UNIVERSITÀ DEGLI STUDI DI MILANO

CONCORSO PUBBLICO, PER ESAMI, A N. 1 POSTI DI CATEGORIA D - AREA TECNICA, TECNICO-SCIENTIFICA ED ELABORAZIONE DATI, CON RAPPORTO DI LAVORO SUBORDINATO A TEMPO INDETERMINATO PRESSO L'UNIVERSITÀ DEGLI STUDI DI MILANO - DIPARTIMENTO DI SCIENZE CLINICHE E DI COMUNITÀ - PROGETTO DIPARTIMENTI DI ECCELLENZA 2023-2027 - CODICE 22431

La Commissione giudicatrice della selezione, nominata con Determina Direttoriale n. 5810 del 17/04/2024, composta da:

Prof.ssa Valentina Bollati	Presidente
Dott.ssa Laura Cantone	Componente
Dott.ssa Federica Rota	Componente
Dott.ssa Annalisa Sena	Segretaria

comunica i quesiti relativi alla prova orale:

GRUPPO DI QUESITI N. 1

La candidata/Il candidato illustri un possibile progetto che comporti l'utilizzo di una camera di esposizione per la misura degli effetti di inquinanti aerodispersi. In particolare descriva la fase di progettazione, l'implementazione degli strumenti di misura, la gestione e l'utilizzo di tali strumenti.

Brano in inglese: The exposome concept refers to the totality of exposures from a variety of external and internal sources including chemical agents, biological agents, or radiation, from conception onward, over a complete lifetime. It encompasses also "psychosocial components" including the impact of social relations and socio-economic position on health. In this review we provide examples of recent contributions from exposome research, where we believe their application will be of the greatest value for moving forward. So far, environmental epidemiology has mainly focused on hard outcomes, such as mortality, disease exacerbation and hospitalizations. However, there are many subtle outcomes that can be related to environmental exposures, and investigations can be facilitated by an improved understanding of internal biomarkers of exposure and response, through the application of omic technologies. Second, though we have a wealth of studies on environmental pollutants, the assessment of causality is often difficult because of confounding, reverse causation and other uncertainties.

GRUPPO DI QUESITI N. 2

La candidata/Il candidato fornisca degli esempi di sensori di nuova generazione per il monitoraggio in tempo reale di alcuni tra i principali fattori di rischio e agenti esogeni quali inquinanti, luce, rumore, etc. La candidata/Il candidato descriva inoltre, nel campo di queste tecnologie innovative, quali potrebbero essere le principali sfide attuali e future.

Brano in inglese: Biomarkers and omic technologies may allow better causal attribution, for example using instrumental variables in triangulation, as we discuss here. Even more complex is the understanding of how social relationships (in particular socio-economic differences) influence health and imprint on the fundamental biology of the individual. The identification of molecular changes that are intermediate between social determinants and disease status is a way to fill the gap. Another field in which biomarkers and omics are relevant is the study of mixtures. Epidemiology often deals with complex mixtures (e.g. ambient air pollution, food, smoking) without fully disentangling the compositional complexity of the mixture, or with rudimentary approaches to reflect the overall effect of multiple exposures or components. From the point of view of disease mechanisms, most models hypothesize that several stages need to be transitioned through health to the induction of disease, but very little is known about the characteristics and temporal sequence of such stages.

GRUPPO DI QUESITI N. 3

La candidata/Il candidato illustri come applicherebbe le proprie competenze per caratterizzare il rischio in tempo reale in un contesto ambientale. Fornisca un esempio concreto di come utilizzerebbe i dati di esposizione per una gestione del rischio efficace.

Brano in inglese: Exposome models reinforce the idea of a biography-to-biology transition, in that everyone's disease is the product of the individual history of exposures, superimposed on their underlying genetic susceptibilities. Finally, exposome research is facilitated by technological developments that complement traditional epidemiological study designs. We describe in depth one such new tools, adductomics. In general, the development of high-resolution and high-throughput technologies interrogating multiple -omics (such as epigenomics, transcriptomics, proteomics, adductomics and metabolomics) yields an unprecedented perspective into the impact of the environment in its widest sense on disease. The world of the exposome is rapidly evolving, though a huge gap still needs to be filled between the original expectations and the concrete achievements. Perhaps the most urgent need is for the establishment of a new generation of cohort studies with appropriately specified biosample collection, improved questionnaire data (including social variables), and the deployment of novel technologies that allow better characterization of individual environmental exposures, ranging from personal monitoring to satellite based observations.

Milano, 21 maggio 2024

La Commissione

Prof.ssa Valentina Bollati Presidente

Dott.ssa Laura Cantone Componente

Dott.ssa Federica Rota Componente

Dott.ssa Annalisa Sena Segretaria