DA VENIAM SCRIPTIS QUORUM NON GLORIA NOBIS
CAUSA, SED UTILITAS OFFICIUMQUE FUIT

COLLEGIUM RAMAZZINI

ANNUAL RAMAZZINI DAYS

24-27 October, 2019
Carpi, Italy

Schedule of Events - Scientific Program - Abstracts by Session

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RAMAZZINI DAYS

WITH SPECIAL THANKS TO:

Istituto Ramazzini
COOPERATIVA SOCIALE ONLUS

CITTÀ DI CARPI

UNDER THE AUSPICES OF:

INAIL
Regione Emilia-Romagna
Provincia di Modena
Azienda USL di Modena
Istituto Ramazzini

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RAMAZZINI DAYS –SUMMARY SCHEDULE OF EVENTS

THURSDAY, 24 OCTOBER 2019

15:00-19:00 Conference check-in
Hotel Touring

19:00 Welcome aperitivo
Ristorante La Bottiglieria, Hotel Touring

19:45 Dinner
Ristorante La Bottiglieria, Hotel Touring

FRIDAY, 25 OCTOBER 2019

9:00-10:45 **Scientific Session I: Casale Monferrato: Lessons learned and the road ahead**
Sala delle Vedute, Palazzo dei Pio

10:45-11:00 Coffee Break

11:15-13:00 **Scientific Session II: Ongoing Experimental Studies at the Ramazzini Institute**
Sala delle Vedute, Palazzo dei Pio

13:00-14:30 Lunch
Ristorante La Bottiglieria, Hotel Touring

14:30-16:00 **Scientific Session III: The key characteristics approach to hazard identification**
Sala delle Vedute, Palazzo dei Pio

16:00-17:45 **Special Session: The Islands and the Whales'**
Sala delle Vedute, Palazzo dei Pio

17:45-20:00 Free time

20:00 Dinner
Ristorante La Bottiglieria, Hotel Touring

SATURDAY, 26 OCTOBER 2019

9:00 **Local Activity for Guests: Walking tour of Carpi**
Departure from the Lobby of the Hotel Touring

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9:00-12:30	**Council of Fellows** *Town Hall of Carpi*
13:00	Lunch *Ristorante La Bottiglieria, Hotel Touring*
14:30-15:45	**Scientific Session IV: Work of the Fellows Poster Session** *Sala delle Vedute, Palazzo dei Pio*
15:45-17:15	**Scientific Session V: Work of the Fellows Oral Presentations** *Sala delle Vedute, Palazzo dei Pio*
17:15-18:45	Free time
18:45-19:45	**Ramazzini Award and Ramazzini Lecture: Dr Richard Lemen** *Sala delle Vedute, Palazzo dei Pio*
19:45	Direct departure for social dinner *Bus pick-up at Hotel Touring: Ristorante il Narciso*

SUNDAY, 27 OCTOBER 2019

9:00-11:00	**Scientific Session VI: Work of the Fellows Oral Presentations** *Sala delle Vedute, Palazzo dei Pio*
11:00-11:30	Coffee
11:30-13:00	**Advocacy Planning and Collegium Ramazzini Standing Committee Meetings** *Sala delle Vedute, Palazzo dei Pio*
13:30	Farewell Lunch *Ristorante La Bottiglieria, Hotel Touring*

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RAMAZZINI DAYS 2019 – DETAILED SCIENTIFIC PROGRAM

FRIDAY, 25 OCTOBER 2019

9:00-10:45 **Scientific Session I: Casale Monferrato: Lessons learned and the road ahead**
Chair: L. Christine Oliver, USA
Session Monitor: Ellen K. Silbergeld, USA
Sala delle Vedute, Palazzo dei Pio

Casale Monferrato: Lessons learned and the road ahead
L. Christine Oliver, USA

A community in need of a novel approach to cure and care
Daniela Degiovanni, Italy

Focus on clinical and translational research in the mesothelioma unit of Alessandria and Casale Monferrato Hospitals
Federica Grosso, Italy

Asbestos related diseases epidemiology and surveillance in Italy: Road ahead and still open questions
Alessandro Marinaccio, Italy

Criminal prosecution of business executives for occupational cancer in Italy
Barry Castleman, USA

10:45-11:15 Coffee

11:15-12:45 **Scientific Session II: Ongoing Experimental Studies at the Ramazzini Institute**
Chair: Fiorella Belpoggi, Italy
Session Monitor: Karel Van Damme
Sala delle Vedute, Palazzo dei Pio

The contribution of in vivo experimental research to the knowledge of adverse effects of RFR on human health
Fiorella Belpoggi, Italy

New evidence on the effects of glyphosate exposure from in vivo studies and a historical agricultural cohort
Daniele Mandrioli, Italy; Jia Chen, USA; Melissa Perry, USA

Effects caused by pesticides on the the historical cohort of the Patecipanza Agraria in Emilia Romagna
Angela Guaragna, Italy

13:00-14:15 Lunch
Ristorante La Bottiglieria, Hotel Touring

14:30-16:00 **Scientific Session III: The key characteristics approach to hazard identification**
Co-Chairs: Martyn Smith (USA) and Lauren Zeise (USA)
Session Monitor: Kurt Straif
Sala delle Vedute, Palazzo dei Pio

Introduction to the key characteristics approach
Martyn Smith

The key characteristics approach to hazard identification
Martyn Smith

Key characteristics of endocrine-disrupting chemicals
Michele LaMerrill, USA

Application of the key characteristics of carcinogens in IARC Monographs
Kathryn Z. Guyton, France

Key characteristics of bioactive chemicals
Linda S. Birnbaum, USA

Key Characteristics Approach to Organizing and Assessing Upstream Toxicity Information
Lauren Zeise, USA

16:00-17:45 **Special Session: The Islands and the Whales**
Chair: Pal Weihe
Session Sponsor: Philippe Grandjean

The islands, the whales, and human health (with film screening)
Pal Weihe

17:45-20:00 Free time

20:00 Dinner *Ristorante La Bottiglieria, Hotel Touring*

DA VENIAM SCRIPTIS QUORUM NON GLORIA NOBIS
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SATURDAY, 26 OCTOBER 2019

9:00-12:30 **Council of Fellows** (Fellows and Emeritus Fellows only)
Town Hall of Carpi

13:00-14:15 Lunch
Ristorante La Bottiglieria, Hotel Touring

14:30-15:45 **Scientific Session IV: Work of the Fellows Poster Session**
Co-Chairs: Jonny Meyers & Casey Bartram
Sala delle Vedute, Palazzo dei Pio

Diagnostic challenges of mixed dust pneumoconiosis
Xaver Baur, Germany

Assessing the feasibility of preventing injury risks and improving work safety amongst factory workers in an urban slum: a participatory before-and-after intervention study: preliminary results
Grazia Caleo, UK

The discovery of PFOA pollution in the Veneto region
Laura Facciolo, Italy (hosted by Philippe Grandjean)

Effects of short and long-term alcohol-based fixation on Sprague-Dawley rat tissue morphology, protein and nucleic acid preservation
Federica Gnudi, Italy

Protecting decommissioning workers at hazardous remediation sites
Michael Gochfeld, USA

Asthmatic symptoms and airborne environmental pollution in the town of Terni, central Italy
Nicola Murgia, Italy

Are sunscreens efficient to prevent the effect of UV radiation?
Daniela Pelclova, Czech Republic

Ethical issues in cancer prevention: A different challenge for behavioral and environmental risk factors
Annie Jeanne Sasco, France

The analysis of longitudinal data from life-span carcinogenicity bioassays on Sprague-Dawley rats
Daria Sgargi, Italy

Dietary intake of acrylamide and risk of breast, endometrial and ovarian cancers: systematic review and dose-response meta-analysis
Tommaso Filippini, Italy

Exposure to inorganic selenium in drinking water and incidence of amyotrophic lateral sclerosis: a long-term follow-up of a natural experiment
Marco Vinceti, Italy

15:45-17:15 **Scientific Session V: Work of the Fellows Oral Presentations**
Chair: Xaver Baur
Session Monitor: Richard Duffy
Sala delle Vedute, Palazzo dei Pio

Mortality from silicosis in Brazil: Temporal trends in the period 1980-2017
Eduardo Algranti, Brazil

Radiographic changes in Colombian asbestos factory workers
Arthur Frank, USA

Severe silicosis outbreak in engineered stone fabrication workers - U.S. perspectives
Robert Harrison, USA

The first announcement of establishing The Japan Association of Occupational Health Law
Fujio Kayama, Japan

The triumph of doubt: Dark money and the science of deception
David Michaels, USA

Potential role of Army Medical Forces in fighting cancer: An untapped resource
Pier Giorgio Natali, Italy

Sibaté, Colombia: Another asbestos induced public-health crisis
Juan Pablo Ramos-Bonilla, Columbia

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17:15-18:30 Free time

18:30-19:30 **Ramazzini Award and Ramazzini Lecture**
Sala delle Vedute, Palazzo dei Pio

The 2018 Ramazzini Award will be conferred upon **Richard Lemen** in recognition of his more than four decades of dedication to the cause of protecting workers against occupational hazards and in particular recognition of his leadership and advocacy in protecting workers against asbestos.

Ramazzini Lecture
Yesterday, Today and Tomorrow.
Richard Lemen, USA

19:45 Return to hotel for departure for social dinner
Ristorante Il Narciso

***** "FALL BACK" one hour before going to bed – CEST goes into effect at 03:00 *****

SUNDAY, 27 OCTOBER 2019

9:00-10:00 **Scientific Session VI: Work of the Fellows Oral Presentations**
Sala delle Vedute, Palazzo dei Pio
Chair: Linda Birnbaum
Session Monitor: Yoram Finkelstein

Child labor among Syrian refugees living in Lebanon: A story of deprivation and neglect
*Rima R. Habib, Lebanon *(please check)*

The legacy of mercury poisoning and racism: The case of a First Nation community in Canada
Donna Mergler, Canada

20 years after the Libby Montana asbestos response: Past, current, and future issues
Aubrey Miller, USA

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10:00 Migrants' health at risk: The Mediterranean case and the public and environmental health agenda
Rodolfo Saracci, Italy

11:00-11:30 Coffee

11:30-13:00 Advocacy Planning and Collegium Ramazzini Standing Committee Meetings
Sala delle Vedute, Palazzo dei Pio

13:30 Farewell Lunch
Ristorante La Bottiglieria, Hotel Touring

DA VENIAM SCRIPTIS QUORUM NON GLORIA NOBIS
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SCIENTIFIC SESSION I

Casale Monferrato: Lessons learned and the road ahead

1. Casale Monferrato: Lessons learned and the road ahead *L. Christine Oliver, USA*

2. A community in need of a novel approach to cure and care *Daniela Degiovanni, Italy*

3. Focus on clinical and translational research in the mesothelioma unit of Alessandria and Casale Monferrato Hospitals *Federica Grosso, Italy*

4. Asbestos related diseases epidemiology and surveillance in Italy: Road ahead and still open questions *Alessandro Marinaccio, Italy*

5. Criminal prosecution of business executives for occupational cancer in Italy *Barry Castleman, USA*

Presentation title: Casale Monferrato: Lessons learned and the road ahead

Presenting Author: L. Christine Olliver

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3. Mesothelioma Unit, Azienda Ospedaliera SS Antonio e Biagio e Cesare Arrigo, Alessandria, Italy
4. Occupational and Environmental Epidemiology Unit, INAIL, Rome, Italy
5. Environmental Consultant, Garrett Park, USA

Presenting author profile:
Dr. Oliver is Adjunct Professor in the Division of Occupational and Environmental Health at the Dalla Lana School of Public Health, University of Toronto. Previously she cared for patients, taught, and did research at MGH/Harvard Medical School in Boston, with a focus on occupational/environmental lung disease. She consults with Occupational Health Clinics for Ontario Workers. Dr. Oliver is on the Scientific Advisory Board of ADAO. She testifies on behalf of injured workers.

Text of abstract:
Background: In 1992 the Italian Parliament approved a nationwide ban on asbestos. The ban was prompted in part by an epidemic of malignant pleural mesothelioma (MPM), a rare cancer caused by asbestos, in Casale Monferrato, a town of 40,000 in the Piedmont region of Italy. The source of asbestos was a plant owned and operated by Eternit, a multinational company that produced asbestos cement. Eternit established its principal Italian production plant in the Town of Casale Monferrato; the plant was in active production from 1907 to 1986. HIgh mortality and incidence rates of MPM were observed among workers in the plant, their wives and family members, and residents of Casale Monferrato Town and Local Health Authority. Risk for MPM increased with increasing cumulative asbestos exposure (CE) determined on the basis of occupationa., domestic, and environmental exposures, with increased risk observed a low-level CE: OR 4.4, 95% CI 1.7-11.3, CE < 1 f/ml-year (Ferrante et al. Occup Environ Med 2016). A sentinel marker for asbestos exposure, MPM has been the most carefully examined health outcome to date. There undoubtedly is an accompanying increase in related lung cancer, given the generally-accepted lung cancer/MPM ratio of 2 or greater.

Conclusions: Eternit brought unimaginable pain and suffering to the Community of Casale

Monferrato. But the Phoenix has risen from the ashes. There are unique public health lessons to be learned from this catastrophe. Here to teach us those lessons are the participating panelists. Three have been on the front lines dealing with medical, psychosocial, and epidemiologic consequences. One has worked with Italian prosecutors and courts struggling to bring former Eternit owner-CEO Stephan Schmidheiny to justice and seek justice for asbestos victims. We must apply the lessons learned to nations and communities around the world facing similar risks from unregulated asbestos use.

Presentation title: A community in need of a novel approach to cure and care

Presenting Author: Daniela Degiovanni

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2. Palliative Care Unit, Casale Monferrato, Italy
3. Mesothelioma Unit SS Antonio e Biagio e Cesare Arrigo, Alessandria, Italy

Presenting author profile:
Dr. Daniela Degiovanni received her degree in Medicine and Surgery in 1977 and her speciality in Oncology in 1982. Since 1978 she has been involved in assistance to patients with mesothelioma in Casale. She has been director of the Hospice and of the program of Home Palliative Care. She founded VITAS, a voluntary Association made up of doctors, nurses, psychologists and physiotherapists. For these activities in 2018 the President of the Italian Republic, Sergio Mattarella presented her the Ufficiale dell'Ordine al Merito award.

Text of abstract:
Background: Casale Monferrato is sadly known in the world for the ongoing malignant mesothelioma (MM) epidemic due to the pollution caused by Eternit, one of the biggest plants of asbestos-cement that was in production from 1907 to 1986 with more than 4000 employees. MM affected workers but also their wives and children and citizens who had nothing to do with the plant and new cases continue to be diagnosed (about 50 new cases per year). MM is a very symptomatic tumor that also causes psychological suffering both in patients and their relatives.
Methods: To face this overwhelming burden of pain we defined a novel approach where cure and care were closely interconnected. Experts in palliative care work together with specialists involved in the diagnostic and therapeutic workflow assisting the patients from diagnosis to the last days of their life. Simultaneous/palliative care are offered to all newly diagnosed patients and psychological aid is also available to their families. A not-for-profit organization, VITAS, has been founded to support the continuous activity of the palliative care team, including physicians, nurses, and physiotherapists, both in the Hospital and in patient's home.
Results: In our experience this model is feasible and very well accepted by patients and families that never feel abandoned. It is also very well integrated with the assistance provided by the specialists working in the hospital.
Conclusion: A novel and efficient model of assistance based on the strong permeation between cure and care has been built to face the global pain of asbestos victims in Casale M., once more demonstrating the resilience of this population.

Presentation title: Focus on clinical and translational research in the mesothelioma unit of Alessandria and Casale Monferrato Hospitals

Presenting Author: Federica Grosso

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3. VITAS NGO, Casale, Italy

Presenting author profile:
Dr. Grosso's clinical research focuses mainly on mesotheliomas and asbestos related cancers whereas her clinical activity includes the whole spectrum of rare cancers, above all mesothelioma, melanoma and sarcoma patients. She is contract professor at University of Piemonte Orientale where she teaches environmental diseases, consultant for the Association of Asbestos Victims and their relatives, (co)author of more than 60 papers in peer-reviewed medical journals.

Text of abstract:
Background: Every year about 50 new cases of Malignant Pleural Mesothelioma (MPM) are diagnosed in Casale, the incidence being more than 20 times higher than in the rest of Italy. Globally it is classified among rare cancers, sharing their typical problems in research, decision making and quality of patient care. In their fight against asbestos, Casale victims asked also for research.
Approach: Since 2013 a mesothelioma unit (MU) has been in place in Casale and Alessandria hospitals, connected with the University of Turin, pursuing a strong link between patientcare and research. Alessandria has a MPM biobank and a clinical trial center. Local clinicians are expert in treating MPM, and work within a multi-professional frame covering the whole diagnostic/therapeutic steps, simultaneous/palliative-care and psychological support. The Istituto Superiore di Sanità funded two efforts; one aiming at exporting this model to other areas and the other at creating a network among Italian centers, based on a common data base, to facilitate research.

Results: every year about 120 new patients are seen and more than 200 are cured or followed in the MU. More than 800 biological samples are stored in the biobank and almost 600 patients have been enrolled into clinical studies with more than 200 receiving experimental drugs. The MU also participates in many translational projects in collaboration with the University of Turin,

of East Piedmont and with the Mario Negri Institute that will be discussed in brief during the presentation.

Conclusion: The MPM epidemic of Casale is well known worldwide as one of the greatest industrial pollution-related disasters. The resilient reaction of the local community stimulated the health professionals to create a dedicated unit in which MPM patients can be cured, cared for and participate in clinical and translational research to increase the knowledge about this rare disease.

Presentation title: Asbestos related diseases epidemiology and surveillance in Italy: Road ahead and still open questions

Presenting Author: Alessandro Marinaccio

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Presenting author profile:
Dr. Marinaccio is chair of the Unit of Occupational and Environmental Epidemiology at Italian National Workers' Compensation Authority and of the Italian Mesothelioma Register. His research activities are focused on occupational cancers surveillance and asbestos related diseases epidemiology.

Text of abstract:
Background: In Italy the legacy of asbestos mining, manufacture and use in a wide range of applications is a still open issue. Starting from the Casale Monferrato experience, the purpose of this presentation is to discuss two critical points about the asbestos related diseases epidemiology: cases of malignant mesothelioma (MM) due to non-occupational exposure and the magnitude of asbestos related lung cancer.
Methods: ReNaM is the Italian surveillance system for MM incident cases and acts as a network of regional registries collecting cases from health care institutions and evaluating the modalities of exposure. The magnitude of asbestos related lung cancer cases has been quantified as shown through epidemiological published papers and by the means of a previous ecological study.
Results: Among the 27,356 mesothelioma cases collected by ReNaM between 1993 and 2015, exposure to asbestos fibers was investigated for 21,387 (78.2%), identifying 1,047 (4.9%) with familial exposure and 939 (4.4%) with environmental exposure. Clusters of cases due to environmental exposure are mainly related to the presence of asbestos-cement industry plants, shipbuilding and soil contamination (Biancavilla in Sicily). The epidemiology of asbestos-related lung cancer (ARLC) cannot be investigated directly because cases are not clinically distinguishable from those due to other causes. Mesothelioma to ARLC ratio was estimated to be closer to 1:1 in ecological studies, but these findings must be evaluated with caution.
Conclusions: It is necessary to define policies for increasing prevention tools and for dealing with compensation rights for malignant mesothelioma cases that received non-occupational exposure to asbestos. The epidemiological knowledge of ARLC magnitude is inadequate and there is a need to define epidemiological methods to better estimate the extent at the population national level. The Italian experience of mesothelioma registration can be used for extending the surveillance system to all asbestos-related neoplasms.

Presentation title: Criminal prosecution of business executives for occupational cancer in Italy

Presenting Author: Barry Castleman

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Presenting author profile:
Dr. Castleman has investigated the public health and corporate history of the asbestos industry. At the request of the community of Casale Monferrato, where a giant asbestos factory had operated for 80 years, he testified as an expert witness in the original Eternit criminal trial in Turin, concerning Eternit owner-executive Stephan Schmidheiny.

Text of abstract:
Background: Law dating from 1930 in Italy establishes the responsibility of the employer's managers and doctors. A "negligent" crime is punishable by imprisonment, in the event of accident, occupational disease or death of one or more workers from management failure to take reasonable preventive measures. Since 1977, prosecutions have charged managers over bladder cancers in dye workers, liver angiosarcoma in vinyl chloride workers, and mesothelioma among asbestos workers.
Methods: The current status of the trials and the refusal (2013-2019) of Yale University to rescind an honorary Doctor of Humane Letters awarded to Schmidheiny (1996) will be discussed.

Results: In the case of asbestos, trials starting with Italian managers came to include longtime owner-CEO of the Swiss Eternit Group, multibillionaire Stephan Schmidheiny. Evidence showed that Schmidheiny directed a cover-up by his managers of the dangers in European countries, including Italy, from the time he took control of the global asbestos enterprise in 1976.
Discussion: Schmidheiny was convicted of creating an environmental disaster causing several thousand deaths of workers, their family members, and neighbors of Italian Eternit plants making asbestos-cement sheets and pipes. The conviction was upheld by the appeals court in 2013, sentencing Schmidheiny to 18 years in jail. This was overturned over a legal technicality in 2014 in the last appeal. That year, murder charges for over 250 deaths were filed by Turin prosecutors; this action was contested for 4 years by Schmidheiny's lawyers. Courts ordered that separate manslaughter trials be held in each of 4 regions of Italy where the deaths occurred. The first case, involving two deaths, was tried in Turin and resulted in conviction and a sentence of 4 years in jail in May, 2019. Schmidheiny never appeared in Italy during these trials, which began in 2009.

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SCIENTIFIC SESSION II

Ongoing Experimental Studies at the Ramazzini Institute

1. The contribution of in vivo experimental research to the knowledge of adverse effects of RFR on human health *Fiorella Belpoggi, Italy*

2. New evidence on the effects of glyphosate exposure from in vivo studies and a historical agricultural cohort *Daniele Mandrioli, Italy; Jia Chen, USA; Melissa Perry, USA*

3. Effects caused by pesticides on the the historical cohort of the Patecipanza Agraria in Emilia Romagna *Angela Guaragna, Italy*

Presentation title: The contribution of in vivo experimental research to the knowledge of adverse effects of RFR on human health

Presenting Author: Fiorella Belpoggi

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Presenting author profile:
Dr. Fiorella Belpoggi is the Director of the Research Department at the Ramazzini Institute, where she has worked since 1981. Her research interests include short and long term toxicity studies on chemicals and physical agents: food additives, solvents, packaging plastics, pesticides, hormones and prescription drugs, vitamins, fuels constituents and additives, endocrine disruptors, asbestos and its substitutes, herbs. gamma radiation, electromagnetic fields from power lines and radio base stations.

Text of abstract:
Background: The proliferation of cellular antennas and other radiofrequency radiation (RFR) generating devices of the last decades has led to more and more concerns about the potential health effects from RFR exposure. Since the 2011 classification as probable carcinogen by the International Agency for Research on Cancer (IARC), more experimental studies have been published that support a causal association between RFR exposure and health hazards.

Methods: We reviewed the results of both the carcinogenic and the reproductive/developmental hazards of RFR emerged from in vivo experimental studies on mammals.

Results: As regard cancer risk, two long-term experimental studies have been recently published by the US National Toxicology Program (NTP) and the Italian Ramazzini Institute (RI). Despite important experimental differences, both studies found statistically significant increases in the development of the same type of very rare glial malignant tumors. In addition to carcinogenicity, reproductive organs might be particularly exposed as well as sensitive to RFR: Seminiferous tubules, spermatozoa and Leydig cells are the main targets of this damage, and sperm count, motility and morphology represent the more frequently affected parameters.

Conclusions: According to NTP there is now clear evidence that RFR causes cancer in experimental animals. RFR re-evaluation have been also listed as a priority by IARC [101].

There is also stronger evidence that RFR exposure is responsible for causing alteration of various sperm parameters, thus affecting male fertility. Although a clear quantification of the carcinogenic and reproductive risk is still lacking, these animal findings suggest that precautionary approach should be promoted by regulatory and health agencies, specially for children and pregnant women. Caution should also be considered in the development and spread of the upcoming 5G technology, particularly in light of the proposed higher frequencies and intensities of the signal. Long-term animal studies are urgently necessary to verify the possible health effects

Presentation title: New evidence on the effects of glyphosate exposure from in vivo studies and a historical agricultural cohort

Presenting Author: Daniele Mandrioli, Jia Chen, Melissa Perry

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Presenting author profile:
Dr. Mandrioli is Associate Director of the Cesare Maltoni Cancer Research Center, Ramazzini Institute. Dr. Jia Chen is Professor in the Departments of Environmental Medicine and Public Health, Pediatrics and Oncological Sciences at the Icahn School of Medicine at Mount Sinai. Dr. Melissa J Perry is Professor and Chair, Department of Environmental and Occupational Health at the Milken Institute School of Public Health of the George Washington University. Each presents an aspect of the work.

Text of abstract:
Background: The current toxicologic in vivo assessment of chronic, low level glyphosate-based herbicide (GBHs) exposure in rats represents the first phase of the Global Glyphosate Study. Additionally, to assess historical glyphosate exposure in humans, we examined urine samples from a biorepository of specimens collected from US dairy farmers between 1997 and 98.

Methods: We treated Sprague-Dawley (SD) rats with glyphosate alone or its formulation Roundup Bioflow starting from prenatal life until adulthood with a dose of glyphosate equivalent to the United States Acceptable Daily Intake (US ADI) of 1.75 mg/kg bw/day, administered orally via drinking water.

Using a standardized protocol for LC-MS/MS performed on blinded samples by a certified commercial laboratory, we compared urinary concentrations of glyphosate and AMPA in urine

from farmers who self-reported glyphosate application in the 8 h prior to sample collection to samples from farm applicators who did not report using glyphosate (LC-MS/MS).

Results: Exposure to GBHs at doses considered safe in humans (US ADI) altered the gut microbiota of rats in early development, particularly before the onset of puberty. Exposure to GBHs was also associated with a statistically significant increase in micronuclei, statistical significant increase of anogenital distance (AGD) in males and females, delay of first estrous and increased testosterone in females.

Of 18 farmer samples tested, 39% showed detectable levels of glyphosate (mean concentration 4.04 μg/kg; range:1.3-12) compared to 0% detections among 17 non glyphosate applicator samples (p-value < 0.01).
Conclusions: The pilot phase of the Global Glyphosate Study revealed that GBHs were able to alter certain important biological parameters, mainly relating to sexual development, genotoxicity and the alteration of the intestinal microbiome. Whereas recent exposure assessment studies have demonstrated GBH exposure in contemporary samples of humans exposed either occupationally or environmentally, these data provide an historical perspective, showing glyphosate exposures were occurring occupationally 20 years ago.

Presentation title: Effects caused by pesticides on the the historical cohort of the Patecipanza Agraria in Emilia Romagna.

Presenting Author: Angela Guaragna

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Presenting author profile:
Dr. Angela Guaragna is the Director of the Cancer Prevention Center of the Ramazzini Institute (RI), Bologna, Italy.

Text of abstract:
The Partecipanza Agraria (Agricultural Participation) is an ancient form of collective ownership of land involved in land reclamation, which originates from the Middle Ages , still in use in Emilia-Romagna and Veneto in the Polesine di Rovigo. The genetic background of the Partecipanza Agraria of the Emilia Romagna region have been extensively studied by the University of Bologna.

Methods: The study will involve at least 100 adult male subjects over 55 years of age from the Partecipanza Agrarie of the Emilia Romagna, including Cento and Sant'Agata Bolognese. The levels in the urine of the following pesticides will be screened: Glyphosate, Boscalid, Azoxystrobin, Imidacloprid. The subjects will undergo a yearly detailed anamnestic, laboratory and imaging investigation in order to assess their health status.

Results: Now the Ramazzini Institute aims to study the burden of exposure and the effects of pesticides in the Partecipanza Agraria of the Emilia Romagna and provide, in collaboration with the University of Bologna, a comprehensive analysis of the interplay between genetics and environmental exposures in this population.

Conclusions: The Ramazzini Institute aims to establish a longitudinal study on the effects of pesticide in the historical cohort of the Partecipanza Agraria. The support form Horizon 2020 and other local and international funders will be fundamental to support the study long-term and extend the study to more individuals of the Partecipanza Agraria of the Emilia Romagna region.

DA VENIAM SCRIPTIS QUORUM NON GLORIA NOBIS
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SCIENTIFIC SESSION III

The key characteristics approach to hazard identification

1. Introduction to the key characteristics approach *Martyn Smith*

2. The key characteristics approach to hazard identification *Martyn Smith*

3. Key characteristics of endocrine-disrupting chemicals *Michele LaMerrill, USA*

4. Application of the key characteristics of carcinogens in IARC Monographs *Kathryn Z. Guyton, France*

5. Key characteristics of bioactive chemicals *Linda S. Birnbaum, USA*

6. Key Characteristics Approach to Organizing and Assessing Upstream Toxicity Information *Lauren Zeise, USA*

Presentation title: Introduction to the key characteristics approach

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1. University of California at Berkeley, Berkeley, CA USA

Presenting author profile:
Martyn Smith is a Professor of Toxicology and Cancer Epidemiology in the School of Public Health at the University of California Berkeley. He received his Ph.D. in Biochemistry from St. Bartholomew's Hospital in London and did post-doctoral training in toxicology at the Karolinska Institute in Stockholm. Dr. Smith is a laboratory scientist with expertise in molecular epidemiology, toxicology and genomics, and his research is aimed at finding the causes of chronic diseases, including cancer.

Text of abstract:
Background: The key characteristics (KCs) of human carcinogens were recently introduced as the basis of a uniform approach for searching, organizing, and evaluating mechanistic evidence to support cancer hazard identification. The KCs comprise the properties of known human carcinogens, including their ability to, be genotoxic; be immunosuppressive; or modulate receptor-mediated effects. Established human carcinogens commonly exhibit one or more of these characteristics, and therefore, data on these characteristics can provide independent evidence of carcinogenicity when human data are lacking. Such data can also help in interpreting the relevance and importance of findings of cancer in animals and in humans.
Method/Approach/Results: In its 2017 report on "Using 21st Century Science to Improve Risk-Related Evaluations", the National Research Council (NRC) recently opined that the KCs approach "avoids a narrow focus on specific pathways and hypotheses and provides for a broad, holistic consideration of the mechanistic evidence." Th NRC further suggested that KCs be developed for other endpoints, such as endocrine disruption and reproductive toxicity. These KCs have recently been published and KCs for neurotoxicants are being developed.
Conclusions: The KC approach holds great potential to improve hazard identification and risk assessment, but still needs to be further developed, especially regarding its potential for helping analyze the toxic effects of untested chemicals and chemical mixtures in cell culture and experimental animals. Unfortunately, the current Tox21 and Toxcast repertoire of assays are mostly lacking in relevance to the KCs, as are most clinical biomarkers. Approaches to developing a new set of high-throughput tests and biomarkers will be described along with a discussion of the use of the key characteristics approach in hazard identification and risk assessment instead of, or in addition to, the current Mode of Action/Adverse Outcome Pathway (MOA/AOP) approach.

Presentation title: The key characteristics approach to hazard identification

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Martyn Smith is a Professor of Toxicology and Cancer Epidemiology in the School of Public Health at the University of California Berkeley. He received his Ph.D. in Biochemistry from St. Bartholomew's Hospital in London and did Post-Doctoral training in toxicology at the Karolinska Institute in Stockholm. Dr. Smith is a laboratory scientist with expertise in molecular epidemiology, toxicology and genomics, and his research is aimed at finding the causes of chronic diseases, including cancer.

Text of abstract:
Background. The key characteristics (KCs) of carcinogens reflect the chemical and biological properties of cancer-causing agents and were introduced in 2015 to provide a common basis for assembling and evaluating mechanistic evidence to support cancer hazard identification. They are becoming increasingly used by multiple authoritative bodies, including IARC, NTP and regulatory agencies. One important aspect of using the key characteristics to assemble data relevant to carcinogenic mechanisms is that an a priori hypothesis about the mechanism of action is not required. Instead, the key characteristics are based on the common properties of known carcinogens, and avoid "a narrow focus on specific pathways and hypotheses" and instead "provides for a broad, holistic consideration of the mechanistic evidence" (National Academy of Science, 2017). This same 2017 National Academy of Sciences report recommended that the KCs approach be expanded to other endpoints, including reproductive effects, endocrine disruption and cardiovascular disease. In 2018, 3 working groups have developed KCs for endocrine disrupting chemicals (EDCs), and male and female reproductive toxicants. A group recently met to develop KCs for neurotoxicants.

Methods. The speakers are: Martyn Smith (UC Berkeley), Introduction to the KC Approach; Michele LaMerrill (UC Davis), KCs of EDCs; Kathryn Guyton (IARC), Application of the KCs

of Carcinogens in IARC Monographs; Linda Birnbaum (retired), KCs of Bioactive Chemicals; Lauren Zeise (OEHHA), KC Approach to Organizing and Assessing Upstream Toxicity Information.

Results/Conclusion. We describe the development and application of KCs for carcinogens, EDCs and reproductive toxicants and discuss their application at IARC and elsewhere.

Presentation title: Key characteristics of endocrine-disrupting chemicals

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Presenting author profile:
Michele A. La Merrill earned her Ph.D. in Toxicology from the University of North Carolina, Chapel Hill and her M.P.H. in epidemiology at the Mount Sinai School of Medicine. Dr. La Merrill is an Associate Professor of Environmental Toxicology at the University of California, Davis. She served on an International Agency for Research on Cancer Monograph that evaluated pesticides as potential carcinogens and is a current appointee of the California Carcinogen Identification Committee.

Text of abstract:
Background: Endocrine-disrupting chemicals (EDCs) are exogenous chemicals that interfere with hormone action, thereby increasing health risks, e.g., for cancer, reproductive impairment, cognitive deficits, and obesity. A complex literature of mechanistic studies provides evidence on EDC hazard, yet there is no widely accepted, systematic method to integrate these data to help identify EDC hazards.
Methods/Approach/Results: Inspired by work to improve hazard identification of carcinogens using key characteristics (KCs), we have developed 10 KCs of EDCs based on our knowledge of hormone actions and EDC effects as follows: 1) Interacts with or activates hormone receptors, 2) antagonizes hormone receptors; 3) alters hormone receptor expression; 4) alters signal transduction in hormone receiving cells; 5) induces epigenetic modifications in hormone producing or receiving cells; 6) alters hormone synthesis; 7) alters hormone transport across cell membranes; 8) alters hormone distribution or circulating hormone levels; 9) alters hormone metabolism or clearance; and 10) alters fate of hormone producing or receiving cells. We describe the logic by which these KCs are identified and the assays that could be used to assess several of these KCs.

Conclusions: We reflect on how these 10 KCs can be used to identify, organize and utilize mechanistic data when evaluating chemicals as EDCs, and use diethylstilbestrol, bisphenol A, and perchlorate as examples to illustrate this approach.

Presentation title: Application of the key characteristics of carcinogens in IARC Monographs

Presenting Author: Kathryn Z. Guyton

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Presenting author profile:
Dr. Guyton is a Senior Toxicologist at the International Agency for Research on Cancer (IARC), where she contributes leadership and expertise in toxicology and carcinogen mechanisms to the Monographs, an authoritative reference on the causes of human cancer. Dr. Guyton earned her BA (cum laude) and her PhD degrees from Johns Hopkins University, and completed her postdoctoral training at the National Institutes of Health. Dr. Guyton has been certified as a Diplomate of the American Board of Toxicology since 1998.

Text of abstract:
Background: The key characteristics (KCs) of carcinogens have recently been introduced to facilitate systematic consideration of mechanistic evidence in IARC Monograph evaluations. Methods/Approach/Results: KCs have been applied in evaluations of more than 50 mechanistically diverse chemicals and complex exposures classified into Groups 1, 2A, 2B, and 3 by IARC Monographs expert Working Groups since 2015. Further, in 2019 amendments, the IARC Monographs Preamble has adopted an approach based the KCs approach. Because they are based on empirical observations of properties associated with known carcinogens rather than on an a priori hypothesis about a mechanism of action, the KCs provide an agnostic and unbiased survey of the mechanistic literature. This improved uniformity across evaluations of mechanistically diverse agents reveals strengths as well as gaps in evidence and highlights mechanistic similarities and differences. However, some challenges, including in interpreting evidence on individual KCs were also identified and are addressed in the amended Preamble. For instance, as non-carcinogens can also induce oxidative stress, and thus evidence of this KC alone should be interpreted with caution. The Preamble also provides guidance on evaluating the quality of study design, exposure assessment methods, and biologic assay validity and reliability for human mechanistic studies. Similarly, quality considerations are emphasized in the review of studies in experimental systems.

Conclusions: In all, the KCs approach provides for a rigorous review of the relevant mechanistic evidence. In the Preamble revision, this approach was taken forward to harmonize approaches to

evidence evaluation across scientific disciplines, leading to a single-step integration of mechanistic, animal bioassay, and human cancer evidence streams. As such, the amended

Preamble includes important advancements to prepare for future advances in molecular research aimed at identifying the causes of human cancer, the first step in cancer prevention.

Presentation title: Key characteristics of bioactive chemicals

Presenting Author: Linda S. Birnbaum

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Presenting author profile:
Dr. Birnbaum has just retired from the US government after 40 years of service. For the past 10+ years, she has been Director of the NIEHS and NTP. She is former President of the Society of Toxicology, Vice-President of the International Union of Toxicology, and Chair of the Division of Toxicology in the American Society of Pharmacology and Therapeutics. She is a member of the US National Academy of Medicine and the Collegium Ramazzini.

Text of abstract:
Background: The great majority of synthetic chemicals have never been tested for their biological activity. For the relatively small number (
Approach: Their bioactivity may be driven by Key Characteristics of Bioactivity, which parallel many of the key characteristics of carcinogens (KCs), reproductive toxicants, and endocrine disruptors. Some of these include: receptor binding; interaction with DNA; induction of epigenetic alterations; electrophilic or metabolic activity; induction of oxidative stress. Other characteristics may include bioaccumulation, biopersistence, and resistance to biotransformation. A chemical need not possess all characteristics to be bioactive.

Results: How the bioactivity of a chemical will be manifested is determined by the dose and many other factors such as the inherent susceptibility of the organism (e.g., age, sex, genetics, past history), and the timing of the exposure, such as acute high level vs chronic low dose.
Conclusions: By understanding the KCs of bioactive environmental chemicals, we hope to better understand the mechanistic basis of chemical hazards and target limited research resources to answer questions that the public and regulators can use to make better health-protective decisions.

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SCIENTIFIC SESSION IV

Work of the Fellows (Poster Session)

1. Diagnostic challenges of mixed dust pneumoconiosis *Xaver Baur, Germany*

2. Assessing the feasibility of preventing injury risks and improving work safety amongst factory workers in an urban slum: a participatory before-and-after intervention study: preliminary results *Grazia Caleo, UK*

3. The discovery of PFOA pollution in the Veneto region *Laura Facciolo, Italy*

4. Effects of short and long-term alcohol-based fixation on Sprague-Dawley rat tissue morphology, protein and nucleic acid preservation *Federica Gnudi, Italy*

5. Protecting decommissioning workers at hazardous remediation sites *Michael Gochfeld, USA*

6. Asthmatic symptoms and airborne environmental pollution in the town of Terni, central Italy *Nicola Murgia, Italy*

7. Are sunscreens efficient to prevent the effect of UV radiation? *Daniela Pelclova, Czech Republic*

8. Ethical issues in cancer prevention: A different challenge for behavioral and environmental risk factors *Annie Jeanne Sasco, France*

9. The analysis of longitudinal data from life-span carcinogenicity bioassays on Sprague-Dawley rats *Daria Sgargi, Italy*

10. Dietary intake of acrylamide and risk of breast, endometrial and ovarian cancers: systematic review and dose-response meta-analysis *Tommaso Filippini, Italy*

11. Exposure to inorganic selenium in drinking water and incidence of amyotrophic lateral sclerosis: a long-term follow-up of a natural experiment *Marco Vinceti, Italy*

Presentation title: Diagnostic challenges of mixed dust pneumoconiosis

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Presenting author profile:
Dr. Baur is retired chair, Occupational Medicine at the University Hamburg and currently president of the European Society for Environmental and Occupational Medicine.

Text of abstract:
Background: Exposures to multiple, mixed inorganic dusts occur in many worksites. Such exposures initiate inflammatory and fibrotic processes in the lung. By taking a detailed occupational history the diagnosis of leading pneumoconioses such as silicosis or asbestosis with typical radiologic pictures is mostly not difficult, e.g. when rounded or irregular opacities located in the upper and lower lung fields, respectively, dominate. However mixed dust exposures, e.g. quartz and carbon in hard coal mines, quartz, asbestos, various other components of cement and concrete dusts in the construction industry, may lead to considerable modification of the radiological and histopathololological pictures. This is associated with diagnostic difficulties, especially with regard to the differential diagnosis of idiopathic pulmonary fibrosis subtypes.
Methods: The files of our outpatient department were searched for patients diagnosed as mixed dust pneumoconiosis.

Results: Five patients were identified whose detailed diagnostic workup during social court litigations (i.e.detailed clinical and occupational history, computed tomography, lung function testing, in one also case lung histology and dust analyses) demonstrated mixed dust pneumoconiosis. Dominating causative substances were quartz (3), quartz plus silicates (1), talkum (1), quartz plus aluminum compounds and silicon carbide (1), which were always combined with various other inorganic material. All cases were initially misdiagnosed as idiopathic pulmonary fibrosis because the assumed typical silicosis or asbestosis pattern was not visible in radiological examinations.

Conclusions: Diagnosis of interstitial lung disorders should always include a detailed occupational history that adequately considers that various inorganic dust exposures may cause mixed-dust pneumoconiosis with a broad spectrum of abnormal lung morphology.

Presentation title: Assessing the feasibility of preventing injury risks and improving work safety amongst factory workers in an urban slum: a participatory before-and-after intervention study: preliminary results

Presenting Author: Grazia Caleo

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Presenting author profile:
Dr. Caleo is a Medical Doctor, and Public Health Specialist. She is the Public Health Advisor for Medecins Sans Frontieres (MSF)supporting research/interventions in Haiti, DRC, CAR, Guinea, Zambia, Niger, and Sierra Leone. In Bangladesh she worked extensively the MSF Occupational Health project to improve work safety and access to care.Grazia studied Epidemiology and Tropical Medicine at the London School of Hygiene and Tropical Medicine (LSHTM). She was an EPIET fellow and worked as consultant for WHO.

Text of abstract:
Background: In Bangladesh an estimated 11.7 thousand workers suffer from fatal incidents and 24.5 thousand die from work-related diseases each year. Whilst addressing occupational injury and disease has been declared a national priority, there remains a critical lack of interventions to mitigate workplace risks. We aim to assess the feasibility of collaborating with factory owners/workers to design and implement occupational health interventions to improve work safety in two metal factories in Kamrangirchar, Dhaka.

Methods: We designed a participatory, mixed methods before-and-after study articulated over three phases. We present the preliminary analysis of data gathered during the first phase of the study. This documents the dynamic nature of incidents, near miss events, injury, hazards and ergonomics risks, and workers' perceptions and experiences of injury and risks, and aims to

inform the design of appropriate intervention packages. Quantitative data were collected through hazard and ergonomics assessments, clinical data and surveillance. Qualitative data were collected using in-depth interviews. Data collected with different methods were integrated at multiple points, and findings from all data sets were triangulated at the end of the first phase.

Results: Overall 67 workers participated in the study. 166 incidents and 129 (77%) injuries occurred. Triangulation of findings consistently identified machine operators and children under 18 years old to be most at risk, poor ergonomics and a lack of personal protective equipment as the main risks. Workers recognised these risks but accepted them as an inevitable part of their work, largely due to practical barriers to mitigating them.

Conclusions: It was feasible to implement the study in collaboration with owners/workers. Incidents are frequent and identified risks are mitigable. Intervention packages will be finalized with owners/workers during phase two of the study. Findings will inform the development of a model that could be implemented more widely in Kamrangirchar or similar neglected contexts.

Presentation Title: The discovery of PFOA pollution in the Veneto region

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Presenting author profile:
Laura Facciolo is Scientific Counselor of "Mamme No PFAS" (No PFASs MUMs), a group of citizens living in the so-called "Red Zone" of Veneto where, at the beginning of 2017, the 350.000 inhabitants suddenly discovered to have been highly exposed to PFASs due to serious contamination by wastewater from PFAS manufacture that reached the groundwater and also the Po river. Laura has a degree in Pharmaceutical Chemistry and lives in Montagnana (Padua).

Text of abstract:
Background: Serious PFAS pollution was discovered in the Veneto region that affected the Venetian aquifer system in the high plain at the foot of
the Prealps. Even the Po River was found to be affected.
Approach: The Mamme No PFAS organization was formed to inform residents on exposure sources, adverse health risks, and prevention efforts, and it is working with governmental agencies to remediate the problems and provide better protection against such pollution in the future. The organization is also working with scientists to obtain better documentation on health effects and to discover possible ways to lower PFAS levels in the body. The company responsible for the pollution will now be sued.

Results: The production company apparently knew of the environmental dissemination in 2006. However, in connection with a health study of teenagers, elevated blood concentrations of PFAS were found in 2017. The unexpected news of serious pollution with persistent chemicals was a shock to the affected population. The citizen group is providing links between exposed residents, scientists, and government, thereby empowering the people affected by the pollution and stimulation research and prevention. This development therefore illustrates the impact of environmental pollution seen from the side of the exposed people.

Conclusions: The early experience from the PFAS pollution in Veneto suggests that improved collaboration between scientists and exposed communities is crucial and also feasible. It also suggests that joint efforts are needed to obtain better prevention of chemical exposures in the future and worldwide.

Presentation title: Effects of short and long-term alcohol-based fixation on Sprague-Dawley rat tissue morphology, protein and nucleic acid preservation

Presenting Author: Federica Gnudi

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Presenting author profile:
Dr Gnudi is a postdoctoral researcher at the Cesare Maltoni Cancer Research Center, Ramazzini Institute, and she works in the pathology unit. Her work involve mainly the optimization of different procedures as IHC staining methods for protein pattern distribution analysis in order to provide technical, collaborative and consultative pathology support.

Text of abstract:
Background: Safety concerns the toxic and carcinogenic effects of formalin exposure have drawn increasing attention to the search for alternative low risk fixatives in laboratories worldwide. Alcohol-based fixatives are considered some of the most promising alternatives.

Methods: We evaluated the performance of alcohol-fixed paraffin-embedded samples from Sprague-Dawley rats, analyzing tissue morphology, protein and nucleic acid preservation, after short and extremely long fixation times. Formalin-fixed paraffin-embedded samples were used as a comparator fixative.

Results: Short and long-term alcohol fixation as well gave generally comparable and satisfactory results regarding the structural status of tissues evaluated by scoring stained sections. Immunoreactivity of proteins, evaluated by immunohistochemistry, showed satisfactory results until 1 year. Alcohol fixation was superior compared to formalin, in terms of quantity of nucleic acid extracted from paraffin blocks, even after long time in alcohol.

Conclusions: Our results confirm that alcohol fixation is a suitable and safe alternative to formalin. There is a need for standardization of formalin-free methods and harmonization of diagnosis worldwide.

Presentation title: Protecting decommissioning workers at hazardous remediation sites

Presenting Author: Michael Gochfeld

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Presenting author profile:
Dr. Gochfeld is professor emeritus at the Rutgers Robert Wood Johnson Medical School. He is an occupational physician and environmental toxicologist with interests in toxic waste remediation and heavy metal exposures. Dr. Burger is Distinguished Professor of Biology at Rutgers with an emphasis on ecological risk assessment and management. Both are founding participants of the Consortium for Risk Evaluation with Stakeholder Participation (CRESP), that provides technical expertise, risk communication, and research support to the U.S. Department of Energy (DOE).

Text of abstract:
Background: "Decommissioning", particularly the end of life decontamination and demolition of nuclear facilities and waste sites, has become a growth industry. The U.S. Department of Energy's (DOE) nuclear weapons legacy at Hanford, Washington poses a huge remediation task with many challenges.
Methods: To help DOE anticipate and prevent worker risks, the multi-university/multi-disciplinary Consortium for Risk Evaluation with Stakeholder Participation (CRESP) team investigated the hazards facing decommissioning workers engaged in remediation of the Hanford tank farms, waste sites, and plutonium production facilities.

Results: DOE espouses a safety culture with responsibilities devolving on every level of subcontractors. This approach embodies sound principles when implemented consistently but incentivizes under-reporting. CRESP divided remediation hazards into 3 classes, each with its dedicated professionals: A: acute blast, burn, or radiation injury due to disasters (explosions, fires, collapses), the domain of Nuclear Safety; B: radiation and toxic chemical exposures from site-specific hazards, the domain of industrial hygiene (IH); C: industrial-type accidents, the domain of industrial safety. DOE has a well-established but incomplete protocol for Documented Safety Analyses (DSA) for each remediation project. Workers close to a Class A source have a

high risk of injury or death, but DSAs estimate the initiating events as "highly unlikely" or less, hence estimate risks to workers as "low". For Class B exposures, DOE and contractors emphasize radiation detection and personal protection, usually effectively. However, worker reports of illnesses from "vapors" at the tank farms are discounted because of inadequate IH. Class C accidents, including vehicles, struck-by, slips-trips-falls, are reported at a low rate. The DSA's specifically exclude consideration of class C when estimating risks for a remediation project. The rationale is that these workers would be doing the same work elsewhere.

Conclusion: All three professional domains need to be involved in evaluating risks to workers for each remedy being evaluated at each contaminated facility whether, in the public or private sector.

Presentation Title: Asthmatic symptoms and airborne environmental pollution in the town of Terni, central Italy

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Presenting author profile:
Nicola Murgia is Associate Professor of Occupational Medicine at the University of Perugia, Italy. His research focuses mainly on occupational and environmental respiratory diseases, in particular on the epidemiology of occupational and environmental lung diseases and on the development of non-invasive methods to study the effects of occupational risk factors on the respiratory system.

Text of abstract:
Background: Airborne pollution is a risk factors for asthma symptoms. In the town of Terni, Central Italy, there are a large steel factory, other industries and a busy highway. Registry data suggest an increase in mortality and morbidity for respiratory diseases in Terni, but more detailed data are lacking. The aim of this study is to evaluate, by a re-analysis of the "Study on Allergy and Respiratory Health in Adults" (SARA) survey, the impact of environmental pollution on asthmatic symptoms.
Methods: 1660 subjects living in Terni municipality answered the SARA questionnaire, containing questions on socio-demographics characteristics and health- related outcomes. Having one or more asthmatic symptoms in the last 12 months was the main outcome of interest. Subjects reporting living close by an industrial area (< 500 m) and a busy road were considered at higher risk of airborne pollution. Chi- square test was used for categorical data and logistic regression models were used to assess the influence of environmental pollution on symptoms.

Results: More subjects at higher risk of environmental pollution reported asthmatic symptoms (32.1% vs 26.4%, p=0.016). In the regression model, adjusted for sex, age, atopy, smoking and occupational status, there was an association between pollution and asthma symptoms that was of borderline statistical significance (OR 1.24, 95%CI 0.97-1.60). Including in the model the reported residence (urban vs rural) did not change the results.

Conclusions: Previous results from SARA were not conclusive on the relationship between respiratory symptoms environmental pollution; our results, considering subjects exposed to different sources of pollution at the same time, suggest an association between environmental exposures and asthmatic symptoms in these circumstances. Given the weakness of a postal questionnaire in assessing the exposure, further studies using more objective and robust indicators of exposure are needed.

Presentation title: Are sunscreens efficient to prevent the effect of UV radiation?

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Professor Daniela Pelclová, M.D., Ph.D., FEAPCCT is emeritus head of the Department of Occupational Medicine, Charles University, Prague and is the Head of the Toxicological Information Centre for the Czech Republic. Her research interests are occupational toxicology, occupational pneumology, diagnostic criteria of occupational diseases and new occupational risks, such as nanoparticles exposure in workers and researchers.

Text of abstract:
Background: UV radiation is a frequent occupational exposure in many jobs outdoor. Our study tested the efficiency of nanoTiO2 sunscreen to prevent the oxidative stress/inflammation caused by ultraviolet (UV) radiation using biomarkers in volunteers' blood.
Methods: Six identical subjects participated in three tests: A) nanoTiO2 sunscreen; B) UV radiation; C) sunscreen + UV. The first samples were collected on day 1 before the test and the second samples after sunscreen application and/or UV exposure. On day 4, the third samples were collected, and the sunscreen was washed off. The fourth samples were collected one week later, on day 11.
In all 3 studies, following biomarkers of oxidative stress and inflammation were measured using liquid chromatography-electrospray ionization-tandem mass spectrometry: malondialdehyde, 4-hydroxy-trans-hexenal, 4-hydroxy-trans-nonenal, aldehydes C6-C12, 8-isoProstaglandin F2α, o-tyrosine, 3-chlorotyrosine, 3-nitrotyrosine, 8-hydroxy-2-deoxyguanosine, 8-hydroxyguanosine, 5-hydroxymethyl uracil, and leukotrienes (LT).

Results: Sunscreen alone did not elevate plasma markers in study A, but UV exposure in study B increased all biomarkers in samples 2: malondialdehyde (p

In study C the sunscreen prevented skin redness caused by UV radiation; however, it did not inhibit the elevation of all 15 oxidative stress/inflammatory markers: malondialdehyde (p Conclusions: The markers of oxidative stress and inflammation were not significantly reduced by the prior use of the sunscreen. Its efficiency to prevent skin cancer may therefore be questioned.

Presentation title: Ethical issues in cancer prevention: A different challenge for behavioral and environmental risk factors

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Presenting author profile:
Dr Sasco founded in 1995 the first Research Unit of Epidemiology for Cancer Prevention at the IARC-WHO. Her objective was and still is the absolute need for epidemiological results to be translated into effective population health policies. Some of the students and fellows she trained all over the world are replicating this approach on a broad scale. Dr Sasco, now back at the Bordeaux University, is exceedingly active on issues of ethics and scientific integrity.

Text of abstract:
Background: Ethics in the medical and health fields was the prime preoccupation of Hippocrates. By contrast, in recent centuries, it has largely been ignored. It became unavoidable, however, with the development of clinical trials for the testing of new therapeutic drugs becoming the "gold standard" for any human study. These clinical trials were generally in the domain of chronic diseases where the beneficial effects were quite small; no consideration whatsoever was devoted to iatrogenicity,. The mythical randomized clinical trial was born and became a mandatory reference. Decades later, "meta-analysis" appeared on the scene when the need arose for assessing statistically significant differences in clinical outcomes.
Methods: The issue of ethics in prevention has been largely ignored and considered a non-issue. Nowadays, it is becoming "the right thing to do" to have charts of ethics in research, medical and university institutions. Some are truly excellent, but the majority correspond simply to vacuous words on a piece of paper or on a screen. Sometimes, when they are presented to the staff or students, the spoken words are invoked simply to minimize ethical concerns. Similarly, networks dealing with ethics do not themselves apply the very rules they prescribe for others.
Results: I shall explain how ethical principles need to be developed in prevention research and actions taken in reference to the field I know best, namely cancer prevention. Two classes of carcinogens will be contrasted because the implications for prevention are totally different. The first one belongs mostly to behavior or lifestyle; the second can be classified as environmental in the restricted (and only valid) sense of the word "environment".
Conclusions: There are significant implications of how ethical principles are applied to prevention research.

Presentation title: The analysis of longitudinal data from life-span carcinogenicity bioassays on Sprague-Dawley rats

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Presenting author profile:
Dr. Sgargi is a member of the Biostatistics Unit at the Cesare Maltoni Cancer Research Centre of the Ramazzini Institute. She obtained a PhD in Statics at the University of Bologna. She works at the analysis of results of bioassays, and at systematic reviews of the literature (collaborating to the WHO/ILO Joint Methodology for the Global Burden of Diseases). She is part of a project with the Sant'Orsola Hospital (Bologna) on Toxicant-associated fatty liver diseases.

Text of abstract:
Background and aim of the work: Long Term Carcinogenicity Bioassays (LTCB) are among the best instruments to strengthen the evidence on which regulatory agencies base their decision to classify harmful agents as human carcinogens; therefore, they are fundamental to protect public health. The statistical analysis is essential to validate the results from cancer and non-cancer outcomes in carcinogenicity bioassay. This work proposes and applies some methodologies for the analysis of non-cancer outcomes, such as body weights.

Methods: We used data from studies already concluded, evaluated and published: 4 bioassays aimed at testing the carcinogenic potential of Coca-Cola on Sprague-Dawley rats of different ages. The analysis of body weights of the second generation of rats was performed using mixed-effects models: linear and non-linear models were fitted, for non-linear models we have considered human non-linear growth functions.

Results: Linear models were fitted using the log-transformation of time and polynomial term of third order for time. Sex and treatment influence body weight, while age of dams during gestation doesn't. Growth models: Jenns-Bayley, Count and 1st order Berkey-Reed growth functions were evaluated; the latter best describes these data. Sex and treatment significantly influence all parameters. The direction, magnitude and significance of the effect of each variable is substantially similar in all models. The analysis of residuals highlights issues for all models: the extreme trends in the last part of life heavily affect the models' performance.

Conclusions: Mixed-effects models allowed to account for the structural effect of covariates that

act the same way on all individuals, and to add random effects that introduce a correlation among subjects if clustering happens; nonlinear human growth models added information about the whole growth process, therefore these may be useful methods in studies focused on development and sexual maturation.

Presentation title: Dietary intake of acrylamide and risk of breast, endometrial and ovarian cancers: systematic review and dose-response meta-analysis

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Presenting author profile:
Dr. Filippini, MD, is a Researcher and a PhD student in Public Health at the University of Modena and Reggio Emilia. He works in the studies of health effects of environmental risk factors, particularly dietary risk factors and outdoor pollutants, with specific reference to the risk of chronic diseases such as neurodegenerative diseases and cancer.

Text of abstract:
Background: Acrylamide is probable human carcinogen that occurs naturally in starchy foods during cooking processes at high temperatures. Aside from occupational exposures and smoking, main source of human exposure is diet, particularly consumption of potatoes, grain products, and coffee. High acrylamide intake has been associated with altered sex-steroid hormone concentrations and increased risk of hormone-dependent gynecologic neoplasms.
Objective: We performed a systematic review of the papers investigating the association between acrylamide intake and risk of breast, endometrial and ovarian cancer. We also examined a possible dose-response relation by carrying out a dose-response meta-analysis of these studies.
Methods: We searched in PubMed up to September 10, 2019 the non-experimental human studies investigating risk of breast, endometrial, or ovarian cancer in relation to dietary intake of acrylamide. We also carried out a dose-response meta-analysis using a restricted cubic spline model.
Results: We retrieved 18 studies: 11 cohort, 5 case-cohort, and 2 case-control studies. Since some studies assessed more than one cancer type, we found a total of ten studies on risk of breast cancer, seven on endometrial cancer, and seven on ovarian cancer. In the dose-response meta-analysis, acrylamide intake was associated with slightly increased risks of endometrial and ovarian cancers, with a stronger and almost linear increased risk among never smokers. Conversely, for breast cancer we found no evidence to support an increased risk following acrylamide exposure, except for a positive association among premenopausal women exposed to at least 20 μg/day of acrylamide.
Conclusions: Based on the relatively small number of studies published to date, acrylamide intake was associated with increased risk of endometrial and ovarian cancer in a dose-response fashion, with a slightly stronger association observed among never smokers. Acrylamide intake

was associated with an increased risk of breast cancer only among premenopausal women and at intakes greater than 20 μg/day.

Presentation title: Exposure to inorganic selenium in drinking water and incidence of amyotrophic lateral sclerosis: A long-term followup of a natural experiment

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Presenting author profile:
Dr. Vinceti is full professor of Public Health at the Department of Biomedical, Metabolic and Neural Sciences at University of Modena and Reggio Emilia where he works in the study of health effects of environmental and dietary risk factors, specifically regarding risk of chronic diseases as neurodegenerative diseases and cancer.

Text of abstract:
Background: Some studies have reported an association between overexposure to selenium and risk of amyotrophic lateral sclerosis (ALS), a rare degenerative disease of motor neurons. From 1986 through 2015, we followed a cohort in Northern Italy that had been inadvertently consuming tap water with unusually high concentrations of inorganic hexavalent selenium from 1974 to 1985.
Methods: We had previously documented an excess incidence of ALS in this cohort during 1986-1994. Here, we report extended follow-up of the cohort for an additional 21 years, encompassing 50,100 person-years of the exposed cohort and 2,233,963 person-years of the unexposed municipal cohort. We assessed ALS risk using a Poisson regression analysis, adjusting for age, sex and calendar year.
Results: We identified 7 and 112 incident ALS cases in the exposed and unexposed cohorts, respectively, yielding crude incidence rates of 14 and 5 cases per 100,000 person-years. The Poisson regression analysis produced an overall incidence rate ratio (IRR) for ALS of 2.8 (95% confidence interval (CI) 1.3, 6), with a substantially stronger IRR in 1986-1994 (8.2, 95% CI 2.7, 24.7) than in 1995-2015 (1.5, 95% CI 0.5, 4.7), and among women (5.1, 95% CI 1.8, 14.3) than men (1.7, 95% CI 0.5, 5.4).
Conclusions: Overall, these results indicate an association between high exposure to inorganic selenium, a recognized neurotoxicant, and ALS incidence, with declining rates after cessation of exposure and stronger effects among women.

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SCIENTIFIC SESSION V
Work of the Fellows (Oral)

1. Mortality from silicosis in Brazil: Temporal trends in the period 1980-2017 *Eduardo Algranti, Brazil*

2. Radiographic changes in Colombian asbestos factory workers *Arthur Frank, USA*

3. Severe silicosis outbreak in engineered stone fabrication workers - U.S. perspectives *Robert Harrison, USA*

4. The first announcement of establishing The Japan Association of Occupational Health Law *Fujio Kayama, Japan*

5. The triumph of doubt: Dark money and the science of deception *David Michaels, USA*

6. Potential role of Army Medical Forces in fighting cancer: An untapped resource *Pier Giorgio Natali, Italy*

7. Sibaté, Colombia: Another asbestos induced public-health crisis *Juan Pablo Ramos-Bonilla, Columbia*

Presentation title: Mortality from silicosis in Brazil: Temporal trends in the period 1980-2017

Presenting Author: Eduardo Algranti

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Presenting author profile:
Dr. Algranti is chief of the Division of Medicine, FUNDACENTRO in São Paulo Brazil where he works since 1984, mainly foccused in the clinical and epidemiological aspects of occupational respiratory diseases. At present his main interests are on the burden of asbestos and silica-related diseases in Brazil.

Text of abstract:
Background: Silicosis is the main pneumoconiosis in Brazil. In 2002 a national programme to eliminate silicosis was launched, ending in 2017. The aim of this study is to calculate mortality rates, to analyze temporal trends, and to identify mortality clustering from silicosis.
Methods: Records from silicosis as the underlying cause of death in adults 20 years of age and over were extracted from the Brazilian Mortality Database (SIM) in the period 1980-2017. Age-standardized mortality rates (ASMR) were calculated. The annual trend in ASMR was analyzed by joinpoint regression. Municipalities were ranked according to mortality rates per 100,000 person-years. Temporal trends according to activity branches were analyzed by merging deaths in municipalities with similar profiles.

Results: There were 3,164 deaths records (96.6% men) distributed in 14% Brazilian municipalities. Mean age of death was 59.2 (SD 15.1) and mean ASMR was 0.085/100,000 (CI 0.080-0.091). A joinpoint regression showed one inflection point with a significant increase in the ASMR from 1980 until 2006 and a significant decrease after 2006, the latter driven by a decrease in deaths under the age of 70 years. Mean age of death increased from 56.0 years in 1980 to 64.1 years in 2017. The highest mortality per 100.000 person-years were observed in municipalities known to have activities of small mining operations of precious/semi-precious stones or stone carving, ranging from 1.45 to 21.83, in gold mining (0.76 to 18.36), in sand

mining (0.34 to 13.92), in ceramic industries (0.36 to 6.91) and in pit digging (0.87 to 3.07).

Conclusions: In contrast with developed countries, mortality from silicosis rose until 2006 when it started to drop, mostly from a plateau/decrease in deaths occurring in municipalities harboring regulated economic activities. However, this was not reflected in the older age group and in the unregulated sector,

Presentation title: Radigraphic Changes in Colombian Asbestos Factory Workers

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Presenting author profile:
Dr.Frank is an occupational physician who has specialized in the study of asbestos disease.

Text of abstract:
Background: Colombia has recently banned the mining ,use and sale of asbestos but much of it has been used to primarily make cement and friction products. Objective: To determine if the use of chrysotile asbestos in friction products gave rise to disease. Methods: 148 workers had x-rays taken. Results: 19 of 148 workers had changes consistent with exposure to asbestos. Conclusion: Colombian workers develop disease as has been documented elsewhere around the world.

Presentation title: Severe silicosis outbreak in engineered stone fabrication workers - U.S. perspectives

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Presenting author profile:
Dr. Harrison is Public Health Medical Officer at the California Department of Public Health and Clinical Professor of Medicine in the Division of Occupational and Environmental Medicine at the University of California, San Francisco. He collects and analyzes work-related injury and illness data, and investigates outbreaks of occupational diseases in California.

Text of abstract:
Background: The emergence in the mid-1980s of silica-containing engineered stone products for residential and commercial countertops has led to multiple outbreaks of severe silicosis among fabrication workers in several countries, including Israel, Spain and Australia. This presentation details the largest outbreak of silicosis among these workers found to date in the US, highlighting the urgent need to identify stone fabrication workers at risk and prevent further excess exposure to silica dust.

Methods: Investigators from four States identified cases of silicosis among engineered stone fabrication workers through hospital discharge records and follow-up medical testing (California); review of electronic medical records in the practice of a physician specializing in occupational lung disease (Colorado); reports to the public health department in workers at an engineered stone countertop manufacturing and fabrication facility (Texas); and review of workers compensation claims data (Washington). All cases were confirmed based on chest computerized tomography (CT) scan or lung biopsy findings.

Results: Eighteen (18) cases of silicosis, including two fatalities, were identified among stone fabrication workers who worked principally with engineered stone materials. Many of the workers (10/18) were under age 50, with severe, progressive disease. Two of the patients had

latent TB infection, and five had concurrent autoimmune disease.

Conclusions: In the U.S., stone fabrication shops are typically small businesses; workers in these shops are often Hispanic immigrants, who may be especially vulnerable to workplace health hazards. It is critical that stone fabrication employers monitor and control dust exposures in compliance with silica standards and provide respiratory medical examinations for all employees who are or have been exposed to silica dust. Employers and health care providers should notify appropriate public health agencies of any silicosis cases that are identified. Comprehensive occupational lung disease surveillance and regulatory enforcement are crucial to address this emerging silicosis threat.

Presentation title: The first announcement of establishing The Japan Association of Occupational Health Law

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Presenting author profile:
Fujio Kayama M.D., Ph.D. graduated from University of Occupational and Environmental Health and was a postdoctoral fellow at NIH/NIEHS in 1991-1993. Dr. Kayama is currently a professor emeritus of Jichi Medical University, a toxicologist and epidemiologist in the field of food safety. He was an initial organizer of the Japan Environment and Children Study and serves as a vice-chair, Board of Directors of the Pacific Basin Consortium for Environment and Health.

Text of abstract:
Background: In 2018, approximately 1,000 work-related suicide cases were reported, but only 100 cases were compensated by Industrial Accident Compensation Insurance. Hardworking Japanese workers suffers "Karoshi", or death by overwork, including suicide; cardio-cerebral vascular diseases have risen recently. The government promulgated several measures such as an annual worker's stress check in 2015 to improve employees' awareness of their own physical and mental stresses. However, the number of lawsuits related to occupational diseases has been rapidly increasing in Japan.

Approach: Professor Takenori Mishiba initiated workshops on occupational health law in 2012 for industrial physicians, certified social insurance labor consultants, lawyers, counselors, and company personnel in charge of human resources. Topics covered included the legal issues of occupational health disorders such as mental health, harassment and work-related diseases.

Results: The workshop secretariat has issued certified credits in the specialty of occupational health law to approximately 800 participants. We decided to establish an association of these multidisciplinary stakeholders to pursuit research in the past legal suits and to disseminate the past lessons to human resources management sectors for the sake of prevention of legal dispute among employers, employees and other stakeholders related in occupation health problems.

Conclusions: We will establish an academic association named the Japan Association of Occupational Health Law in November 2020. International exchanges of information and collaboration are highly welcomed for establishing academic body of knowledge in occupational health law.

Presentation title: The triumph of doubt: Dark money and the science of deception

Presenting Author: David Michaels

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Presenting author profile:
Dr. Michaels is an epidemiologist and Professor at George Washington University. He was US Assistant Secretary of Labor for Occupational Safety and Health from 2009 to 2017, the longest serving in OSHA's history. From 1998 to 2001, he was US Assistant Secretary of Energy for Environment, Safety and Health, charged with protecting the workers, community residents and environment in and around the nation's nuclear weapons facilities.

Text of abstract:
Background: "Product defense" experts employed by polluters and manufacturers of dangerous chemicals have applied the tobacco industry's strategy of manufacturing scientific uncertainty to impede public health and environmental protections and defeat claims of compensation for victims. Far from acknowledging products cause harm, it is now standard corporate practice to deny and defend, hiring consulting scientists and economists.
In the current US administration, polluters and manufacturers of dangerous products have a great deal more power. Rollbacks in environmental public health protections are occurring.
Approach: We need to rebuild our system of public health protection. It is an opportunity to reimagine how it could be made more effective and make better use of scientific evidence.

Results: We must strengthen the evidence base for public health and environmental protections, including complete disclosure of research funding and control of research by independent scientists. We must build a research infrastructure in which corporations pay for the research into the potential harms of their products, but do not control any aspect of that research. The structures and policies that protect the integrity of this evidence base should preclude studies paid for by or through attorneys on behalf of a client, end rigged data re-analyses and rely on unconflicted scientists for data syntheses.

Conclusions: It is important to explore and implement programs and policies that discourage irresponsible corporate behavior. Voluntary guidelines and self-certification may be useful but have not been adequately evaluation. Litigation, especially class-action suits, can also drive

corporations to act more responsibly. Many laws place the burden on public health agencies to prove the danger before acting to protect the public. The presumption of innocence should not apply to chemicals and other products that might be reasonably predicted to be harmful. Waiting for proof of harm before acting will too often permit harm to occur.

Presentation title: Potential role of Army Medical Forces in fighting cancer: An untapped resource

Presenting Author: Pier Giorgio Natali

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Presenting author profile:
Pier Giorgio Natali developed his scientific career at the "Regina Elena" National Cancer Institute where he was also Scientific Director (1995-2001) focusing his work on laboratory and clinical studies and translational medicine, including the areas of cancer prevention and public awareness. He is the former President of the Italian Cancer Society and is currently Secretary General of the Mediterranean Task Force for Cancer Control (MTCC). He is on the Advisory Board of the Collegium Ramazzini Journal.

Text of abstract:
Background: An appreciation that military medicine can support global health is growing in many countries which are recognizing the military as an ideal partner in such civil activities. However, attempts to explore strategies to govern military engagement in civil public health activities are limited. Understanding how to guide and govern military activities in public health can aid in achieving a balance between military and civilian global health capacities relevant nationally and at a global level.

Methods: Using the example of Non-Communicable Diseases (NCDs), cancer has been recognized by the United Nations as a Global Emergency. In this context, prevention, in conjunction with early diagnosis, is recommended as a priority strategy. This is especially significant in view of the diminishing economic resources and increasing economic burden of treating advanced disease. However, arguing the economic cost of treatment is wrongly placed since the largest proportion of the most commonly occurring tumors can be efficiently prevented and diagnosed at early, curable stages with enormous costs saving. Thus, dissemination of policies which translate and implement effective preventive interventions into practice is critical.

Results: Since 2015, the Mediterranean Task Force for Cancer Control (MTCC) has recognized the lack of cancer prevention and early detection efforts in the Mediterranean region as it developed its founding strategy. MTCC recognizes also that military doctors could become valuable supportive partners of their civilian counterpart s in cancer control. In this way, the power of anticipatory (preventive) care is likely to be significantly enforced to counter the foreseen increasing cancer burden .

Conclusion: Thus, efforts should be devoted to enriching military medicine missions by widening its defense and security commitments to better include those of humanitarian and civil society.

Presentation title:
Sibaté, Colombia: Another asbestos induced public-health crisis

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Presenting author profile:
Dr. Ramos-Bonilla is Associate Professor in the Department of Civil and Environmental Engineering at Universidad de los Andes in Bogotá, Colombia, where he has led research projects analyzing occupational and environmental health risks resulting from asbestos use. He has also conducted projects to determine the potential health impacts of criteria air pollutants, chlorine pesticides and lead.

Text of abstract:
Background: Sibaté is a 40,000-inhabitant municipality located 25 km southwest from Bogotá, the capital of Colombia. In 1942 the first asbestos cement facility of the country was built in Sibaté. Inhabitants of Sibaté have perceived an unusual large number of asbestos related diseased cases diagnosed over the years. Inhabitants have also reported the construction of landfill zones with asbestos-cement residues in the urban area of Sibaté. In 2015, a study was initiated to analyze the situation in Sibaté.
Methods: Based on the information collected from 355 door-to-door surveys, 29 mesothelioma

case resports were identified. Copies of the medical record of 17 of the 29 case reports were obtained, which were subsequently evaluated by a panel of six physicians. Landfill zones were identified using topographic maps, aerial photographs, and satellite images, was complemented with information collected in two participatory workshops engaging the residents. Soil samples were collected on the identified landfill zones.

Results: The panel of physicians classified 15 mesothelioma cases as Certain, one as Probable, and one as Not Mesothelioma. Focusing on cases diagnosed while living in Sibaté between 2008 and 2017 (i.e., 6 males, 3 females), the age standardized incidence rate for Sibaté was 3.1 x10^5 persons-year for males and 1.6 x10^5 persons-year for females. Both incidence rates are among the highest when compared with the same indicators in Colombian and worldwide cancer incidence registries or in other areas affected by asbestos exposure. Soil samples confirmed the presence of a friable asbestos buried in the landfill zones.

Conclusions: The evidence supports the existence of a mesothelioma cluster in Sibaté, with most of the cases experiencing non-occupational asbestos exposure. During the construction of landfill zones, relevant asbestos exposures of the general population of Sibaté may have occurred.

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SCIENTIFIC SESSION VI
Work of the Fellows (Oral)

1. Child labor among Syrian refugees living in Lebanon: A story of deprivation and neglect *Rima R. Habib, Lebanon*

2. The legacy of mercury poisoning and racism: The case of a First Nation community in Canada *Donna Mergler, Canada*

3. 20 years after the Libby Montana asbestos response: Past, current, and future Issues and implications *Aubrey Miller, USA*

4. Migrants' health at risk: The Mediterranean case and the public and environmental health agenda
5. *Rodolfo Saracci, Italy*

Presentation title: Child labor among Syrian refugees living in Lebanon: A story of deprivation and neglect

Presenting Author: Rima R. Habib

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Presenting author profile:
Dr. Rima R. Habib is a Professor of Environmental and Occupational Health and the Chair of the Department of Environmental Health at the Faculty of Health Sciences. She served as the Chair of the Technical Committee on Gender and Work in the International Ergonomics Association between 2010 and 2017. She has lead research focusing on the health of displaced, refugee and migrant populations. Her research is grounded in principles of social and environmental justice.

Text of abstract:
Background: The eight-year Syrian War has resulted in a refugee crisis affecting millions of Syrians. The vast majority of refugees displaced outside of Syria reached neighboring countries, including over one million who are currently residing in Lebanon. Syrian refugees living in Lebanon experience extreme precarity, often lacking the resources and livelihood opportunities to safeguard their wellbeing. Familial poverty has forced many children to forgo schooling and enter the workforce in the agriculture, construction, and service sectors.

Methods: A household survey of Syrian refugee children studied the living and working conditions of children between 4 and 18 years, in 2017. The survey included 1,902 households in the informal, tented settlements of the Bekaa Valley in eastern Lebanon, an agricultural land bordering Syria. Face-to-face interviews using structured questionnaires were carried out with female homemakers who answered questions relating to working children between 4 and 8 years. Working children between 8-18 years were directly interviewed.

Results: Data analysis showed that out of 6972 children (4-18 years) living in the surveyed households, 4592 were working (66%). The survey reached 4377 working children (52% males and 48% females). The average age for starting work was 10.9 years. Around 50% of the working children did not go to school because of work and only 18.3% were enrolled in some form of schooling. The majority of children (75%) worked in agriculture and 30% reported having been injured at work. Seventy-nine children reported knowing another child who died

following a work accident.

Conclusion: Widespread child labor is consequential for this generation of Syrian refugee children, as they and their families grapple with the present and future implications of lost childhoods and opportunities. Immediate interventions are needed to protect the children and ensure their wellbeing.

Presentation title: The legacy of mercury poisoning and racism: The case of a First Nation community in Canada

Presenting Author: Donna Mergler

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Presenting author profile:
Dr. Mergler is a Professor Emerita at the University of Quebec in Montreal, where she has been doing research with unions and communities for over forty years. Her research uses an ecosystem, community-based approach, grounded in interdisciplinarity, gender equality and integrating short and long-term solutions into the study design. For the past four years, she has been collaborating with the Grassy Narrows First Nation community to provide a scientific basis for the community's demands.

Text of abstract:
Background: The presentation begins with a video of Judy Da Silva, Anishinaabe grandmother from Grassy Narrows First Nation, recounting the 50-year old history of mercury (Hg) poisoning of their community and government response. Following the discharge of 10,000 kg of mercury (Hg) from a chlor-alkali plant, they lost their livelihood, health and dietary mainstay. Between 1970 and 1997, health authorities measured Hg in blood, hair and cord blood. Dr. Masazumi Harada from the Kumamoto Gakuen University and founder of the Open Research Center for Minamata Studies and colleagues visited several times and identified cases of Minamata Disease. Despite repeated requests from the community, no epidemiological study was performed. In 2016, Grassy Narrows invited us to (i) participate in a Community Health Assessment (CHA) and (ii) create a historical database of Hg biomarkers (HgDB).

Methods: The CHA added questions concerning Hg exposure and affects to the Canadian First Nations Regional Health Survey. Community members designed the recruitment strategy and conducted the survey. Participation rate on the reserve was 78.2%; 424 adults completed the survey for themselves and 353 children. The HgDB, derived from governmental archives, contains 3525 year-based data points for 648 living and deceased persons. Analyses include multiple regression models and longitudinal approaches.

Results: Results show that childhood mercury exposure is a major determinant of later life nervous system dysfunction. Illness prevalence in Grassy Narrows is similar to other First Nations in Canada except for Hg-related outcomes, which leaves them in a worse socio-economic situation. Longitudinal HgDB analyses confirmed childhood fish consumption is a major determinant of adult neurologic symptoms and well-being. For children, maternal fish consumption during pregnancy predicts health conditions that impact school performance and behavior.

Conclusions: Systemic racism led to non-recognition of serious health issues in this community. Findings support recommendations to improve community health and education.

Presentation title: 20 years after the Libby Montana asbestos response: Past, current, and future Issues and implications

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Presenting author profile:
Dr. Aubrey Miller is Senior Medical Advisor to the Director of the National Institute of Environmental Health Sciences (NIEHS), where he provides leadership and advice on NIEHS programs and policies, including asbestos-related activities. Formerly, as a Public Health Medical Officer for US DHHS and EPA, and co-Chair of the EPA Asbestos Technical Review Workgroup, he led the Libby, Montana health investigations, remediation efforts, health care initiatives, research and policy efforts.

Text of abstract:
Background: Libby, Montana, the first U.S. Environmental Protection Agency (EPA) and Department of Health and Human Services (DHHS) Superfund Public Health Emergency involved widespread asbestos contamination and illnesses among workers and non-workers, reenergizing asbestos science and the need for improved health protections. It's been 20 year since the Libby response.

Methods: This presentation will focus on the Libby, Montana asbestos response and associated health effects, exposures, toxicology, risk assessment, risk management, and policy efforts. Extensive health and exposure studies at the site are summarized. Efforts to address the community health impacts, as well as environmental contamination at several hundred vermiculite processing locations, attic insulation in millions of homes, and other sites across the US will be presented.

Results: Ongoing issues and implications concerning the challenges of characterizing and controlling environmental exposures, "non-asbestos" hazardous mineral fiber exposures, and risks from naturally occurring asbestos contamination will be described.

Conclusions: Additional research and opportunities for advancing our occupational and environmental health research and policies to protect human health exist and are needed.

Presentation title: Migrants' health at risk: The Mediterranean case and the public and environmental health agenda

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Presenting author profile:
Rodolfo Saracci, MD, FFPH (UK) has held senior positions, including Chief of analytical epidemiology, at the WHO International Agency for Research on Cancer in Lyon, developing international research programs on environmental and occupational cancer and participating in the Monographs program on carcinogenic hazards evaluation. The environmental and social health determinants have been his guiding priorities as founder and teacher of the European "EEPE" Summer School in epidemiology in Florence and while President of the International Epidemiological Association.

Text of abstract:
Background: Migrants make media headlines mostly as victims of catastrophic 'in transit' events or because of newly added and tightened security policies aimed at blocking their arrival. The role of natural and man-made environmental hazards in the etiology of migration and the public health dimensions of migration are usually confined to marginal or lip service attention.
Approach: Although representing only a small fraction of the total world migration, the Mediterranean flow of migrants to Europe is highly informative of the spectrum of issues involved in today's migration flows, especially to high income countries, and has been selected for analysis.

Results. The flow has been characterized by an increase since the early years of this century, reaching a peak in the mid 2010s followed by a marked decrease. In sharp contrast the risk of death at sea has been increasing while the systems of life and health protection have evolved in a disorderly way, often hampering the operations of NGOs specialized in these tasks. Features of origin, transit, and arrival of migrants along different routes are described and compared, attempting to untangle the factors affecting migrants' health.
Discussion and conclusions: A most notable feature of the migrant flow to Europe, in particular by sea, is the heavily lopsided 'security' approach to it by governments and in the media and large sections of the population. There is a pressing need - persistent since I called attention to it (BMJ-Opinion/Global Health/31 August 2018) - for a change in perspective and action agendas,

regarding migrants flows chiefly as the result of environmental hazards and treating migrants first of all as vulnerable population groups in the public health sense.

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