

Sector 1 CBRNe Emerging Threats and Critical Infrastructure Protection: Innovation and Technology for Preparedness, Response and Consequence Mitigation

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51. New technologies in public health challenges

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Abstract

Among the wide range of fields with possible applications of AI medicine stands out as one in which there is tremendous potential along with equally substantial challenges. There is virtually no area in medicine and care delivery that is not already being touched by AI. For example, AI-driven applications are available to capture the dictation of medical notes; many such applications are attempting to synthesize patient interviews and laboratory test results to write notes directly, without clinician intervention.

Medicine is much different from other areas where AI is being applied. AI enables new discoveries and improved processes in the entire health care continuum; ethical, governance, and regulatory considerations are critical in the design, implementation, and integration of every component of the AI applications and systems. Because of concerns about both utility and safety, new applications will generally have to adhere to the same standards applied to other medical technologies.

AI and machine learning can transform medicine. Health professionals will figure out how to work with AI and machine learning as we grow along with the technology. AI and machine learning will not put health professionals out of business; rather, they will make it possible for health professionals to do their tasks better and leave time for the human–human interactions that make medicine the rewarding profession we all value.

Keywords: Artificial intelligence; health care transformation; health decisions

Biography - Marinko Artuković



Marinko Artuković, MD, PhD, is a specialist in internal medicine, subspecialist in allergology and clinical immunology and rheumatology. Since 1997, he has been working at the Sveti Duh Clinical Hospital, Zagreb, Croatia. 2016-2023. he was the director of the Special Hospital for Pulmonary Diseases in Zagreb which was declared the best-managed healthcare institution during his tenure.

He is an assistant professor at the North University, Croatia. Since 2023., he has been working as the head of the Service for Strategic Planning, Innovation and Coordination of EU Projects at the Croatian Institute for Public Health.

7. Academic and Nongovernmental education and research activities in the field of the nuclear security and nonproliferation in Georgia (on the example of the CCDS)

Irakli Mchedlishvili

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Abstract

The purpose of this presentation is to review academic and non-governmental (NGO) education and research efforts in the field of nuclear security and nonproliferation in Georgia; outline prospects of future developments of this sector and introduce possible options for further international cooperation.

To begin, the presentation will examine the regional context and recent advancements in nuclear security and nonproliferation from Georgia's perspective. Additionally, it will delve into the government's efforts and policy developments in this field. The presentation will highlight the contributions made by Georgian academic and non-governmental organizations in this domain.

A particular focus will be given to the education and awareness programs on nuclear security and nonproliferation conducted by the CCDS. This will include an in-depth look at their tools, such as STATIONARY and MOBILE interactive maps used to monitor background radiation. The presentation will also review CCDS's publications and highlight their conference and network activities, specifically the Tbilisi Regional Stability Forum. This forum brings together governmental representatives and experts from regional countries, primarily from the Caucasus and Black Sea regions, as well as the EU and the US.

At the conclusion emphasis will be placed on the significance of academic and non-governmental initiatives in nuclear security and nonproliferation. These efforts are integral to a country's national and international security objectives. The presentation will underscore the role of international cooperation among academic and non-governmental organizations as a means of empowerment of their capabilities.

Biography - Irakli Mchedlishvili



Since 2005 Irakli Mchedlishvili is a co-founder and executive board member of the Civil Council on Defense and Security (CCDS), Tbilisi, Georgia. In the frames of CCDS he is involved in Research and education programs in the field of Nuclear Security, Radiation Safety and Non-proliferation. Before Irakli Mchedlishvili was working for different Georgian NGOs and Think Tanks on Defense and Security Sector democratic reformation, NATO integration, issues of regional cooperation and stability. For a short period, he also worked for the Committee on Foreign Relations of the Parliament of Georgia. Irakli Mchedlishvili graduated from the Faculty of Physics of the Tbilisi State University. In 2009-2016 He was also involved in the work of the

Combating Terrorism Working Group of the NATO Partnership for Peace (PfP) Consortium of Defense Academies and Security Studies Institutes based in the Marshall Center, Garmisch-Partenkirchen, Germany, while in 2001 – 2003 he was a Co-Chairman of the Southern Caucasus Regional Stability Study Group and the member of the Secretariat Working Group of the PfP Consortium. Irakli Mchedlishvili is an author of various articles on international relations and national security issues. He is an editorial board member of the books: "Evaluation of Parliamentary Powers Related to Oversight of the Defense Sector in Georgia" and "Georgia's Nuclear Odyssey: The Path from Soviet Atomic Legacy to Global Nonproliferation Regime".

55. Amerithrax 22 Years Later – The Case for Environmental Surveillance for Intentional Releases of Infectious Agents and Emerging Infectious Diseases

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Abstract

In October of 2001, a letter was mailed to the American Media, Inc. (AMI) building in Boca Raton, Florida that contained *Bacillus anthracis* (*Ba*) spores. This resulted in two cases of anthrax including one death. Subsequently, letters with *Ba* spores were sent to various media outlets in New York City and to Capital Hill. It was estimated that each letter contained 2 grams of spores. In total, the release of spores resulted in 23 anthrax cases, 12 cutaneous, 11 inhalation, and 5 deaths. Over 10,000 environmental samples were collected at anthrax-contaminated facilities to understand the degree of contamination, the exposure pathways, and to drive medical treatment strategies and remediation plans. Concentrations on surfaces ranged up to 10⁸ colony forming units per gram of dust. In addition to the health impacts, there was a significant economic burden incurred for the cleanup of contaminated buildings. Fumigation of the United States Postal Service (USPS) of contaminated Processing and Distribution Centers cost \$200M, which does not include business continuity costs (i.e., costs associated with facility closure, renovation, and security upgrades). Two years later, a national airborne biosurveillance system was created to detect and shorten the time frame for response to such events. Fast forward to today, environmental microbiology played a critical role in understanding the persistence and transmission pathways of SARS-CoV-2 during the pandemic that resulted in a shift of fomite transmission to primarily airborne. Novel airborne sensor technologies have evolved that include immunoassays, genetic testing, Raman spectroscopy, and mass spectroscopy (MALDI-TOF).

Keywords: Emerging Infectious Diseases, *Bacillus anthracis* (*Ba*) spores, environmental microbiology

Biography - Kenneth F. Martinez



Certified Industrial Hygienist and Environmental Engineer with experience in leading and conducting large-scale research; managing programs in occupational safety and health, and emergency response; and creating and teaching professional development courses. Brings 33 years of CDC expertise in the area of hazardous agent exposure characterization and mitigation control practices in the manufacturing and healthcare industry. Recognized subject matter expert in biological agents including infectious disease and bioterrorism agents. Over a nine-year period for CDC, served in numerous emergency response field leadership roles

including the World Trade Center collapse, anthrax, SARS, multi-drug resistant TB, hurricane emergency responses (Katrina and Wilma) and the Deep-Water Horizon oil spill. As a subject matter expert on biological threat agents, provided counsel and leadership to senior management of other federal agencies including providing testimony before a congressional sub-committee on Capitol Hill, presenting before senior leaders of the OSTP, GAO, USPS, DHS, EPA, and FBI and serving on a CDC team tasked to provide responses and a strategic plan to the Pandemic and All-Hazards Preparedness Act (PAHPA). During 2009, the H1N1 pandemic, coordinated and directed education through media communication to over 600 Cincinnati NIOSH staff. Research efforts in bioaerosols have resulted in 38 peer-reviewed journal articles and book chapters; 32 NIOSH technical reports; over 100 technical presentations at scientific meetings; and courses on bioaerosols targeted at the local, state, and national level. From 2013 to 2020, he supported DHS as a contractor for a national airborne biodetection system serving as a Jurisdictional Coordinator for two jurisdictions, as an Environmental Assessment (EA) team lead and as a Field Operations team lead. Subsequently, he provided contract support to FEMA CBRN and FDA. He currently serves as a Senior Critical Infrastructure Analyst for Idaho National Laboratory and concurrently operates as the Chief Science Officer for a non-profit (Integrated Bioscience and the Built Environment Consortium – IBEC) created to provide support of COVID-19 pandemic response efforts nationally. He also serves as an Adjunct Professor at the Edith Cowan University, School of Medical and Health Sciences in Australia.

42. Specialist CBRN medicine training for medical personnel – Polish experience

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Abstract

The increased risk of incidents involving CBRNe agents as a consequence of the war in Ukraine and possible terrorist activities requires proper preparation of medical personnel in Poland to provide specialist medical care. The research conducted in 2021-2022 uncovered inadequate readiness of the Emergency Medical Services (EMS) and the Health Care System in Poland for CBRNe threats. The urgent need to address this grave problem inspired a specialist educational programme for medical personnel, CBRNmedicine Training Project, conducted as part of the Strengthening CBRNe Safety and Security – Coordination and Standardization project financed by the Norwegian Financial Mechanism 2014-2021. The programme, focusing on the three key areas: pre-hospital care, medical decontamination (biological, chemical and radiation) and in-hospital treatment, offered comprehensive training in emergency and disaster management, CBRNe triage, rapid detection and identification of CBRNe agents, the use of personal protective equipment, and advanced life support. Between 2022-2023, twenty one specialist training courses were conducted for the benefit of selected EMS and hospital personnel, paramedics from a CBRNe fire brigade and the Polish armed forces. Additionally, we trained a medical team from Kiev (Ukraine). Overall, the CBRNmedicine Training Project shaped a new perception of CBRNe threats by the medical staff, set a new direction in the education of medical and military professionals, as well as proved invaluable in the preparation of specialized CBRNe medical procedures.

Keywords: CBRNe training, medical simulation

Biography - Lt. Col. (ret.) Arkadiusz Trzos, MD, PhD



Acting Head of Department of Disaster Medicine and Emergency Care. Lider of the Project 'Strengthening CBRNE Safety and Security – Coordination and Standardization' at the Jagiellonian University Collegium Medicum. Author of a innovative training programme 'CBRNmedicine for emergency and medical personel'. Editor and Co-author of the CBRNE medical procedures for Emergency Medical Services and Emergency Departments in Poland.

59. The AI ACT awaiting

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Abstract

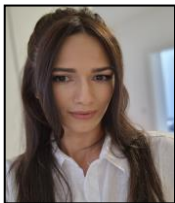
Artificial intelligence improves forecasting accuracy, optimization of operations and allocation of resources and while personalizing the provision of services. Healthcare is an area in which artificial intelligence may significantly contribute to the achievement of results that are in the interest of society, but it may also give rise to new risks or negative consequences for individuals or society as a whole. The Artificial Intelligence Act defines healthcare as a high-risk system in the context of artificial intelligence application for it is unambiguously clear that healthcare is increasingly exposed to risks of human rights violations. The vulnerability of health system users due to their poor health, potential discrimination and possibility of misdiagnoses are just few of the challenges to be faced in the application of artificial intelligence in the healthcare system.

Croatia must swiftly and efficiently become involved in the creation of legal framework for the application of artificial intelligence that will prevent possible abuses and enable all areas, including healthcare, to benefit from artificial intelligence, while also taking steps to educate all stakeholders of the healthcare system. Artificial intelligence should not be resisted or feared, but rather regulated by establishing legal frameworks.

The author gives a brief review of the European Union regulatory framework for artificial intelligence based on the principle of fairness and demonstrates key challenges in the creation of legal framework for application of artificial intelligence in the healthcare system of the Republic of Croatia.

Keywords: Artificial Intelligence; Health care; Legal framework

Biography – Zorica Topić Omaljev



Zorica Topić Omaljev (April 3, 1988.) is the head of the Department for Legal & General Affairs, Human Resources and the Assistant Director for Legal Affairs at the Special Hospital for Pulmonary Diseases in Zagreb.

She graduated from the Faculty of Law in Zagreb, and gained experience in a law firm and private companies in the country and abroad, working from intern to head of the legal affairs department.

Currently, she is a doctoral student at the Doctoral Study in Media and Communication of the University North in Croatia. Passionate about law in general, interested in the field of human rights protection, business intelligence and health policies.

60. Human Health Risk Assessments (HHRAs) and Climate Change Considerations in Contaminated Sites

Asish Mohapatra

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Abstract

Within the scope of our Contaminated Sites Program and requirements to address chemical stressors exposure and climate change considerations, two projects were completed; 1) Scoping Review of Climate Change Human Health Risk Assessment (HHRA); 2) Cumulative Risk Assessment (CRA) modelling tools, methodological frameworks review and applications. The broad goal and objective of these studies were to evaluate exposure and health risks and their interconnectedness to various stressors and how those were likely to be influenced by climate change considerations. Human receptor sensitivity frameworks for HHRAs were also identified.

The CRA project was based on the initial scoping review project that focussed on contaminated sites HHRAs and some chemicals of potential concern such as arsenic, cadmium, mercury, per-fluorinated chemicals, and petroleum hydrocarbons. Based on the updated literature reviews, findings from northern environments (e.g., permafrost affected areas) will be shared in the presentation. Further evaluation of climate change considerations affecting chemical fate, transport and toxicity will be included. Furthermore, analyses and understanding of the heterogeneity and variability in characteristics traits of sensitive sub-populations including application of sex and gender-based analysis plus framework are recommended.

The presentation will focus on some relevant examples and make a case for using a broad climate change lens to address various short-duration and chronic exposure issues and to evaluate complex Chemical, Biological, Radiological, Nuclear and Explosives (CBRNe) HHRAs.

Disclaimer: The presentation is based on two contract projects. The contractor reports and papers cited in the presentation neither reflect the views and opinions of Health Canada, nor is it Health Canada guidance.

Biography – Asish Mohapatra



Asish is a toxicologist and a human health risk assessment specialist with Health Canada and a regional member of the Chemical Emergency Preparedness and Response Unit (CEPRU). His interdisciplinary areas of expertise include toxicology, human health risk analysis, CBRN toxicology, chemical fate, transport and transformation analyses, climate change health risk assessments and data fusion tools and methodological applications. Asish is one of the Editors-in-Chief for the journal – Global Security: Health, Science and Policy (Taylor and Francis). Current major publications include "Information Resources in Toxicology" (5th edition, 2020, two volumes) and "Encyclopedia of Toxicology" (4th edition, to be published in 2023) as part of the Elsevier's Reference Collection in Biomedical Sciences.