Translating Science to Support Decisions

Overview of Assessing Health Effects Evidence

Presenter: Dr. Andrew Rooney, NIEHS/DNTP

Literature-analysis activities are the front line for translating published scientific literature into useable information to support public health decisions. With more than 2 million research articles published every year, even the process of identifying relevant information from the volume of available data is a growing challenge. Systematic review methods provide a transparent and rigorous process for identifying, selecting, critically assessing, and synthesizing evidence from scientific studies to answer specific research questions. The NTP is a leader in the development and conduct of systematic review approaches[1][2] to address environmental health questions, where multiple evidence streams may provide relevant data and therefore conclusions need to integrate human, experimental animal and mechanistic evidence. While systematic review methods are ideal for assessing the evidence that a specific exposure is associated with specific health effect, these approaches are time-intensive and may not be the best approach for all literature-based questions (e.g., emerging environmental exposures or broad questions with multiple exposures or outcomes). Alternative review formats that employ systematic review methodologies, including scoping reviews and evidence maps, are being developed by NTP to address environmental health questions with a fit for purpose approach. The emphasis is on developing a useful balance between summary and the main output in the form of an interactive, searchable database characterizing the evidence in a given research area that allow users to explore whatever aspect of the data they may be interested in.

Literature Scoping and Evidence Mapping Approaches

Presenter: Ms. Vickie Walker, NIEHS/DNTP

Systematic evidence mapping develops a summary and categorization of literature to rapidly map the key concepts including types of evidence, and gaps in research related to a defined research area by systematically searching, selecting, and presenting existing knowledge. Using a fit for purpose approach, the resulting evidence map may involve varying degrees of categorization and synthesis of the existing knowledge to support a standalone product, the evidence map may be part of a literature scoping review or used in support of decision making as to areas of focus. Articles are categorized by study characteristics to address the research question or to inform decision making (i.e., future research, full systematic review or evidence

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[1] Handbook for Preparing Report on Carcinogens Monographs (https://ntp.niehs.nih.gov/pubhealth/roc/handbook/index.html)

[2] Handbook for Conducting Literature-based health assessments using OHAT approach for systematic review and evidence integration (https://ntp.niehs.nih.gov/go/systematic_review)

monitoring of new topics or fields) and routinely include evidence stream (e.g., human, experimental animal, or *in vitro*), the exposure, and health effects measured. These metadata are then displayed in an interactive table or figure that allow the reader to explore the data by the captured study characteristics. Currently, OHAT is using a variety of software and online tools to collect, screen, code, and display data.

Integrating Literature Analysis into the Research Pipeline

Presenter: Dr. Windy Boyd, NIEHS/DNTP

Broad scoping efforts are also being used by NTP to ask which environmental exposures have been reported to be associated with highly prevalent diseases in the published literature. These cross-divisional efforts use a variety of approaches and formats to convey a large body of evidence and focus in on specific areas of the evidence base for further research. An interactive evidence map was developed for almost 2,000 studies of environmental chemical exposures associated with Parkinson's disease or parkinsonian symptoms. Most studies focused on a narrow range of chemicals including pesticides, metals, and metal-containing compounds. Similarly, in a subset of these studies reporting changes in genes known to be associated with Parkinson's disease, only a handful of genes from distinct pathways were investigated including α-synuclein, SNCA, and the dopamine transporter, SLCA3; and usually in conjunction with the most commonly-studied environmental chemicals. From this broad scoping effort, NTP has identified data-rich topics for further systematic review (e.g., paraquat), as well as data-poor knowledge gaps that can be addressed through further research (e.g., targeted testing efforts).