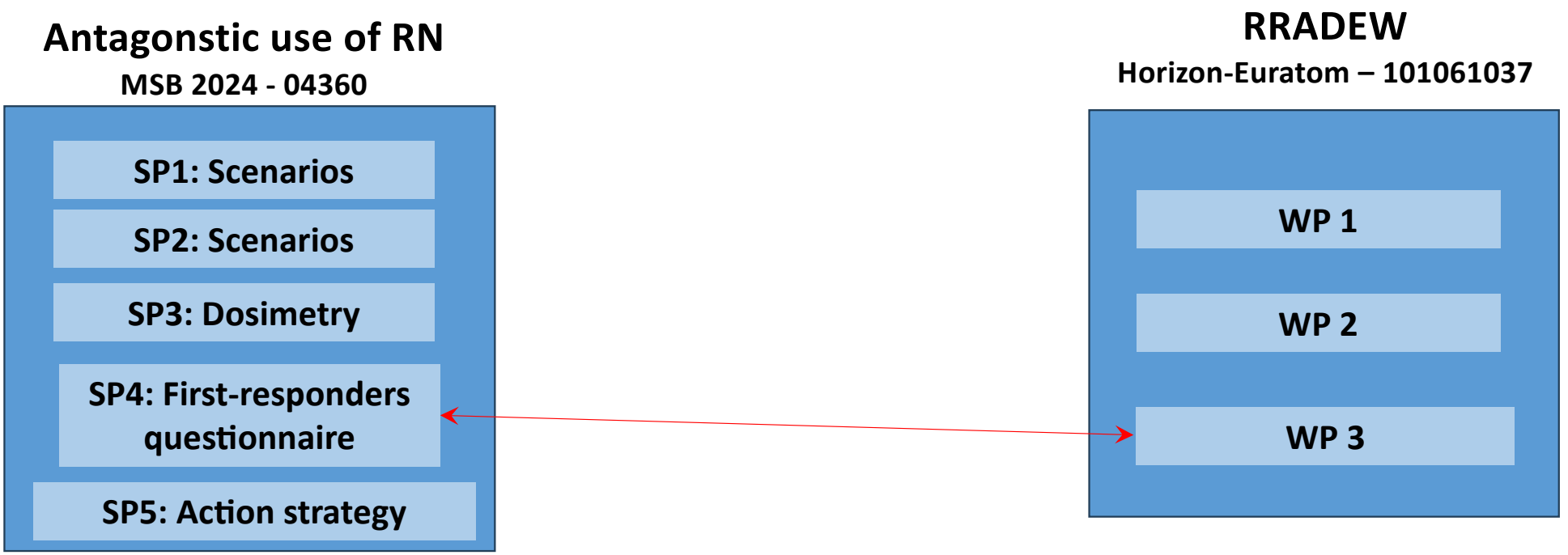
4. Communication remains a persistent weakness (especialoy senesitive target groups)

Adversarial uses of chemical, biological, radiological, nuclear, and explosive (CBRNE) materials present distinct challenges for the emergency response community (ERC). This literature review examines 108 studies on ERC resilience to deliberate CBRNE threats. Using a systematic review approach, we analyse literature covering six ERC components: fire services, civil protection services, emergency medical services, law enforcement, military, and non-affiliated volunteers – each with distinct roles and operational logics that complicate coordination. Four core challenges are identified: the capability and willingness of first responders is often undermined by a lack of training and resources; existing emergency plans frequently underestimate CBRNE-specific demands; institutional fragmentation hinders joint action; and communication remains a persistent weakness. While much of the literature emphasizes perceived preparedness and relies on simulations, it often neglects critical ERC actors, especially police, military, and volunteers. Despite the identified weaknesses, the review consolidates recommendations for practice to strengthen resilience, understood as the capacity to prepare for, adapt to, respond to, and recover from adverse events. These findings offer insights to guide future research and inform improved policy and practice in ERC resilience to CBRNE incidents.

Rasmussen, J. and Schäfer, R.
Submitted to Safety Science

”The interdiscinplanry nature of CBRNE research has generated valuable but fragmented insights, often focusing of isolated dimensions of resilience or specific segements of emergency preparedness.”

Link to other project

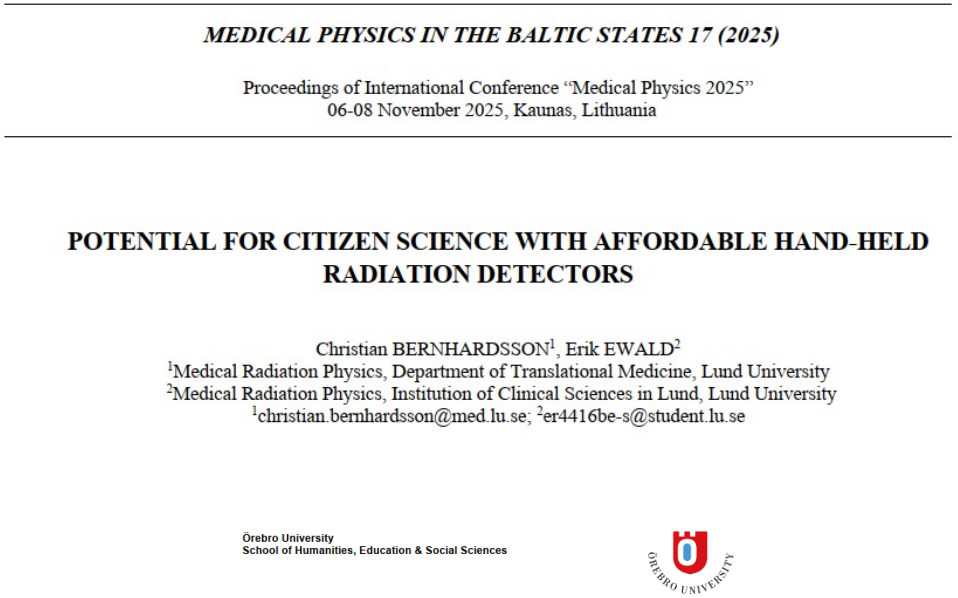


Strengthened societal resilience to radiological and nuclear events

Conclusions

Multidisciplinary research joining experimental physics, computational sciences, communication and social sciences

Rebuilding of national research capacity in EPR in Sweden



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POTENTIAL FOR CITIZEN SCIENCE WITH AFFORDABLE HAND-HELD RADIATION DETECTORS

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Scared or prepared?

A narrative literature review of the state of research regarding the preparedness of the emergency response community for terror attacks involving CBRN(E) threats

Thank You for Your Attention!

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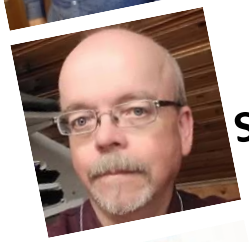

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