

Report 69: Infectious Diseases and the Environmental Health Portfolio

Convener: Ellen Silbergeld

Brief History:

Over the past 50 years, infectious disease has moved out of the environmental health portfolio of research, clinical medicine, and public health practice – for a variety of reasons. As a result, the NIEHS research portfolio has relatively little intra- and extramural investments in this area. It was generally agreed that this situation has opened up “holes” in knowledge and missed opportunities for understanding and predicting disease risks as well as designing interventions and preventive health programs.

Much of the gap concerns understanding the importance of the environment in transmission and in population response. Examples: understanding how the environment may influence pathogens (persistence, virulence and infectivity); understanding how environmental exposures may affect host response and variations in host response within populations.

History: NIEHS used to be involved in the EID program at Fogarty, but not so much at present (info from FIC) and not in a way that integrates the NIEHS “take” on EH into ID research.

Earlier discussions on immunotoxicology are relevant to this discussion as well, and participants from that workshop were present at this meeting.

Discussion Highlights:

Discussion recognized the importance of a strategic approach in terms of resource constraints and “turf” among NIH institutes.

Immunotoxicology and its relevance to infectious disease could be a critical handhold in such discussions.

Also, interest in the environment and microbiome (see workshop) is relevant, as this area of research is considering how exposures (nutrients, pathogens, and chemicals) may modify human microbiomes and how the microbiome may modulate presentation of environmental exposures (e.g., metals, organics).

Other discussion topics: knowledge base on exposures to air pollutants and ID; could go both ways (ID as an effect modifier of response to air pollutants, or air pollutants as modifiers of response to pathogens) Examples were: air pollutant and RSV; cookstoves and early respiratory infections in children (including TB), possible activation of dormant pathogens and changes in viral latency may be associated with environmental exposures (note: some of these exposures include nutrients, and “beneficial” chemicals should also be considered).

Much discussion on building the case for valuing integration of EH perspectives and knowledge into ID in order to reduce burdens of disease. This focused on two directions: building case from toxicological and mechanistic data on specific environmental agents (such as ozone or mercury) and utilizing existing

large cohort studies to insert methods to assess associations between environmental exposures and immune status or disease risk. Examples included utilizing existing sources, such as the Agricultural Health Study or NHANES (which include biosamples as well as extensive annotation on participants in terms of exposures); seeking to participate in longitudinal studies to include appropriate sampling and information (ex: study vaccine “take” in the NCS, being sure to include a sample of the vaccine administered); the MADGC study on persons with multiple autoimmune diseases; drawing in opportunities from research in the developing world where both environmental exposures (e.g. e-waste) and infectious diseases may be significant in terms of risk.

Recommendations:

1. We need momentum to energize this conversation by developing an agenda that builds the case for the importance of integrating ID and EH
2. We also need to find ways to bridge the research gaps in existing research portfolios by conversations among NIH institutes and others
3. Convene a workshop to discuss opportunities for exploiting existing population studies such as NCS, including both large environmental health studies as well as large ID studies with equal weight and potential value.

Discussion Participants:

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