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Etiologies and prevention of mesoamerican nephropathy in Guatemalan sugar cane workers

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Background. We are entering the third decade of a global epidemic of chronic kidney disease of unknown cause (CKDu) first recognized in Latin America where it was referred to as Mesoamerican Nephropathy. Occurring mostly in agricultural communities, it is especially affecting male agricultural workers in their 20s to 40s, especially sugar cane cutters who perform strenuous labor outdoors in conditions of high heat and humidity. Researchers hypothesize that CKDu is linked to repeated heat stress and recurrent dehydration, however other causal pathways have been suggested, including nephrotoxic agrochemicals, heavy metals, tobacco use, pain medications, diet, and infection.

Methods/Approach. For the past two years, we have examined the incidence, prevalence, and risk factors for this condition in a large cohort of Guatemalan sugar cane workers. In addition, we have conducted a series of intervention studies to evaluate practical solutions to mitigate the risk of kidney injury and examine disease mechanisms.

Results. This presentation covers evidence connecting acute and chronic kidney injury, the role of heat stress, findings that indicate a potential role for heavy metals, and results of recent pragmatic trials of heat stress interventions.

Conclusions. Interventions that maximize hydration, rest and shade, while important, are insufficient to eliminate this epidemic. Nephrotoxic exposures in the workplace and community must also be addressed. When placed in the context of climate change, it is critical that we address agricultural worker health in order to address food insecurity on the planet, as well as to address worker health, productivity, and poverty.

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Preterm birth risk of newborns associated with parental occupational and environmental exposure

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Background. Significant increase in incidence of preterm birth is reported in developed countries during the last two decades. Preterm birth is associated with a number of health risks during adulthood. Prevention of preterm birth and introduction of targeted biomarkers for estimation of the health status of preterm newborn is of great significance. The aim of this analysis is preparation of an inventory of available data on parental exposure reported to be associated with preterm birth.

Methods/Approach. A literature search was based using Pubmed and Scopus without language restriction.

Results. Preterm birth is associated with maternal occupational and environmental exposure to Cd, Pb, Cr, bisphenol A, phthalate compounds, occupational exposure to cosmetic products and farming (pesticides). Additionally, lifestyle exposure to tobacco smoke and parental exposure to As and welding fumes are also associated with preterm birth.

Conclusions. Despite reported increase in preterm birth incidence, number of studies and studied compounds are limited and clearly show a significant gap in biomonitoring of preterm newborns. Parental occupational and environmental exposure associated with preterm birth in their children show that majority of compounds are endocrine disruptors and that biomarkers applied in follow up of pregnancy and newborns should be focused on health disturbances described for these compounds such as hormonal (infertility), immunological (allergy), metabolic (risk of diabetes) and genome damage (breast cancer, leukemia). Acknowledgment Funded by EU European Regional Development Fund, Operational Programme Competitiveness and Cohesion KK.01.1.1.01.0008

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The world history of carbon disulfide poisoning

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Background. Carbon disulfide is an occupational and environmental toxicant that has not been appreciated as widely as it should be for its biomedical, sociopolitical, and historical importance.

Methods/Approach. A far ranging historical survey using primary, secondary, and other sources to systematically assess the understanding of carbon disulfide hazards and why efforts to control it were ineffectual.

Results. The story of carbon disulfide is inextricably intertwined with that of viscose. Viscose was an innovative and lucrative product first introduced in the early twentieth century. It quickly became the prototype for other multinational corporate enterprises. The viscose industry spanned two highly profitable world wars, was at the vanguard of the mid-century export of hazardous manufacturing to developing countries, and currently is an avatar of "greenwashing," promoting its product as an eco-friendly product. In the mid-19th century, this chemical was well-recognized as a potent neurotoxicant causing psychosis and neuropathy in the rubber industry. Viscose manufacturing, which requires carbon disulfide to regenerate cellulose-based materials, later was responsible for an epidemic of such disease along with a litany of other disorders including parkinsonism, stroke, and heart attack. Although viscose fiber manufacture today has largely moved to India, China and Indonesia, other viscose products such a sponges, cellophane, and synthetic casing for sausages occupy important viscose manufacturing niches in the U.S and Europe. Even so, the U.S. OSHA standard for carbon disulfide remains less protective than almost any other nation's (although India has the same legal exposure limit).

Conclusion. The world history of viscose reminds us that we must stay vigilant of current hazards, informing our understanding with an in depth understanding of their histories.

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Ethics and occupational health: from the development to the complexity of contemporary society

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Background. Over the past decades new ethical issues have come to the fore, partly reflecting changes in the world of work, demographic shifts, new technologies and, more generally, the impact of globalization. A very central role in this scenario is played by the occupational health professionals (OHPs) because the increasing complex and sometimes competing responsibilities of OHPs towards the workers, the employers, the public, public health and labor authorities and other bodies such as social security and judicial authorities. This study is aimed at analyzing the development of the concept of ethics in occupational health in the contemporary world of work, focusing on emerging ethical concerns.

Methods/Approach. After reviewing the development of the concept of ethics in occupational health, we analyzed the existing literature focusing on the ethical conflict in occupational health, from the individual, professional and institutional point of view, in order to identifying drivers and barriers for correct professional ethics.

Results. Although the topic of ethical conflict in occupational health has been discussed since the 1970s and have received increased attention in recent years, there has been no systematic attempt to study the true extent of ethical issues and how they are resolved in practice. The presence of numerous variables to be taken into consideration, as well as the growing number of potential stakeholders involved in ethical choices, prevented the identification of an ideal proposal able to solve ethical challenges in OHPs practice.

Conclusions. To deal with the complexity in today's changing world of work the logic of an integrated approach must take account of the importance of all three types of ethics: personal (individual), professional and institutional.

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Epidemiological surveillance in National Priority Contaminated sites in Italy

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Background. The health impact associated with residence in Contaminated Sites has been studied in a limited number of countries. The 6th Ministerial Conference on Environment and Health (WHO European Region), Ostrava, Czech Republic, 2017, included this issue among the priorities of the European process on Environment and Health. In Italy, 45 areas (319 municipalities) defined as National Priority Contaminated Sites (NPCS) by the Ministry of Environment due to major contamination of soil and of ground and surface water due to the presence of petrochemical plants, refineries, chemical industries, steel foundries, asbestos quarries and industries, hazardous waste dumping sites and other facilities, were included in a national epidemiological surveillance system, SENTIERI, designed and implemented by the Istituto Superiore di Sanità, in strict cooperation with a network of national, regional and local institutions.

Methods/Approach. A literature search provided a list of diseases associated with residence in the neighbourhood of sources of contamination (diseases of a priori interest). Cause-specific mortality and hospitalization were investigated in all 45 NPCSs (time-window 2003-2013) contrasting the observed with the expected cases (obtained from the general population of the Regions in which the Sites are located). Cancer incidence was available for 22 sites served by Cancer Registries (different time-windows). The reference population corresponded with that of five Region's macroareas.

Results. An overall excess mortality for all causes and all cancers was observed in the population resident in NPCS. The extra mortality cases in 11 years for all causes were 5,267 in men, 6,725 in women, for all cancers 3,375 and 1,910 respectively. The extra cancer incidence cases in 5 years were 1,220 in men and 1,425 in women. The analysis of individual Sites showed a series of associations of etiologic relevance.

Conclusion. SENTIERI's results may contribute to priority setting in cleanup operations, health promotion intervention, communication and empowerment of affected communities.

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Environmental health disaster from the use of biocides as a humidifier disinfectant in South Korea

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Background. Humidifiers have been one of the essential home appliances in Korean households since modernization of heating system and housing after the 1970s. Since 1994, several types of biocides have been sold for the disinfection of the water in the humidifier. Humidifier disinfectant-induced lung injury that has killed more than a thousand people, mostly children and pregnant women, was first reported in 2011 and its etiology, clinical characteristics and scope of the victims were investigated. In this report, the historical aspects of humidifier disinfectant-induced lung injury and its scope and impact on the public health and policy implication were presented.

Methods/Approach. An historical, nonsystematic review of the epidemiologic, clinical and toxicological aspects was conducted. Social and legal issues were also discussed.

Results. Since first report of its toxicity in 2011, more than 6,000 people registered to government as potential victims. Total size of the exposed population was estimated to be more than 500,000 nationwide over 16-year period. Main chemical components were biocides made of guanidine polymers such as polyhexamethylene guanidine phosphate (PHMG) and oligo(2-(2-ethoxy)ethoxyethyl guanidium chloride (PGH), and mixture of 5-Chloro-2-methyl-4-isothiazolin-3-one (CMIT) and 2-Methyl-4-isothiazolin-3-one (MIT). Initial clinical findings were severe progressive pulmonary destruction located on terminal bronchiole and rapidly progressing pulmonary fibrosis leading to respiratory failure. Investigation has shown that wide spectrum of clinical syndrome including asthma, interstitial pneumonitis, bronchiectasis, pneumonia, toxic hepatitis and nephritis, atopic dermatitis, and upper respiratory disorders exists. The compensation process is ongoing, but there are conflicts in the legal field; the legislative approach for the victims of the hazard are initiated with challenges on the research and compensation process.

Conclusions. The role of the government for the management of environmental health issues under the National Health Insurance System is challenged. More comprehensive legislation in addition to the expansion of the spectrum of disease, strengthening chemical registration through revising the K- REACH system, and adoption of post-marketing surveillance system are needed.

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Epidemiological surveillance systems of occupational cancers as a tool for supporting prevention policies and improving welfare systems effectiveness

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Background. The long latency, the complexity of interactions between different causative factors and the lack of knowledge about risks at the workplace are the main causes of underreporting occupational cancer, with a negative impact on the efficiency of welfare systems and prevention policies.

Methods/Approach. The epidemiologic surveillance system of occupational cancers in Italy has been established by force of the law since 2008, with three different sections: mesothelioma and sino-nasal registries (called ReNaM and ReNaTuNS respectively) and the monitoring system for the other anatomical sites (named OcCaM project). For mesothelioma surveillance, a Regional Operating Centre (COR) is currently established in each Italian regions, actively searching incident malignant mesothelioma cases from health care institutions. Occupational history, lifestyle habits and residential history are obtained using a standardized questionnaire to the subject or to the next of kin. Analogous system is actually on going for sino-nasal cancer surveillance (with 8 regions involved) and 9 regions contribute to OcCaM project.

Results. At present, ReNaM has collected 27,356 malignant mesothelioma cases, referring to the period of incidence between 1993 and 2015. The modalities of exposure to asbestos have been investigated for 21,387 (78%) and an occupational exposure has been defined for around 70% of defined cases (14,818). Epidemiological analyses concerning latency period, survival determinants, modalities of exposure and trend predictions have been provided. A standardized rate of 0.65 and 0.26 (*100,000, in men and women respectively) have been estimated for nasal cancer incidence, with a predominant role of wood and leather dust, but also chrome, solvents, tannins and formaldehyde exposures relevant in etiology.

Conclusions. The Italian experience shows that epidemiological surveillance of occupational cancer cases has a key importance for assessing and monitoring the public health impact of occupational hazards, programming and testing the effectiveness of preventive measures and finally for improving welfare system fairness.

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