

Scientific Pathways to Biotoxin Preparedness

15 October 2025



SYMPOSIUM BOOKLET







PAN-EUROPEAN MANAGEMENT OF BIOLOGICAL TOXIN INCIDENTS THROUGH STANDARDISATION INITIATIVES FOR CRISIS RESPONSE ENHANCEMENT



EMBRACE is funded by the European Union's Horizon Europe Research and Innovation funding programme, Grant Agreement N° 101168322.

Table Of Contents

INTRODUCTION TO THE PROJECT

The Objectives of EMBRACE

Concept and Results

The Stakeholders

THE SYMPOSIUM

Purpose and Framing

Speakers and Sessions

Agenda

THE BIOTOXIN TASK FORCE

Origins and Purpose

Objectives and Needs

Membership, Actions and Early Operations

THE MOST RECENT OUTCOMES OF

EMBRACE ACTIVITY

Gaps and Needs in current Civil Protection

Mechanisms

Gaps and Needs in the current Standardisation

Landscape

Technical Developments in EMBRACE

Front page image: iStock.com/BenDC



Introduction to the Project

The Challenge

Biotoxins represent a very special class of threats that conventional crisis management structures in Europe are currently poorly equipped to address, but which also offer the opportunity to strengthen and adapt these structures with dedicated approaches and solutions. Differently from other chemical or biological agents, their distinctive properties require specialised detection, protection, and response measures. Accidental laboratory leaks caused by human error or poorly designed processes, alongside the relative ease of producing some toxins, mean both accidental and deliberate incidents are plausible and potentially devastating. These risks demand a coordinated European response that can protect citizens, responders, and critical infrastructure.

The current body of scientific and operational knowledge is fragmented, and existing European civil protection frameworks do not fully address the demands of a biotoxin crisis. EMBRACE sees this not as a weakness, but as an opportunity: by closing these gaps, Europe can create a more resilient, standardised, and future-proof system of biotoxin preparedness.

PHICONCE

The Objectives of EMBRACE

The EMBRACE project, funded under Horizon Europe (Grant Agreement No. 101168322), aims to establish a coherent, interoperable European capacity for biotoxin crisis management. Its goals are to: enhance Europe's preparedness by identifying gaps in current protocols and delivering science-based solutions; design innovative field tools—portable diagnostics, secure sampling methods, improved PPE, and novel decontaminants—that support decision-making in emergencies; provide integrated, standardised solutions that ensure cross-border interoperability; foster collaboration through a Biotoxin Task Force, a permanent forum for expertise and mutual support; and secure long-term impact through a regulatory roadmap, pathways to commercialisation, and an active stakeholder community.

CONCEPT & RESULTS

Concept and Approach

At its core, EMBRACE takes a pragmatic "What if?" approach, modelling realistic scenarios and working closely with end users to deliver operationally useful solutions. New protective equipment, decontamination methods, and detection devices will be tested in both laboratory and field conditions. Legal and procedural aspects, such as sample provenance and forensic validity, are addressed alongside scientific advances to ensure credibility. A regulatory and standardisation roadmap will underpin outputs, embedding them in Europe's wider disaster resilience framework. By combining scientific rigour with enduser engagement, EMBRACE ensures results are practical, scalable, and aligned with European and international standards.

Results and Outcomes

EMBRACE will deliver both tangible tools and enduring systems. Expected outcomes include: a portable suite of diagnostic and detection devices; secure sampling procedures that meet forensic requirements; improved PPE and decontamination solutions; and new biomarkers of intoxication that advance medical knowledge. These technical results will be accompanied by risk-assessment tools, revised concepts of operations, and new training resources. The Biotoxin Task Force will sustain expertise and provide guidance beyond the project, while a regulatory and standardisation roadmap will ensure integration of EMBRACE innovations into European practice. Together, these outcomes will strengthen Europe's ability to anticipate, respond to, and recover from biotoxin incidents, reinforcing civil protection and resilience at every level.

The Stakeholders

EMBRACE is built on the understanding that biotoxin resilience cannot be delivered by science alone. Its stakeholder community spans six categories: researchers and scientific experts, policymakers and regulators, industry stakeholders, first responders and medical professionals, civil society organisations, and communication actors such as media and NGOs.

Researchers benefit from access to new tools and data; policymakers and standards bodies receive evidence-based insights; industry gains pathways to commercialise new technologies; and responders receive better training, equipment, and procedures. Civil society and citizens are equally central, with EMBRACE committed to providing accessible information, including a "Guide to Surviving a Biotoxin Event," to build public trust and awareness. Engagement is not passive: stakeholders co-design solutions, test tools in the field, validate findings, and help spread awareness.

By weaving these diverse communities into a single knowledge network, EMBRACE ensures that solutions are not only scientifically sound but also socially grounded, operationally validated, and politically relevant.



The EMBRACE Symposium

EMBRACE
2025
Symposium





marks a pivotal moment in Europe's efforts to strengthen resilience against biotoxin threats. Organised under the Horizon Europe EMBRACE project (Grant Agreement No. 101168322), the event will convene leading scientists, practitioners, policymakers, and international organisations on 15 October 2025 at the OPCW ChemTech Centre in The Hague.

The symposium's central purpose is to advance a shared scientific, operational, and policy agenda that will close current gaps in crisis management, reinforce preparedness, and launch the EMBRACE Biotoxin Task Force (BTF).

Purpose & Framing

The 2025 symposium will discuss the complex challenges of Biotoxins and the gaps in the frameworks traditionally used for chemical or biological response. It will be the initial driver of new approaches to detection, investigation, and mitigation given the diversity, the differentiated origins, the response complexities and varieties and the forensic challenges.

EMBRACE has been designed to work across scientific, clinical, operational, and regulatory domains and consolidate knowledge.

The symposium represents the first opportunity to bring these strands together in a public international forum and it will showcase scientific advances—such as biomarker discovery, diagnostic innovations, and forensic profiling—but also underline the operational and policy dimensions essential for protecting populations, responders, and infrastructure.

The symposium's design reflects the EMBRACE philosophy that preparedness is most effective when it is inclusive, multidisciplinary, and internationally aligned.

Speakers & Sessions

Keynote speeches

The morning session opens with a welcome from the Organisation for the Prohibition of Chemical Weapons (OPCW), delivered by Daan Noort, Head of the OPCW Laboratory. Hideki Matsuno, representing the United Nations Secretary-General's Mechanism (UNSGM), will provide the perspective of the UN Office of Disarmament Affairs on biotoxin preparedness and response. Symposium Chair Gwyn Winfield, editor of CBRNe World, will then set the scene, introducing the purpose of the day and the ambitions of EMBRACE.

The EMBRACE Project Overview will be presented by Dimitrios Drakoulis of Telesto Technologies, providing context on the project's scientific programme, objectives, and expected outcomes. This is followed by Fanny Ewann of INTERPOL's Bioterrorism Prevention Unit, who will outline the operational and investigative dimensions of biotoxin threats, highlighting law enforcement's critical role in responding to incidents that may cross borders and involve deliberate misuse.

Scientific contributions will then be provided by three renowned experts:

- Mirjam de Bruin-Hoegée (TNO, Netherlands), addressing biomarkers for detecting exposure to chemical warfare agents and their relevance to biotoxin research.
- Anne Bossée (DGA CBRN Defence, France), analysing which biotoxins are most relevant to intentional incidents and why they warrant targeted investigative and preparedness measures.
- Crister Åstot (Swedish Defence Research Agency), presenting advances in ricin chemical profiling, including new methodologies for classifying preparation routes and matching samples.

Together, these interventions set a rigorous scientific foundation for the remainder of the symposium.

Speakers & Sessions

Q&A and moderated discussions

After the initial presentations, participants will engage directly with the speakers in a structured Q&A session. This interactive format is intended to encourage practitioners, academics, and policymakers to probe deeper into scenarios, forensic challenges, and operational implications. The late-morning moderated discussion will extend the dialogue to cross-cutting issues, drawing connections between scientific and technical advances, operational and response gaps, and broader policy and strategy needs. These exchanges embody the EMBRACE approach: ensuring science is not isolated but embedded in practical response and governance frameworks.

The Biotoxin Task Force

Following the networking lunch, the symposium will shift focus to the Biotoxin Task Force (BTF), one of EMBRACE's cornerstone initiatives. Jon Hall and David Crouch of the Resilience Advisors Network will introduce the Task Force, explaining its vision, scope, and intended role within the European and international security landscape. Conceived as a sustainable, multi-sectoral knowledge and expertise hub, the Biotoxin Task Force will draw together scientists, responders, regulators, and industry actors to provide a standing capacity for advice, guidance, and rapid mobilisation in the face of biotoxin incidents.

The Biotoxin Task Force Facilitated Session

A dedicated workshop session will follow, open to all participants. Structured around scientific and technical activities, operational and response support, and EU policy and strategy dimensions, this discussion will enable stakeholders to shape the Task Force's priorities and operating model. Input from practitioners, forensic specialists, emergency responders, and policymakers will ensure the Biotoxin Task Force develops as a relevant, credible, and user-driven platform. The workshop exemplifies EMBRACE's stakeholder engagement strategy, where active co-creation replaces passive consultation.

Speakers & Sessions

Biotoxin Task Force - Next Steps

The day culminates with the meeting confirming the next steps for the Biotoxin Task Force. This moment will synthesise feedback gathered throughout the workshop, consolidate membership, and outline immediate next steps. The event symbolises the transition from preparatory work to operational reality: from a project deliverable to a community-anchored mechanism with enduring impact. By embedding the Biotoxin Task Force within networks such as the Union Civil Protection Knowledge Network and linking it to initiatives like CMINE and CSTAC, EMBRACE ensures the Task Force is positioned for long-term relevance and sustainability.

The Conclusions

The EMBRACE 2025 Symposium is the powerful and diversified springboard for a new collaborative body to address the most difficult challenges in Biotoxin crisis management. It provides a world-class platform for open discussion, and introduction of the Biotoxin Task Force, establishing a durable European and international capability for Biotoxin response. It will be the starting point of a pathway to involve participating stakeholders in developing new insights into science and policy as well as providing them with an opportunity to become active contributors to a network that will shape the future of Biotoxin response in Europe.

Agenda

| Time | Title | Name | Affiliation |
|---------------|--|---|---|
| 8:30 - 9:00 | Coffee and registration | | |
| 9:00 - 9:10 | Opening address from the OPCW | Daan Noort | Head of the OPCW Laboratory |
| 9:10 - 9:30 | Introduction – Setting the Scene | Gwyn Winfield | Symposium Chairman. Owner / Editor of CBRNe World |
| 9:30 - 9:45 | EMBRACE – Project Overview | Dimitrios Drakoulis | Telesto Technologies Ltd (EMBRACE Consortium) |
| 9:45 - 10:10 | INTERPOL: Operational and investigative dimensions of biotoxin threats | Fanny Ewann | Specialized officer. Bioterrorism Prevention Unit - CBRNE and Vulnerable Targets Sub- Directorate, INTERPOL |
| 10:10 - 10:30 | Q&A to speakers from the opening session | All participants Moderator: Gwyn Winfield | Questions on scenarios and investigative /forensic challenges |
| 10:30 -10:50 | Refreshment break | | |
| 10:50 -11:15 | Detecting Exposure to Chemical Warfare Agents: New Biomarker Insights | Mirjam de Bruin-Hoegée | TNO, NL |
| 11:15-11:40 | What biotoxins are most relevant to consider when investigating intentional incidents and why? | Anne Bossée | Head of Synthesis, Toxicology & Analytical Chemistry, DGA, CBRN Defense (France) |

Agenda

| Time | Title | Name | Affiliation |
|-------------|--|--|--|
| 11:40-12:05 | Ricin chemical profiling: classification of preparation method and sample matching methodology | Crister Åstot | Research Director, Swedish Defence Research Agency |
| 12:05-12:50 | Moderated Discussion | All participants Moderator: Gwyn Winfield | Scientific and technical issues Operational and response gaps and needs Policy, strategy and cross-cutting issues |
| 12:50-13:50 | Networking Lunch | | |
| 13:50-14:10 | Biotoxin Task Force Collaborative Session - Introduction | Jon Hall David Crouch | The Resilience Advisors Network (EMBRACE Consortium) |
| 14:10-15:30 | Biotoxin Task Force Collaborative Session - Facilitated Session | Workshop (all participants) | Scientific and technical activities, operational and response support, EU policy, strategy & preparedness activities |
| 15:15-15:45 | Biotoxin Task Force Collaborative Session - Next Steps | Jon Hall | Summary of feedback and invitations to join |
| 15:45-16:00 | UNSGM address | Hideki Matsuno | UN Office of Disarmament Affairs |
| 16:00-16:15 | Closing Remarks | Gwyn Winfield | Symposium Chairman |



Daan Noort *OPCW Laboratory*

Daniel Noort (1965, The Netherlands) studied chemistry at the University of Leiden. After obtaining his PhD in 1992, he started his professional career at The Netherlands Organization for Applied Scientific Research (TNO) in The Netherlands and worked for 30 years in the CBRN domain.

From 01 June 2022, Dr. Noort is the Head of Laboratory at the Organisation for the Prohibition of Chemical Weapons (OPCW, The Hague, The Netherlands). He is responsible for all activities of the OPCW laboratory, including the interactions with the network of Designated Laboratories and research activities taking place at the Centre for Chemistry and Technology.



Hideki Matsuno *UN Office of Disarmament Affairs*

Hideki Matsuno is a Political Affairs Officer in UN Office for Disarmament Affairs (ODA), Weapons of Mass Destruction Branch. He has been working on the UNSGM since 2018, and in this capacity, he has implemented training courses for experts, supported Member States in implementing laboratory exercises, coordinated the UN Internal Task Force, maintained the UNSGM roster, and conducted outreach activities in regions underrepresented in the SGM roster. He also works on nuclear issues in ODA. Previously, he worked on conventional arms issues, such as small arms, cluster munitions, the Arms Trade Treaty and transparency/confidence-building measures in the Conventional Arms Branch of ODA for over 10 years. Prior to that, he worked in the UN Department of Peacekeeping Operations (DPKO) and the Japan Air Self Defense Force (JASDF).





Gwyn Winfield
Symposium Chairman
Owner / Editor of CBRNe World

Gwyn Winfield has been a defence journalist for nearly 30 years and a CBRNE one for twenty four. He has had the opportunity to focus on a single topic for most of his career. He is acknowledged as the world's leading journalistic authority on chemical, biological, radiological and nuclear (CBRN) defence. He has travelled around the world studying CBRN defence, and covered stories as diverse as anthrax contaminated heroin and sarin releases in Syria. In addition to this he frequently assesses future threats and whether current national systems are set up to be able to deal with them. For the past 18 years he has organized the largest CBRN responder conferences in the world, called CBRNe Convergence. He has written for defence and homeland security magazines and national newspapers, presented a BBC documentary on the state of UK readiness for a CBRN attack, co-authored a book on terrorism (Axis of Evil) and Edited the comprehensive catalogue on CBRN defence devices. As well as the magazine Gwyn has also been involved in European Commission FP7/H2020 programs and commercial consultancy.



Dimitrios Drakoulis

Telesto Technologies Ltd (EMBRACE Consortium)

Dr. Dimitrios Drakoulis is the co-founder and leader of R&D activities in Telesto Technologies. His engineering background is in the design for interoperability of complex systems, and the Alenabled convergence of Cyber and Physical Security with applications in the protection of Critical Infrastructures and Disaster Resilient Societies. As the leader of Telesto R&D team, he coordinates activities in the EMBRACE project (Grant ID: 101168322), the "pan-European Management of Biological toxin incidents through standaRdisAtion initiatives for Crisis response Enhancement". He has background in standardization, and has chaired the process for the CWA 17356 pre-standard "Interoperability of security systems for the surveillance of widezones".



Fanny Ewann

Bioterrorism Prevention Unit, INTERPOL

Dr Fanny EWANN is a Specialized Officer in INTERPOL Bioterrorism Prevention Unit. She is a developer and implementer of multiagency capacity building activities for INTERPOL member countries and the lead scientist for biosecurity and biosafety risk assessment. Prior to this assignment, Dr Ewann obtained a PhD in microbiology and worked as a scientist on respiratory pathogens in academia and research institutions spanning basic research to early vaccine and drug research and development, before joining the European Commission Joint Research Centre as a biosafety and biosecurity expert.

Session: Biotoxins challenges: INTERPOL's perspective and role

In a constantly evolving threat landscape, biotoxins remain a major bioterrorism and biocrime threat for countries across the world. Their availability and diversity represent an additional challenge for regulatory and law enforcement agencies in preventing their misuse, it is therefore essential for countries to be prepared to detect and develop appropriate response to the deliberate release of biotoxins. INTERPOL, in support to its membership, works with national, regional and international partners to strengthen the sharing and analysis of information linked to incidents involving biotoxins, as well as to improve capacity to detect and respond to these types of incidents.



Mirjam de Bruin-Hoegée

TNO

Dr. Mirjam de Bruin-Hoegée is a scientist at TNO in Forensic Chemistry. She holds a BSc in Chemistry from Utrecht University and an MSc in Forensic Science from the University of Amsterdam. After joining TNO's CBRN Protection department as physical analytical chemist, she pursued a PhD in forensic analytical chemistry, focusing on chemical weapons profiling using mass spectrometry and chemometrics. Her research included a threemonth visit to NIST (USA) and led to a cum laude PhD for her thesis "Revealing the origin of chemical weapons." Currently, she works on biomarker discovery, the application of artificial intelligence within the framework of the Chemical Weapons Convention, and on-site exposure verification using dried blood spots.

Session: Detecting Exposure to Chemical Warfare Agents: New Biomarker Insights

After exposure to chemical warfare agents, the analysis of biomedical samples play a pivotal role in both clinical diagnostics and forensic investigations. Samples such as blood, urine, hair, and postmortem tissues offer a valuable matrix for detecting evidence of exposure. Due to the reactivity and the rapid metabolism of chemical warfare agents in the human body, direct detection is often unfeasible. Instead, the identification of biomarkers, such as free metabolites or adducts to proteins and DNA, provides a reliable alternative. A distinct advantage of using biomedical samples is the possibility to find long-lasting biomarkers of exposure, which will increase the time window of opportunity for verification activities. Recent advancements have focused on integrating chemical forensic techniques with biomarker discovery, enabling more robust and sensitive detection strategies. This presentation will highlight key studies and real-world cases where biomedical profiling has contributed to the successful verification of chemical weapons use.



Anne Bossée

DGA, CBRN Defense (France)

Dr. Anne Bossée holds the position of director of the chemistry division within the DGA CBRN Defence, the French military center specializing in CBRN concerns. This division is responsible for chemical synthesis, toxicological evaluations and analytical chemistry. Dr. Bossée is a member of the scientific council of the French network of laboratories involved in the fight against NRBC terrorism. She also leads the upskilling of DGA staff on CBRN topics. She holds a PhD in analytical chemistry from Pierre and Marie Curie University in Paris, France. Her areas of expertise include biotoxins analysis, the sampling, detection and identification of chemical weapons (CWA) and related compounds in environmental and biomedical matrices. She was the head of the OPCW French designated laboratory during 12 years. She was a member of the SAB temporary working group (TWG) on biotoxins (2021–2022) and is currently the chair of the SAB TWG on chemical forensics (2024–2025).

Session: OPCW Scientific Advisory Board Temporary Working Group on Biotoxins: Methodology and conclusions of the most relevant biotoxins in investigations of alleged use

Biotoxins are toxic chemicals usually obtained from biological source materials. Biotoxins vary widely in properties such as structure, size (high molecular weight and low molecular weight) and mechanisms of toxicity. The misuse of any biotoxin is prohibited by the Biological Weapons Convention and Toxins and under the Chemical Weapons Convention.

A 2-year temporary working group of the OPCW Scientific Advisory Board gave its recommendations in 2023 to enhance the OPCW's capabilities in the biotoxin field. A list of prioritized relevant biotoxins was proposed, based on the risk assessment in case of alleged use. This risk evaluation follows a methodology of a score attribution for each biotoxin family or specific toxin.

The methodology consists of defining relevant criteria and assigning a score to each criterion based on open literature information such as ease of production, historical use, toxicity, stability, detection/identification methods, the clinical manifestation and medical management. The threshold for establishing the prioritized list was set to the value corresponding to that of VX used for comparison.

The presentation proposes to present the defined criteria and the list of the most relevant biotoxins obtained in case of alleged use, as well as the consequences on the OPCW capabilities to be strengthened.



Crister Åstot

Swedish Defence Research Agency

Dr Åstot has more than 30 years' experience of research in the area of chemical analysis by modern analytical techniques. Since 2000 he has been working at the Swedish Defence Research Agency, Department of CBRN Defence and Security. The main area of his research is method development based on mass spectrometry for the analysis of chemical warfare agents (CWAs) and toxins in environmental and biomedical samples. An emphasis for the last 10 years has been chemical profiling of CWA as a tool for attribution. He has also a long-term experience of work as the laboratory manager of the OPCW designated laboratory at FOI (year 2003–2011) and this work has been a source of ideas of how to improve the tools for chemical analysis of the relevant threat agents. Dr Åstot has published 38 scientific articles in peer-review journals. Since 01 January 2022, Dr Åstot has been a member of the OPCW Scientific Advisory Board.

Session: Ricin chemical profiling: Classification of preparation method and sample matching methodology

Ricin toxins are prepared from castor beans, the seeds of the ricin plant (Ricinus communis). Chemical profiling of ricin toxin preparations from castor beans involves the characterization of ricin's structure, isoforms, and associated marker compounds, enabling accurate identification and source attribution. Source attribution methods may answer the questions;

- How was this toxin sample prepared?
- Are samples from the different seizures linked to each other?
 Techniques such as mass spectrometry, chromatography, immunoassays, and proteomic analyses are commonly employed to detect trace contaminants that provide insights into extraction methods or seed origin. Profiling also extends to ricinine and other low-molecular-weight biomarkers that co-occur with ricin and can serve as indicators of castor material processing. This presentation highlights the current tools and strategies in ricin chemical profiling developed at multiple laboratories worldwide and gives examples how the tools may be used in casework.



Jon Hall

The Resilience Advisors Network (EMBRACE Consortium)

Jon Hall QFSM is a senior Fire Officer with extensive experience of CBRNe design, establishment and command of emergency and disaster response capability. International policy and capacity advisor to EU member states. Currently he works as founder of the Resilience Advisors Network (strategic disaster risk experts), facilitator of the Crisis Management Innovation Network, chair of the CBRNe and Standardisation Cluster of EC projects, partner manager of project EMBRACE and responsible partner for the Biotoxin Task Force.



David Crouch

The Resilience Advisors Network (EMBRACE Consortium)

Professor David Crouch is a globally recognised expert in Chemical, Biological, Radiological, and Nuclear (CBRN) defence and civil nuclear safety, with over 30 years of experience across defence, security, and civil nuclear sectors. He currently serves as Director of the MoD Counter CBRN Professional Education Programme and Head of the CBRN & Survivability Group at Cranfield University. David is also Technical Director at United CBRN Limited and a Visiting Professor at the University of Hertfordshire. With leadership roles at 3M and Scott Safety, David pioneered respiratory and CBRN protective solutions. He has chaired CBRN-UK, contributed to the advancement of international safety standards, and is an Senior Associate Fellow of the Royal United Services Institute (RUSI). David's work spans hazardous environment operations globally, and he is an advisor for the EU EMBRACE Project on biological toxin response with the Resilience Advisor Network . A published author and sought-after speaker, David is dedicated to advancing resilience and safety in high-risk environments worldwide.



The Biotoxin Task Force: Building Europe's Preparedness

Origins & Purpose

The Biotoxin Task Force is being established within the EMBRACE project to create a forward-looking expert body providing trusted, science-based expertise and acting as a catalyst for addressing the gaps in policy, regulatory, and operational frameworks related to biotoxin threats, thereby strengthening Europe's overall preparedness.

It is designed to serve as a reference group for the EMBRACE project and, progressively, for European institutions and the wider civil and health protection community, with the aim of being sustained beyond the EMBRACE grant period.

This event will bring together researchers, policymakers, responders, and security specialists, representing a key milestone in strengthening Europe's collective preparedness for biotoxin threats.

Objectives & Needs

The key mission of the Biotoxin Task Force is to ensure that Europe has a place to turn for the expertise and operational foresight required to plan effectively for biotoxin crises. Its objectives include identifying gaps in current civil protection mechanisms, providing scientific oversight, and evaluating the emerging Biotoxin Concept of Operations (CONOPs) that EMBRACE is developing. In doing so, the Biotoxin Task Force will serve not only EMBRACE but also wider networks such as the Union Civil Protection Knowledge Network (UCPKN).

The Biotoxin Task Force will **improve Europe's ability to respond to biotoxin incidents** by
bridging scientific excellence with real-world
application. **This includes** standardising
procedures, developing interoperable
practices, and validating new technologies,
from portable diagnostic devices to
biomarkers of intoxication and protective
equipment.

Acting as a platform for knowledge integration and stakeholder engagement, the Biotoxin Task Force will consolidate expertise across research laboratories, forensic institutions, civil protection agencies, law enforcement, health authorities, and civil society.



The need for such a body is pressing. Biotoxins can be produced with relative ease, raising the risk of both accidental release and deliberate misuse. A single incident could overwhelm local capacities, requiring rapid mobilisation of expert advice and harmonised European response strategies. The Task Force addresses this by ensuring that expertise is available to guide policymakers, responders, and scientific actors in real time.

The Biotoxin Task Force represents a practical contribution to European security, strengthening preparedness at a time when resilience against CBRNe (Chemical, Biological, Radiological, Nuclear and Explosive) and, specifically, biothreats are recognised as a priority across the European Union.

Membership, Actions & Early Operations

The Biotoxin Task Force will bring together a core group of leading experts, supported by a wider membership that reflects the diversity of biotoxin knowledge and practice. Members will come from the various stakeholder groups engaged by the EMBRACE project, with international partners also invited, ensuring global perspectives while maintaining a strong European focus.

Members will have access to a secure communication and knowledge-sharing environment on the CMINE platform, managed by a secretariat to support exchanges and decision-making. This environment will link directly to the Biotoxin Reference and Stakeholder Hub (BRSH), a central tool in EMBRACE's stakeholder engagement strategy.

The Task Force will meet regularly, with additional consultations as needed in response to urgent events. Its initial work will include advising on standardised response procedures, identifying technological and scientific needs, and reviewing emerging EMBRACE solutions. These activities will directly strengthen Europe's ability to detect, contain, and recover from a biotoxin crisis.

Membership offers more than privileged access to information. Members will contribute to setting strategic priorities for European preparedness, influencing both the scientific agenda and operational response frameworks. They will play an active role in policy debates and practical planning, while also building lasting connections across the biotoxin and CBRN community. Such cooperation ensures stronger and faster coordination when real crises occur.

In practice, membership means early access to cutting-edge research, technologies, and operational approaches, with the opportunity to shape their development and use. It also provides direct engagement with policymakers, scientists, first responders, and industry leaders. Through the EMBRACE Biotoxin Hub and the CMINE platform, members will connect with peers across Europe and beyond, strengthening their own networks while contributing to Europe's collective resilience.

In short, membership of the Biotoxin Task Force offers knowledge, influence, visibility, and collaboration in an area of critical global importance.

Shaping Europe's Biotoxin Response

Members of the Biotoxin Task Force will not simply observe; they will actively shape Europe's future biotoxin preparedness. Each participant has the opportunity to take on roles as advisors, validators, or knowledge brokers. Some will contribute to developing field protocols and operational guidance, others will test and validate tools in laboratory or response settings, while still others will help translate complex scientific results into usable policy recommendations.

In practice, this means that the Task Force will become Europe's rapid reference group for biotoxin-related crises. Whether providing guidance on personal protective equipment, advising on laboratory sampling, or reviewing cross-border coordination, members will ensure that Europe's biotoxin response is evidence-based, interoperable, and forward-looking.

By linking scientific innovation with operational practice, the BTF embodies EMBRACE's wider vision of creating a coherent, pan-European system for managing biotoxin threats. Its establishment ensures that the advances developed during the project will not remain isolated research results but will be embedded in Europe's crisis management systems for years to come.

The EMBRACE 2025 Symposium in The Hague is part of the beginning of this journey, with the Biotoxin Task Force stepping onto the European stage as a symbol of resilience, collaboration, and preparedness. From this moment onward, the Task Force will serve as a lasting resource for Europe and its partners, helping to safeguard societies from one of the most challenging threats of our time.



The most recent outcomes of EMBRACE activity

Gaps and Needs in current Civil Protection Mechanisms

by Luise Niebisch, Disaster Competence Network Austria

Biotoxins present a distinct challenge within the broader CBRN landscape. They are often underrepresented in strategic planning and receive comparatively less operational attention than chemical, radiological, or nuclear threats. To address this gap, the study combined a literature review with qualitative interviews and an expert workshop to assess preparedness in Europe and identify needs within civil protection mechanisms. The results consolidate prevailing strengths and limitations and provide a basis for setting requirements and guiding future planning.

Findings indicate that existing preparedness frameworks are fragmented and inconsistent. Biotoxin management is typically pursued as part of an all-hazards approach, with few measures tailored to toxin-specific characteristics. This contributes to divergent perceptions of responsibility and uneven prioritization across contexts. While overarching civil protection frameworks exist, they rarely offer the specificity needed for biotoxin challenges.

These shortcomings are visible in detection and diagnostics. Current approaches cover only a narrow range of toxins, and laboratory capacity can be rapidly saturated during incidents. Early warning methods remain underdeveloped, complicating timely response. Coordination remains a critical challenge, with fragmented responsibilities and unclear information flows undermining effective response. Addressing this requires more centralized structures, secure cross-sector information sharing, and stronger mechanisms for both international coordination and civil-military cooperation to ensure coherence in future incidents.

The study also underscored the importance of strengthening human capacities. More standardized approaches to training are required, complemented by international exercises and clearer protocols for public risk communication. Resilience further depends on reliable access to essential resources. This includes protective equipment and antidotes, supported by mechanisms for joint procurement and the shared use of capacities at international level, alongside engagement with private actors to drive innovation.

Designated authorities, existing policies, international projects and knowledge-transfer initiatives already provide an important foundation for biotoxin preparedness. However, these measures remain insufficiently integrated and sustained, which limits their long-term impact. Durable progress will depend on consolidating existing structures, strengthening cross-border exchange and embedding outcomes into permanent systems. The adoption of the EU Preparedness Strategy in spring 2024 has already addressed several of these issues at policy level, but the central challenge now lies in its implementation.

On the basis of the identified needs and gaps, the next stage will define requirements for a dedicated biotoxin response capacity and on developing concepts of operations to ensure coherent and effective action in future incidents.

Gaps and Needs in the current Standardisation Landscape

by Eliška Špeldová, Technologická platforma "Energetická bezpečnost, ČR"

The EMBRACE project has finalized the first iteration of its Standardization Roadmap, a foundational document that outlines the project's strategic approach to enhancing Europe's resilience against incidents involving biological toxins.

The roadmap presents a comprehensive analysis of the existing European and international standardization landscape relevant to CBRN security, with a special focus on biotoxins. A systematic review confirmed the project's core premise: a critical gap exists in the current framework. While robust standards are in place for general crisis management and industrial biocontamination, there is a significant lack of standards tailored to the unique challenges posed by biotoxin threats.

Key deficiencies were identified in several areas, including the absence of harmonized methods for biotoxin-specific detection, a lack of validated decontamination protocols for diverse biotoxin classes, and insufficient integration of biotoxin considerations into overarching crisis management and personal protective equipment (PPE) standards.

To address these gaps, the roadmap details a pragmatic and focused action plan. Instead of initiating new work items, the EMBRACE project will act as a key expert contributor to ongoing standardization efforts. This strategy involves establishing formal liaisons with key Technical Committees, such as CEN/TC 391 'Societal and Citizen Security,' and providing targeted, evidence-based contributions to relevant CEN Workshop Agreements (CWAs), including those on human decontamination and disaster risk preparedness.

Through this strategic engagement, the EMBRACE project will ensure its innovative research outcomes are integrated into the normative framework governing Europe's resilience, delivering a lasting impact on the continent's preparedness for biotoxin incidents.

Technical Developments in EMBRACE's first year

by Sebastian Simonsen, Prometech B.V.

EMBRACE is developing an integrated technological ecosystem for biotoxin incident management that connects detection, response, and decision-making capabilities into a unified system. During its first year, the project has established the foundational architecture and begun developing key system components that will improve how Europe responds to biotoxin emergencies.

Connected Detection and Analysis Network

The first year has focused on connecting detection technologies into a unified forensics chain-of-custody platform. The differential mobility analyzer has progressed through refinement phases, with new improved components being introduced on a monthly basis. Special effort has been devoted to the system's automatic controls, via PCBs with ADC/DAC stages controlled by microcontrollers. The instrument combines fast gas-chromatography with tandem DMA analysis. Meanwhile, the pBDi immunoassay detector has begun developing biotoxin test kits specifically for the EMBRACE target list, building on existing 20-minute detection capabilities. These detection systems are being designed to feed data into the central sample management framework that will correlate findings across multiple sensors and locations.

Integrated Sample Management and Response Chain

Year one work includes establishing the framework for linking sample collection with tracking capabilities. Specialized sampling systems are under development while the BreathDraw collection platform has made progress alongside forensics tracking and management systems, creating the foundation for an end-to-end chain of custody system.

The biotoxin escalation pathway has advanced, establishing protocols for tracking potential poisoning cases from initial symptom recognition through hospital treatment. The integration of breath and biofluid collection capabilities has moved through initial design phases, with the system architecture now defined for processing large numbers of potentially exposed individuals and feeding results back into the incident management platform.

Unified Decision Support and Risk Assessment

The first year has established the groundwork for integrating multiple decision support tools into a cohesive framework. The BioRA risk assessment tool has begun development with a focus on integration capabilities, while the CBRN toolbox structure has been defined to serve as the central repository for operational procedures and technical guidance. The biotoxin escalation pathway algorithm has made progress and will feed into the BioRA framework. This integration allows the system to receive biotoxin alerting data and initiate risk assessments when potential biotoxin poisoning cases are identified, providing coordinated response recommendations.

The Human Durability Index development has advanced through initial setup phases, establishing the framework for connecting physiological monitoring of first responders with environmental conditions and protective equipment performance, preparing for integration with deployment decision systems.

Integrated Response Framework

The first year has established the central coordination architecture that links all system components together. Technical foundations have been built with data sharing protocols defined and role-specific interface requirements established for different user groups. The integration framework ensures that detection triggers automatically sample track, the escalation pathway activates appropriate medical protocols, and risk assessments inform protective equipment recommendations. This integrated approach positions EMBRACE to deliver a comprehensive response framework that enhances Europe's biotoxin incident management capabilities.

Organisers



Hanna Hakulinen

VERIFIN

Director of VERIFIN, Finland's OPCW-designated laboratory specializing in chemical disarmament related research and training.

Sue Denham

EMBRACE Project Manager, Telesto Technologies, Ltd.

Formerly Professor of Cognitive and Computational Neuroscience (retired), with over 25 years experience of teaching and managing research programmes in computer science, artifical intelligence and cognitive science.





Luca Alessandro Remotti

The Lisbon Council

Senior director with over 25 years of experience in technology development and marketing and communication.



Resilience Advisors Network, CMINE

Director at the Resilience Advisors Network and Admin of CMINE. Involved in many of RAN's Horizon Europe projects. Specialist in Risk Assessments.





Ben Hall

Resilience Advisors Network, CMINE

CMINE Coordinator and Operations Director at the Resilience Advisors Network (RAN), where he leads on logistics, coordination, and operational delivery across projects and events.

THE EMBRACE Consortium





































SLOVAK OFFICE OF STANDARDS, METROLOGY AND TESTING



Keep in touch





