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Abstract Book

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Talk 35. A globally harmonized approach for occupational health surveillance and epidemiology in nanomaterial workers: a roadmap

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In the late 1980s/mid 1990s epidemiological occupational health studies were carried out in the carbon black and amorphous silica industries, two classic examples of nanomaterials. Recently, medical surveys and small-scale epidemiological studies started worldwide that investigate populations exposed to novel nanomaterial. Such studies are needed to determine safe exposure levels and to assess if (occupational) protection practices are effective. The success of epidemiological studies for quantitative risk assessment depends on the quality of available exposure and health response data. To achieve a coherent approach that leads to valid conclusions, data collection needs to be defined so that ongoing and future studies can pool data to compare different situations world-wide.

Such efforts to allow pooling of data should in particular aim to:

- Harmonize the description of exposure metrics and exposure determinants
- Agree on a minimum set of biomarkers and metrics of early effects for acute and chronic diseases
- Evaluate how concepts of systems biology, gene activation and epigenetics can inform these studies on outcomes and related biomarkers of potential interest
- Define data collection strategies that take into account data protection philosophies and the associated legal systems of different countries.

At the moment, the necessary conditions for such a pooling are not in place: namely agreements on design, exposure and effect characterization are challenging and require close collaboration between the involved research groups. To bridge this gap and to provide a coherent approach in view of future epidemiological research, we recently proposed a roadmap [1] to reach global consensus. The strategy aimed at keeping the costs of action proportionate to the potential benefits, and to allow for a pragmatic and practical approach.

In contrast to classical epidemiology, the roadmap partners aim to go beyond the collection of health complaints, illness statistics or even counts of deaths: the manifestation of such clear endpoints would indicate a failure of preventive measures. Instead, we should agree on a minimum set of biomarkers and metrics of early effects for acute and chronic diseases while evaluating how novel biological and statistical concepts can inform on outcomes and related biomarkers of potential interest.

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