

The National Academies of
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**Workshop on the Utility, Feasibility, Security, and Ethics
of Verifiable COVID-19 Credentials for International Travel**

Virtual Workshop Dates:

August 3, 2021, 11:00 am-1:00 pm EDT

August 4, 2021, 11:00 am-1:00 pm EDT

August 5, 2021, 11:00 am-1:15 pm EDT

The workshop will discuss the utility, feasibility, security and ethics of establishing verifiable COVID-19 credentials for international travel. The workshop will explore issues that need to be addressed in order to have effective, feasible and secure ways to document and provide health information before travel, and to ensure the request is ethical and does not exacerbate inequities. Participants will contribute perspectives from domestic and international governments, multilateral health and business organizations, academia, and private and nonprofit sectors. The workshop will focus on the following issues:

- Standardization of the differing requirements for acceptable vaccines between countries
- Acceptance of other correlates of immunity such as positive antibody test or use of testing for active infection
- Ethical, legal and practical considerations in mitigating negative effects of global inequalities that requiring vaccines as a condition of entry for travel will exacerbate
- Validity of credentials, security and privacy of health information, and need for universal interoperability
- National and global governance of verifiable COVID-19 credentials
- Impact on diplomacy, international businesses and tourism

Agenda

All times are in EDT

AUGUST 3, 2021

11:00-11:10 INTRODUCTION

Overview of Global COVID-19 Travel Restrictions – What is the goal and what is ethical/feasible/practical?

*Abbey Wojno, U.S. Centers for Disease Control and Prevention
Saskia Popescu, George Mason University*

11:10-11:35 PUBLIC HEALTH AND EPIDEMIOLOGY

Public Health Impact of Requiring Vaccination or Testing for Travel

Kathleen Neuzil, University of Maryland School of Medicine

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Changing Landscape of Vaccine Requirements – Boosters and Variants

Angie Rasmussen, Vaccine and Infectious Disease Organization, University of Saskatchewan

11:35-12:00 POLICY DEVELOPMENT

Enacting Policy on Verifiable COVID-19 Credential Requirements

Adam Cutler, Ministry of Health Israel

The Search for Universal Agreement on Documentation

Garrett Livingston Mehl, Department of Digital Health and Innovations at WHO

12:00-12:15 COMMUNICATION AND MESSAGING

How to Obtain Public Acceptance of and Adherence to Guidelines on a Global Scale

Scott Ratzan, CUNY Graduate School of Public Health and Health Policy

12:15-1:00 DISCUSSION

Moderator:

Saskia Popescu

AUGUST 4, 2021

11:00-12:00 ACCURATE, SECURE, VERIFIABLE AND USABLE DATA

Sources of Credible Data

Rebecca Coyle, Executive Director, American Immunization Registry Association

Security, Privacy, and Protection of Data

Josh Mandel, Microsoft

Interoperability and Verifiability

Dakota Gruener, ID2020

Moderator:

Abbey Wojno, U.S. Centers for Disease Control and Prevention

12:00-1:00 PANEL DISCUSSION ON: CASE STUDIES/CURRENT EXAMPLES

Sandra Beattie, Lead, Excelsior Pass

Rick Klau, California Department of Technology

Alexander Dahl, Akinox

Edem Adzogenu, African Union

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Louise Cole, International Air Transport Association
Brian Behlendorf, Linux Foundation

Moderator:

Brian Anderson, MITRE Corporation

AUGUST 5, 2021

11:00-11:40 PRIVACY ISSUES AND LEGAL CONSIDERATIONS

U.S. Law and Border Control

Meryl Chertoff, Georgetown Project on State & Local Government

Europe and the General Data Protection Regulation

Jean McHale, University of Birmingham

Privacy Protections and other Legal Challenges in Implementing Vaccine Information Sharing

I. Glenn Cohen, Harvard Law School

DISCUSSION

Moderator:

Lawrence Gostin, Georgetown University

11:40-12:30 ETHICAL CONSIDERATIONS

Global Justice and Barriers to Access

Vardit Ravitsky, University of Montreal

Fairness and Vaccine Credentials: Problems with Ignoring Differential Risk

Govind Persad, Sturtevant College of Law, University of Denver

Vaccine Manufacturing in the Global South: Paradoxically Fueling Inequity

Keymanthri Moodley, South Africa

Vaccination Certificates: A Public Health Ethics Approach

Carla Saenz, PAHO

DISCUSSION

Moderator:

Ezekiel Emanuel, University of Pennsylvania

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12:30-1:15 **BUSINESS AND ECONOMIC ISSUES**

Transportation Sector

Erik Hansen, US Travel Association

Impact on Tourism

Zoritsa Urosevic, UN World Tourism organization

Impact on International Business and Trade

David Turner, Organisation for Economic Cooperation and Development

DISCUSSION

Moderator:

Mark Pearson, OECD

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PLANNING COMMITTEE

Saskia Popescu, Ph.D., M.P.H., M.A., CIC

Committee Chair

Assistant Professor, Biodefense Program
Schar School of Policy and Government
George Mason University
Arlington, VA

Brian Anderson, M.D.

Chief Digital Health Physician
Digital Health Engineering
MITRE Corporation
Harvard Medical School
Bedford, MA

Ezekiel Emanuel, M.D., Ph.D.

Vice Provost for Global Initiatives
Co-Director, Healthcare Transformation
Institute
Levy University Professor, Medical Ethics
and Health Policy
Wharton School of the University of
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Philadelphia, PA

Lawrence O. Gostin, J.D.

University Professor
Founding O'Neill Chair in Global Health Law
Faculty Director, O'Neill Institute for National
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Global Health Law
Director, World Health Organization
Collaborating
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Georgetown University Law Center
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Margaret A. Hamburg, M.D.

Interim Vice President, Global Biological Policy
and Programs
Chair, NTI bio Advisory Group
Nuclear Threat Initiative
Washington, DC

Kathleen M. Neuzil, M.D., M.P.H.

Director, Center for Vaccine Development
and Global Health
Professor of Medicine and Pediatrics
The Myron M. Levine, MD, DTPH Professor of
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University of Maryland School of Medicine
Baltimore, MD

Mark Pearson, M.Sc.

Deputy Director of Employment, Labour and
Social
Affairs Directorate
Organisation for Economic Co-operation and
Development
Paris, France

Megan Walklet-Tighe, M.A.

Director, Office of Transportation Policy
Bureau of Economic and Business Affairs
United States Department of State
Washington, DC

Abbey Wojno, Ph.D.

Lead of Innovation
IDEA – Office of Innovation, Development,
Evaluation, and Analytics
Division of Global Migration and Quarantine
U.S. Centers for Disease Control and Prevention
Atlanta, GA

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PLANNING COMMITTEE BIOGRAPHIES

Saskia Popescu, Ph.D., M.P.H., M.A., CIC, (Chair) is a Term Assistant Professor in the Biodefense Program within the Schar School of Policy and Government at George Mason University.

She received her PhD in Biodefense from the Schar School in 2019; a Master's in Public Health with a focus on infectious disease epidemiology and a Master's of Arts in International Security Studies from the University of Arizona. While completing her PhD, she served as a student ambassador for the Global Health Security Agenda Ministerial Meeting in Bali, Indonesia, and has served as a signatory on the NGO statement for the Biological Weapons Convention. During her epidemiology graduate studies, she was a recipient of the Frontier Interdisciplinary eXperience (FIX) HS-STEM Career Development Grant in Food Defense through the National Center for Food Protection and Defense. Popescu is an Alumni Fellow of the Emerging Leaders in Biosecurity Initiative (ELBI) at the Johns Hopkins Bloomberg School of Public Health, Center for Health Security. She currently serves as a member of the Federation of American Scientists (FAS) Coronavirus Taskforce and is a member of the Committee on Data Needs to Monitor Evolution of SARS-CoV-2 within the Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine (NASEM).

Prior to joining Mason, Popescu worked as infection prevention epidemiologist in several large healthcare systems, working to enhance readiness and biopreparedness. More recently, she created and disseminated a gap analysis for a six-hospital system to establish vulnerabilities for high-consequence diseases, helping to guide the creation of a high-consequence disease initiative to enhance readiness at the healthcare level. This work aided in rapid and coordinated responses to COVID-19. Her assessment and leadership regarding healthcare biopreparedness efforts has resulted in several peer-reviewed literature. She is certified in infection prevention (CIC), hospital preparedness through FEMA's NIMS, and pandemic preparedness from the DHS Center for Domestic Preparedness. Popescu's research addresses gaps within global health security, biodefense, healthcare biopreparedness, and the integration of antimicrobial resistance into global health security initiatives. She also serves as an adjunct professor in the University of Arizona College of Public Health Epidemiology and Biostatistics program.

Brian Anderson, M.D., is Chief Digital Health Physician at MITRE where he leads research and development efforts across major strategic initiatives in Digital Health, including partnering with the United States government on public-private partnerships during the COVID-19 pandemic.

Dr. Anderson is also responsible for co-founding the Vaccination Credential Initiative; leading MITRE's development of machine learning techniques to leverage real world health data; and linking genomic and clinical data to provide insight into the efficacy of therapeutics and vaccines. He also leads MITRE's largest Health R&D effort in Oncology and Personalized Medicine. His teams help to architect, implement, and analyze health data and information systems for federal agencies including HHS, NIH, CDC, ASPR, CMS, the FDA and VA.

Prior to joining MITRE, Dr. Anderson led the Informatics and Network Medicine Division at athenahealth where he launched a new model of clinical decision support leveraging artificial intelligence. He has also

served on several national health information technology committees in partnership with the Office of the National Coordinator (ONC).

Dr. Anderson completed his clinical training at Massachusetts General Hospital. He completed his BA ('00) and MD ('06) degrees, both with honors, at Harvard College and Harvard Medical School.

Ezekiel Emanuel, M.Sc., M.D., Ph.D., Ezekiel J. Emanuel is the Vice Provost for Global Initiatives, the Diane v.S. Levy and Robert M. Levy University Professor, and Co-Director of the Healthcare Transformation Institute at the University of Pennsylvania. From January 2009 to January 2011, Dr. Emanuel served as a Special Advisor on Health Policy to the Director of the Office of Management and Budget and National Economic Council. Prior to that he was the founding chair of the Department of Bioethics at the National Institutes of Health from 1997 to August of 2011. Dr. Emanuel received his M.D. from Harvard Medical School and his Ph.D. in political philosophy from Harvard University. Dr. Emanuel served on President Clinton's Health Care Task Force, the National Bioethics Advisory Commission (NBAC), and on the bioethics panel of the Pan-American Healthcare Organization. He has published over 300 articles mainly on health care reform, research ethics, and end of life care in the *New England Journal of Medicine*, the *Lancet*, *JAMA*, and many other medical journals. He has also authored or edited 15 books. His latest book entitled *Which Country Has the World's Best Health Care?* was published in June 2020.

Lawrence O. Gostin, J.D., is an internationally distinguished scholar on global health. Gostin serves as Faculty Director and Founding Chair, O'Neill Institute for National and Global Health Law, and holds Georgetown's highest academic rank, "University Professor" conferred by the University president. He is a Member of the National Academy of Medicine and Council of Foreign Relations, and Fellow of the Royal Society of Public Health.

Gostin is director of the World Health Organization Collaborating Center on Public Health Law & Human Rights and he has served on major WHO committees including the Director-General's advisory committee for reforming the WHO. He served on two global commissions investigating WHO's response to the West Africa Ebola outbreak. In 2016, President Obama appointed Gostin to the National Cancer Advisory Board. Gostin holds international academic professorial appointments at Oxford University, the University of Sydney, and the University of the Witwatersrand, Johannesburg, South Africa, among others, and has received numerous awards and honorary degrees. The National Consumer Council (UK) conferred the Rosemary Delbridge Memorial Award on Prof. Gostin for the person "who has most influenced Parliament and government to act for the welfare of society." The American Public Health Association awarded Gostin its Distinguished Lifetime Service Award. He is JAMA's Legal & Global Health Correspondent.

Margaret A. Hamburg, M.D., is an internationally recognized leader in public health and medicine, who currently serves as chair of the NTI|bio Advisory Group. She previously served as foreign secretary of the National Academy of Medicine and is a former Commissioner of the U.S. Food and Drug Administration (FDA), having served for almost six years. Before joining FDA, Hamburg was founding vice president and senior scientist at the Nuclear Threat Initiative. Previous government positions include Assistant Secretary for Planning and Evaluation, U.S. Department of Health and Human Services, Health Commissioner for New York City, and Assistant Director of the National Institute of Allergy and Infectious Diseases, National Institutes of Health.

Hamburg recently stepped down from her position as Foreign Secretary of the National Academy of Medicine, the health arm of the National Academy of Sciences, Engineering and Medicine. In her former role, she served as senior advisor on international matters and was the liaison with other Academies of Medicine around the world. She is an elected member of the Council on Foreign Relations and the National Academy of Medicine. Hamburg currently sits on the boards of the Commonwealth Fund, the Simons Foundation, the Urban Institute, the Global Alliance for Vaccines and Immunization, the Parker Institute

for Cancer Immunotherapy and the American Museum of Natural History. She is chair of the Joint Coordinating Group for the Coalition for Epidemic Preparedness and Innovation, and a member of the Harvard University Global Advisory Council, the Global Health Scientific Advisory Committee for the Gates Foundation, the Harvard Medical School Board of Fellows, and the World Dementia Council. Hamburg earned her B.A. from Harvard College, her M.D. from Harvard Medical School and completed her medical residency at Weill Cornell Medical Center. She is the recipient of multiple honorary degrees and numerous awards.

Kathleen Neuzil, M.D., M.P.H. is the Myron M. Levine Professor in Vaccinology, Professor of Medicine and Pediatrics, and the Director of the Center for Vaccine Development and Global Health at the University of Maryland School of Medicine. She is an internationally recognized research scientist and advocate in the field of vaccinology. Throughout her career, Dr. Neuzil has conducted clinical and epidemiologic studies on vaccine-preventable diseases, yielding high-profile publications that inform policy decisions and public health actions. Dr. Neuzil's work has spanned dozens of low-resource countries with multiple vaccines, including influenza, rotavirus, human papillomavirus, Japanese encephalitis, typhoid conjugate vaccines, and most recently, COVID-19 vaccines. Dr. Neuzil is central to the domestic and global response to COVID. As a co-PI of the NIH-funded Leadership Group for the Vaccine and Treatment Evaluation Unit network, Dr. Neuzil is part of the strategic team evaluating COVID vaccines and therapeutics in the US and was part of the study team who designed the first COVID-19 clinical vaccine trial in the US. The CVD is likewise participating in COVID treatment and post-exposure prophylaxis trials. Dr. Neuzil also directs TyVAC, the Typhoid Vaccine Acceleration Consortium, with the goal to accelerate the introduction of typhoid conjugate vaccines into low-resource countries. She has more than 230 scientific publications on vaccines and infectious diseases. Dr. Neuzil's research capabilities are complimented by 20 years of involvement in domestic and international policy, including past membership on the US Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices. She is a member of the World Health Organization Strategic Advisory Group of Experts on Immunization and is a member of the prestigious National Academy of Medicine.

Mark Pearson, M.Sc. is Deputy-Director for Employment, Labour and Social Affairs (ELS) at the Organisation for Economic Co-operation and Development (OECD). Mr. Pearson works with the Director to provide leadership in the co-ordination and management of the activities of ELS and ensure that it is at the forefront of the international social, health and employment agenda.

In 2009 he became Head of the Health Division where the central focus of work was on how to deliver health care with greater efficiency, including putting much more effort into prevention of obesity and harmful use of alcohol. He gave evidence to the US Senate on 'Obamacare', and has been on a panel advising the Chinese government on its health reforms.

More recently, Mr. Pearson led the cross-OECD initiative for Safe International Travel during the COVID-19 pandemic.

Mr. Pearson is British, and has a degree in Politics, Philosophy and Economics from Oxford, and an MSc in Economics and Econometrics from Birkbeck, University of London.

Megan Walklet-Tighe, M.A., is the Director of the Office of Transportation Policy (OTP) in the Bureau of Economic and Business Affairs at the U.S. Department of State. OTP works to increase global capacity and safeguard the commercial aviation and maritime sectors. Working with U.S. and foreign partners, OTP promotes adherence to the highest international standards to enhance the safety and security of the global

transportation system. As the principal staff officer for European and multilateral affairs in the Office of Transportation Policy from 1999 - 2003, she managed aviation issues with the European Union (EU), the Organization for Economic Cooperation and Development (OECD), the International Civil Aviation Organization (ICAO), and the World Trade Organization (WTO). From 2003, Megan was OTP's Team Leader for the aviation section, and in 2013 she was promoted to Office Director with responsibility for both aviation and maritime policy. She was a member of the negotiating team that concluded the landmark US-EU Air Transport Agreement in 2007, as well as the US-EU Aviation Safety Agreement in 2010, and participated in international efforts to reach agreement on a global mechanism to reduce emissions from aviation in the International Civil Aviation Organization. Prior to joining the State Department, Megan worked for the Federal Aviation Administration (FAA) in the Americas Division of the Office of International Affairs. Megan is a Senior Fellow in the Partnership for Public Service's Excellence in Government leadership program. She earned her Master's Degree in International Policy Studies from the Monterey Institute for International Studies at Monterey, California in 1990, and her undergraduate degree from the University of North Carolina-Charlotte in 1997. Megan lives in Virginia with her husband and daughter.

Abbey E. Wojno, Ph.D., serves as the Lead of Innovation with the Office of Innovation, Development, Evaluation, and Analytics in CDC's Division of Global Migration and Quarantine. In this role, Abbey works with her CDC colleagues to push forward novel solutions to public health challenges faced by globally mobile populations and the practitioners engaged with them. Abbey earned her PhD in organizational and health communication in 2011 from the Scripps College of Communication at Ohio University.

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SPEAKER BIOGRAPHIES

****Edem Adzogenu** is an accomplished investment facilitation, government affairs and international crisis management specialist for global investors and businesses across Africa and Asia. His global experience ranges from advising Fortune 100 companies and G7 countries, to helping resolve disputes over multi-billion dollar mining concessions in war-threatened regions.

Lately, Dr. Adzogenu has been at the forefront of groundbreaking initiatives to promote African multinationals and intra-African investments. He is an architect and Senior Advisor of the AfroChampions Initiative, a public-private partnership which was launched on the sidelines of the January 2017 African Union Heads of States Summit, to galvanize policy frameworks and innovative corporate alliances supporting the emergence and success of African private sector champions in the regional and global spheres.

A physician by training, Dr. Adzogenu has continuously contributed to the coordination, formulation and management of development programs in the health sector of Ghana and throughout Africa.

Sandra Beattie is First Deputy Director of the New York State Division of the Budget (DOB). She is responsible for supporting the overall development and management of New York State's fiscal policy, including the preparation of budget recommendations for all State agencies and programs, economic and revenue forecasting, tax policy, fiscal planning, capital financing, and management of the State's debt portfolio. In addition, from the start of the COVID-19 pandemic, Ms. Beattie played a central role in New York State's response, including the procurement of personal protective equipment, the fight for federal funding, and delivering new technology to support the vaccination and program and to launch the Excelsior Pass, a digital proof of vaccination. Ms. Beattie holds a BA in political Science from Emmanuel College in Boston and an MBA from the State University of New York at Albany, and has previously worked for the US Government Accountability Office (GAO) in Washington, Deloitte Consulting, and she started her career with DOB working in Albany and as DOB's Washington, DC-based representative in the New York State Office of Federal Affairs.

Brian Behlendorf is General Manager for Blockchain, Healthcare and Identity at the Linux Foundation. In that capacity he oversees the Linux Foundation Public Health initiative, which works with public health authorities, technology vendors, and volunteer technology teams to build software and standards to fight pandemics and other public health challenges. He also oversees the Hyperledger Project, which has developed foundational blockchain and distributed ledger technologies for all sorts of use cases, including distributed digital identity. He also is a member of the Board of Directors at the Electronic Frontier Foundation, the Filecoin Foundation and the Mozilla Foundation.

Meryl Chertoff is the Executive Director of SALPAL and an adjunct professor of law at Georgetown Law. From 2009 to 2019 she served as the Executive Director of The Aspen Institute's Justice and Society

Program. Among her notable work at Aspen was direction of seminars for judges, lawyers and state government officials, creation of the Inclusive America Project, and direction of the Sandra Day O'Connor Conversation.

Professor Chertoff has had a variety of positions in and around state government. She was Director of the New Jersey Washington Office, served on the legislative staff of a New Jersey Assembly leader, and worked as a lobbyist in Trenton. Professor Chertoff worked in the Office of Legislative Affairs at the Federal Emergency Management Agency (FEMA) participating in the agency's transition into the Department of Homeland Security in 2003.

From 2006-2009 she directed the Sandra Day O'Connor Project at Georgetown Law, on judicial independence and civic education.

She is a graduate of Harvard College and Law School, and served as a law clerk to Federal District Judge Myron H. Thompson (M.D. Ala).

She contributes opinion writing to The Hill, Bloomberg Law, and other publications, has provided expert testimony before state legislatures on various bills, and provides briefings on American federalism to international visitors through US State Department sponsored programs.

Professor Chertoff is admitted to the Bar in New York and New Jersey, is a Fellow of the American Bar Foundation, and served as an ABA Advisor to the Uniform Law Commission's Study Committee on State Governance During Public Health Emergencies in 2020. She is a member of the Board of ChangeLab Solutions.

I. Glenn Cohen is one of the world's leading experts on the intersection of bioethics (sometimes also called "medical ethics") and the law, as well as health law. He also teaches civil procedure. From Seoul to Krakow to Vancouver, Professor Cohen has spoken at legal, medical, and industry conferences around the world and his work has appeared in or been covered on PBS, NPR, ABC, CNN, MSNBC, Mother Jones, the New York Times, the New Republic, the Boston Globe, and several other media venues.

He was the youngest professor on the faculty at Harvard Law School (tenured or untenured) both when he joined the faculty in 2008 (at age 29) and when he was tenured as a full professor in 2013 (at age 34), though not the youngest in history.

Prof. Cohen's current projects relate to big data, health information technologies, mobile health, reproduction/reproductive technology, research ethics, organ transplantation, rationing in law and medicine, health policy, FDA law, translational medicine, and to medical tourism – the travel of patients who are residents of one country, the "home country," to another country, the "destination country," for medical treatment.

He is the author of more than 150 articles and chapters and his award-winning work has appeared in leading legal, medical, bioethics, scientific, and public health journals, as well as Op-Eds in the New York Times and Washington Post. Cohen is the author, co-author, editor, or co-editor of more than 15 books.

For his law school teaching he was awarded the HLS Student Government Teaching and Advising Award in 2017. He also sometimes teaches courses at Harvard College and Harvard Medical School. For the public he created the free online Harvard X class Bioethics: The Law, Medicine, and Ethics of Reproductive

Technologies and Genetics, which was nominated by Harvard for the Japan Prize. More than 97,000 students have taken the course so far. You can also watch his Tedx talk, *Are There Non-Human Persons? Are There Non-Person Humans?* He is also the faculty lead on Zero-L, an online course to help law students transition to law school that is now being used by more than half of all U.S. law schools.

Prior to becoming a professor he served as a law clerk to Judge Michael Boudin of the U.S. Court of Appeals for the First Circuit and as a lawyer for U.S. Department of Justice, Civil Division, Appellate Staff, where he handled litigation in the Courts of Appeals and (in conjunction with the Solicitor General's Office) in the U.S. Supreme Court. In his spare time (where he can find any!) he still litigates, having authored an amicus brief in the U.S. Supreme Court for leading gene scientist Eric Lander in *Association of Molecular Pathology v. Myriad*, concerning whether human genes are patent eligible subject matter, a brief that was extensively discussed by the Justices at oral argument. Most recently he submitted an amicus brief to the U.S. Supreme Court in *Whole Women's Health v. Hellerstedt* (the Texas abortion case, on behalf of himself, Melissa Murray, and B. Jessie Hill).

Cohen was selected as a Radcliffe Institute Fellow for the 2012-2013 year and by the Greenwall Foundation to receive a Faculty Scholar Award in Bioethics. He is also a Fellow at the Hastings Center, the leading bioethics think tank in the United States as well as being a fellow of the Pierre Elliot Trudeau Foundation. He leads the Project on Precision Medicine, Artificial Intelligence, and the Law (PMAIL), which is part of the larger Centre for Advanced Studies in Biomedical Innovation Law (CeBIL). He co-leads the Regulatory Foundations, Ethics, and Law Program of Harvard Catalyst | The Harvard Clinical and Translational Science Center program. He also leads the Project on Precision Medicine, Artificial Intelligence, and the Law (PMAIL). He previously served as one of the key co-investigators on the multi-million dollar Football Players Health Study at Harvard which is committed to improving the health of NFL players (for more on this work click here). He is also one of three editors-in-chief of the *Journal of Law and the Biosciences*, a peer-reviewed journal published by Oxford University Press and serves on the editorial board for the *American Journal of Bioethics*. He served on the Steering Committee for Ethics for the Canadian Institutes of Health Research (CIHR), the Canadian counterpart to the NIH, and the Ethics Committee for the American College of Obstetricians and Gynecologists (ACOG). He currently serves on the Ethics Committee of the U.S. Organ Procurement and Transplantation Network (OPTN).

Louise Cole is the IATA Travel Pass Implementation Manager for the International Air Transport Association (IATA). Previously, Louise was the Manager Identity Solutions where she had the responsibility for the development of standards and recommended practices in robust, integrated identity management across the end-to-end passenger process (IATA One ID).

Prior to this, Louise was in leadership positions in the New Zealand Public Service for 20 years, most recently as Manager Information Partnerships with the Department of Internal Affairs (DIA). In addition, Louise was the New Zealand representative on the International Civil Aviation Organisation (ICAO) New Technology Working Group (NTWG) and lead for the NTWG Sub Group developing the technical specifications and international policy for the Digital Travel Credential.

Rebecca Coyle is AIRA's Executive Director. She oversees the development and promotion of tools and best practices to support the implementation of immunization information systems as an essential tool in preventing and controlling vaccine-preventable diseases. Rebecca has a master's degree in education with an emphasis in public health.

Rebecca began her work in the immunization community in 2002 as the School & Childcare Coordinator for the Idaho Immunization Program. She worked in the Minnesota Department of Health as a Center for Disease Control and Prevention public health advisor before returning to Idaho as the Immunization Program Manager. Rebecca joined AIRA in 2010 as the Executive Director.

Adam Cutler is the Deputy Division Director for International Relations and Media at the Israeli Ministry of Health. During the COVID-19 pandemic, Adam served as the Product Manager for the Vaccination Certificate Program, as well as Israel's representative to several international initiatives to safely reopen global travel, including to the World Health Organization, OECD, and ICAO. Adam is a native of Philadelphia, PA, and holds a BA from the University of Pennsylvania and an MA from Bar Ilan University.

Alexander Dahl, Founder and CEO of Akinox, Alexander Dahl is driven by a profound idealism and belief in the capacity for human beings to better the world when working together beyond silos and divisions. A citizen of three countries and raised in Africa, Europe and the South Pacific, now settled in Canada, he is passionate about building technology to improve access to quality care for all – from the most remote villages in the Great North to the densest urban jungles and mega-hospitals. Since they say: “hire your weaknesses,” (and he has many), at Akinox he gets to work with a truly outstanding team of brilliant and diverse individuals spread across continents, all committed to making a difference by helping transform healthcare. He has spent over twenty years helping implement large-scale eHealth programs with governments and healthcare organisations, including pioneering one of the world’s first large-scale enterprise telehealth solutions. He felt a strong sense of duty and privilege when Akinox was called upon to help Quebec with the COVID-19 pandemic response since March 2020, including outbreak management, automated case management and contact tracing, testing, and vaccination. The Akinox platform has now served over 7 million VCI SMART Health Card proofs of vaccination and seeks to intelligently address global challenges related to COVID-19 credentials.

Dakota Gruener is the executive director of ID2020, a global public-private partnership, which brings together technologists, advocates, implementers, and funders toward a common vision: good digital ID for all.

In February 2021, ID2020 launched the Good Health Pass Collaborative, a cross-sector global initiative, which has brought together more than 125 global companies and organizations from across the technology, health, and travel and tourism sectors to develop principles and standards for digital health passes aimed at restoring international travel.

Dakota launched ID2020 in 2016, following her work at Gavi, the Vaccine Alliance, where she served as aide-de-camp to the CEO, Seth Berkley. A graduate of Brown University, with dual degrees in biology and political science, Dakota started her career as a management consultant with Oliver Wyman. She was recognized by Forbes Magazine as part of the Forbes 30-Under-30 in 2019.

Erik Hansen, vice president of government relations, leads development of U.S. Travel's domestic policy agenda, and represents the travel community before the Executive Branch and Congress.

Hansen focuses on issues related to aviation, surface transportation, infrastructure and federal travel. He also served as general manager of the Connecting America Through Travel conference, which convened travel industry leaders, transportation experts and policy influencers to help shape the discussion on revitalizing America’s travel infrastructure.

Before joining the U.S. Travel Association, Hansen worked for five years as a legislative aide on the House Transportation and Infrastructure Committee, and for the office of Congresswoman Chellie Pingree. Prior to his work on Capitol Hill, he served as Field Director for the reelection campaign of Congressman Steny H. Hoyer (D-Md.), and worked in the government affairs office of Prudential Financial.

Rick Klau joined CDT as Deputy Director of Office of Enterprise Technology (OET) and State Chief Technology Innovation Officer in February 2021. His team launched the Digital COVID-19 Vaccine Record portal in June 2021 built on open source SMART Health Card framework guidelines to provide digital vaccine records statewide. More than 1 million digital records were delivered in less than two weeks.

Previously, Klau, spent more than 13 years at Google. He began on the business development team and moved to product management where he led product initiatives on some of Google's largest consumer products (Blogger, Google+, and YouTube). He spent his last nine years at Google Ventures (GV), Alphabet's early-stage venture capital firm, as Senior Operating Partner responsible for leading several of GV's operating teams. In that capacity, he worked with founders and leaders at hundreds of fast-growth startups, helping with everything from scaling their organizations, aligning priorities across teams, and connecting them to the C-suite at Fortune 500 companies in his network to accelerate their growth.

Josh C. Mandel, MD is a physician and software engineer working to fuel an ecosystem of health apps with access to clinical and research data. As Chief Architect for Microsoft Healthcare, Chief Architect for SMART Health IT, and Lecturer at the Harvard Medical School Department of Biomedical Informatics, Josh works closely with the standards development community to lay groundwork for frictionless data access, authorization, analytics, and app integration. He led development of the SMART specification and launched the Clinical Decision Support Hooks project. As a member of the national Health IT Standards Committee, Josh showed a special interest in tools and interfaces that support software developers who are new to the health domain.

Jean McHale is Professor of Health Care Law and Director of the Centre for Health Law Science and Policy at the University of Birmingham. She is the author/editor of several books including in the area of EU Health Law- European *Health Law Themes and Implications* with Tamara Hervey (CUP: 2015) and numerous academic articles. Her work on EU Health law has led her to be invited to give formal evidence in person to the UK House of Commons Health and Social Care Select Committee and House of Lords European Union Select Committee and presentations to the Scottish Government and members of the Scottish Parliament. She is currently leading a ESRC 18 month funded project "Removing Rights from the Vulnerable? The Impact of Covid-19 social care easements.

Garrett Mehl is the Unit Head of Digital Health Technology in the Digital Health and Innovation Department of the World Health Organization in Switzerland and leads work related to digitizing WHO health and data recommendations into "SMART" standards-based guidelines and establishing clearinghouse mechanisms for digital health solutions that are consistent with WHO guideline recommendations and interoperability standards and specifications. His current work focuses on supporting the generation and synthesis of evidence related to digital health, developing evidence-based Guidelines and implementation guidance for governments, establishing standards-based content for digital systems, and facilitating evaluation efforts that promote scale and wide-scale adoption of digital and other innovations. Prior to joining DHI, Dr. Mehl coordinated the research and evaluation work on digital health and innovations in the Department of Reproductive Health and Research and HRP Special Programme, and

research on adolescents in the WHO Department of Child and Adolescent Health; and worked on the development of the WHO Framework Convention on Tobacco Control.

Keymanthri Moodley is a Distinguished Professor in the Department of Medicine and Director of the Centre for Medical Ethics and Law, Faculty of Health Sciences, Stellenbosch University. In 2017, she was appointed as Adjunct Professor in the Department of Social Medicine, University of North Carolina-Chapel Hill, USA. Keymanthri is a specialist family physician, bioethicist and has served as a Principal Investigator on clinical trials.

She is an NRF rated researcher and has served on the SAMRC Board and the NHREC and in international organisations: WHO, International AIDS Society (IAS), NIH DSMBs, the WHO SAGE Ebola Working Group and various WHO COVID ethics working groups. The Centre was re-designated as a Collaborating Centre in Bioethics in 2019 by the WHO, one of twelve in the world and the first on the African continent.

Keymanthri is a member of the Academy of Science of South Africa and completed an Executive MBA in 2015. To date, she has been awarded research and capacity development grants to the approximate value of R40 million. The Centre has trained 40 mid-career professionals from 10 African countries in bioethics and is currently co-presenting an NIH funded Leadership program in Bioethics with 7 PhD trainees. Keymanthri serves on the Scientific Advisory Committee of EDCTP, Netherlands and has served on the Science and Research Working Group of the International Paralympic Committee, Bonn, Germany.

Kathleen Neuzil is the Myron M. Levine Professor in Vaccinology, Professor of Medicine and Pediatrics, and the Director of the Center for Vaccine Development and Global Health at the University of Maryland School of Medicine. She is an internationally recognized research scientist and advocate in the field of vaccinology. Throughout her career, Dr. Neuzil has conducted clinical and epidemiologic studies on vaccine-preventable diseases, yielding high-profile publications that inform policy decisions and public health actions. Dr. Neuzil's work has spanned dozens of low-resource countries with multiple vaccines, including influenza, rotavirus, human papillomavirus, Japanese encephalitis, typhoid conjugate vaccines, and most recently, COVID-19 vaccines. Dr. Neuzil is central to the domestic and global response to COVID. As a co-PI of the NIH-funded Leadership Group for the Vaccine and Treatment Evaluation Unit network, Dr. Neuzil is part of the strategic team evaluating COVID vaccines and therapeutics in the US and was part of the study team who designed the first COVID-19 clinical vaccine trial in the US. The CVD is likewise participating in COVID treatment and post-exposure prophylaxis trials. Dr. Neuzil also directs TyVAC, the Typhoid Vaccine Acceleration Consortium, with the goal to accelerate the introduction of typhoid conjugate vaccines into low-resource countries. She has more than 230 scientific publications on vaccines and infectious diseases. Dr. Neuzil's research capabilities are complimented by 20 years of involvement in domestic and international policy, including past membership on the US Centers for Disease Control and Prevention's Advisory Committee on Immunization Practices. She is a member of the World Health Organization Strategic Advisory Group of Experts on Immunization and is a member of the prestigious National Academy of Medicine.

Govind Persad, JD, PhD, is an Assistant Professor at the University of Denver Sturm College of Law. He has published or forthcoming work on COVID-19 immunity credentials in the *Journal of the American Medical Association* and the *American Journal of Law and Medicine*, and on other COVID-19 topics in

venues including *JAMA*, the *New England Journal of Medicine*, *Science*, the *Journal of Medical Ethics*, and several law journals. He has also co-authored op-eds in the *New York Times*, *Washington Post*, *USA Today*, *Boston Globe*, and *Denver Post*, and collaborated in the development of the University of Pittsburgh model policy for allocation of scarce COVID-19 treatments. In addition to his COVID-19 work, he was selected as a 2018-21 Greenwall Faculty Scholar in Bioethics for an ongoing research project on health insurance and protection against financial risk.

Professor Persad was selected as a Health Law Scholar in 2017 and as a BioIP Scholar in 2018 by the American Society of Law, Medicine and Ethics. He clerked for the Hon. Carlos Lucero, U.S. Court of Appeals for the Tenth Circuit, and received his JD and PhD from Stanford University.

Angela (Angie) Rasmussen, Ph.D., is a virologist at the Vaccine and Infectious Disease Organization (VIDO) at the University of Saskatchewan. Her research focuses on the role of the host response in viral pathogenesis, with a particular interest in emerging viruses that are or have the potential to be major threats to global health, such as avian influenza, dengue virus, Ebola virus, MERS-CoV, and SARS-CoV-2. Her work combines classical experimental virology and animal models with systems biology approaches to study the global response to infection and how that contributes to pathogenesis or protection from emerging pathogens.

Dr. Rasmussen graduated from Smith College with a BA in Biological Sciences (2000) and received a MA (2005), MPhil (2006), and PhD (2009) in Microbiology and Immunology from Columbia University. She did her postdoctoral fellowship at the University of Washington and previously held faculty positions at the University of Washington and the Columbia Mailman School of Public Health. In addition to her primary appointment at VIDO, Angie is also affiliated with the Georgetown Center for Global Health Science and Security. She is a member of the Verena Consortium, a multi-disciplinary, international effort to predict and study emerging viral pathogens, as well as the Communications Director for the CoVaRR-Net research consortium. She is also a member of the WHO Ad Hoc Expert Committee for Preclinical Models of COVID-19 and sits on the Editorial Boards at Vaccine, mSphere, and Cell Reports.

In addition to her research, Dr. Rasmussen is a prolific science communicator on both social media and in the mainstream press, as well as a writer for numerous publications including Forbes, Leaps.org, Slate, Foreign Affairs, the Washington Post, and the New York Times. She is passionate about advocating for equity in biomedical research and public health, and is a member of the US NIH Advisory Committee to the Director Working Group on Changing the Culture to End Sexual Harassment, as well as a faculty mentor for the volunteer science education group Wearing is Caring. She believes strongly that biosecurity and global public health must be collaborative international efforts and is eager to extend this outreach work in Canada and abroad.

Scott Ratzan, M.D., M.P.A., M.A., has three decades of pioneering accomplishments in the U.S. and globally in health communication, health literacy, and strategic diplomacy. He is the founding Editor-in-Chief of the *Journal of Health Communication: International Perspectives*. Before joining CUNY, he was a Sen Senior Fellow at the Mossavar-Rahmani Center for Business and Government at Harvard Kennedy School. He has worked in multiple sectors with Johnson & Johnson, ABInBev and USAID in Brussels, New York and Washington DC. He has been published extensively in the field of health communication

and policy including articles related to vaccine literacy and uptake in the New England Journal of Medicine, Lancet, JAMA, Nature Medicine, National Academies of Medicine Perspectives as well as the Washington Post, STAT News and Financial Times.

He co-founded CONVINCE-- Covid-19 New Vaccine INformation Communication and Engagement. He leads efforts with CONVINCE USA with the Vaccine Equity Cooperative and with the City University of New York Graduate School of Public Health and Health Policy (CUNY SPH) as well as private sector activities with the Business Partners to CONVINCE with the U.S. Council for International Business Foundation.

Building on his work in the 1990s as a professor and Founding Director of the Emerson-Tufts Masters Program in Health Communication, Dr. Ratzan co-directs the Masters Program in Health Communication for Social Change at CUNY SPH.

He is currently on the Board of Global Health for the National Academies of Science, Engineering and Medicine, the RAND Health Advisory Board, and World Information Transfer, Inc. a UN accredited NGO. He has served as Co-Chair of the UN Secretary General's Every Woman Every Child Innovation Working Group, and on the Centers for Disease Control and Prevention, Board of Scientific Counselors, Office of Infectious Disease.

Dr. Ratzan is a co-author of the term health literacy adopted by HHS and integrated in the Affordable Care Act, defined as "the degree to which an individual has the capacity to obtain, communicate, process, and understand basic health information and services to make appropriate health decisions." His books include the Mad Cow Crisis: Health and the Public Good, Attaining Global Health: Challenges and Opportunities, and AIDS: Effective Health Communication for the 90s

He holds adjunct professorial appointments at Columbia University Mailman School of Public Health, Tufts University School of Medicine, and the University of St Andrews School of Medicine.

Dr. Ratzan has an M.D. from the University of Southern California, an M.P.A. from Harvard Kennedy School, and an M.A. in Communication from Emerson College.

Vardit Ravitsky is Full Professor at the Bioethics Program, School of Public Health, University of Montreal and part-time Senior Lecturer on Global Health and Social Medicine at Harvard Medical School. She is President of the International Association of Bioethics and Director of Ethics and Health at the Center for Research on Ethics. She is a 2020 Trudeau Foundation Fellow and Chair of the Foundation's COVID-19 Impact Committee, as well as Fellow of the Canadian Academy of Health Sciences and of the Hastings Center. She is member of the Standing Committee on Ethics of the Canadian Institutes of Health Research (CIHR) and of the Institute Advisory Board of CIHR's Institute of Genetics. She is also member of the National Human Genome Research Institute's (NHGRI) Genomics & Society Working Group. Her research focuses on the ethics of genomics and reproduction and is funded by Canada's leading funding agencies. She published over 170 articles and commentaries on bioethical issues.

Carla Saenz is the Regional Bioethics Advisor at the Pan American Health Organization (PAHO), which is the World's Health Organization's Regional Office for the Americas. She is responsible for PAHO's Regional Program on Bioethics, which provides supports on bioethics to countries in Latin America and the Caribbean. An elected fellow of the Hastings Center, she has authored numerous publications on different areas of bioethics, coedited the book *Public Health Ethics: Cases Spanning the Globe*, and contributed to several ethics guidance documents. She has been responsible of the development of PAHO's ethics guidance for Zika and COVID-19. She holds a PhD in Philosophy from the University of Texas at Austin and, before joining PAHO, she was at the Department of Bioethics at the Clinical Center of the National Institutes of Health (NIH), and in the faculty in the Philosophy Department at the University of North Carolina at Chapel Hill.

David Turner was a researcher of the ESRC Macroeconomic Modelling Bureau of the University of Warwick analysing the properties of UK macro models before coming to the OECD in 1991. He has held a variety of posts at the OECD, but has been Head of the Macroeconomic Analysis Division since 2009, where his main responsibilities currently include overseeing the ADB macroeconomic database used by the Economics Department as well as overseeing analysis of potential output, modelling the effects of structural reforms and long-term projections for the global economy. He has recently been part of a team that has been modelling the effect of lockdown and public health policies on both the spread of COVID-19 and on economic activity, using a multi-country panel estimation approach (see the link [here](#) for the most recent publication relating to this work).

Zoritsa Urosevic is currently the UNWTO Special Representative to the United Nations in Geneva and New York (a.i), and Director of the Institutional Relations and Partnerships Department, providing policy advice for external relations, strategic partnerships and financing for development to the Secretariat, including the integration of the 2030 Agenda and the UN Reform in the organization's strategic work and delivery.

Urosevic is a member of UNWTO's Global Tourism Crisis Committee (GTCC), strengthening UNWTO and partners response to the current COVID-19 crisis, with a key focus on collaboration with WHO, ICAO and other UN entities and International Organizations (IOs), as well as forging a strategic delivery with International Finance Institutions for recovery and resilience building.

Urosevic joined the World Tourism Organization in 2006 as Executive Secretary of the Business Council. As of 2010 she has led work on positioning tourism in the development cooperation and trade agenda, while strengthening UNWTO institutional framework, leading the inclusion of UNWTO in the OECD DAC list. The UN Rio+20 outcome document "The future we want" acknowledged for the first time the importance of tourism in the three dimensions of sustainability. She participated with the United Nations Environment Programme (UNEP) in the formulation of the 10 Years Framework Programme for Tourism (today known as One Planet) and she was involved in the build-up towards the universal 2030 Agenda. Since 2015, she has been a strong advocate for maximizing the dialogue between Trade and Tourism with Geneva based IOs, in order to unlock tourism's potential for development and growth. She is currently leading the UNWTO work on the Sustainable Development Goals (SDGs) and after publishing the report: "Tourism and SDGs – a journey to 2030", she created the Tourism for SDGs (T4SDG) platform, a co-creation space for all, to make tourism a key sector for the 2030 Agenda.

Rich with experience in both developed and developing countries, her innovative thinking has been key to building responses to global challenges, formulating and developing sustainable policies and strategies at the regional, national and corporate level.

From 1993 to 2004, she worked in the Seychelles at the Ministry of Industry and the Ministry of Tourism and Transport, as Director of International Cooperation at regional and global levels, including with UNWTO and other institutions. In her position as co-chair of the UNWTO Programme Committee (representing 45 African Member States), she lobbied for the first UNWTO Programme for Africa, approved by the UNWTO Member States in 1997 for 10 years.

She started her career in France as Export Director for Groupe SOGEXPORT (Bank Societe Generale) in Paris, after completing her Psychology and Business Management studies in Strasbourg.