Letter

Association of occupational and environmental clinics exposure code system and criteria for substances that cause work-related asthma

The Association of Occupational and Environmental Clinics (AOEC) is made up of more than 50 occupational and environmental member clinics, which although predominately in the USA includes clinics in other countries. AOEC has developed many educational and clinical resources since its beginning in 1988. Almost all of these resources are accessible by all practitioners.

In 1991, the AOEC developed a database system for use by AOEC clinics to help identify emerging occupational and environmental health concerns. This database included diagnostic and exposure data on occupational and environmental illnesses and injuries for patients seen in member clinics. The clinical information in the database is not available to all practitioners due to privacy concerns.

By 1993, AOEC recognised the need for a more standardised and flexible coding system for exposures in clinical settings. In 1995, an epidemiologist, and an industrial hygienist, developed an exposure classification (EC) system for use by clinicians that included not only chemicals but other hazards (Hunting, McDonald, 1995).[1] The EC-List is not an official document of any governmental agency and is available without charge at www.aoecdata.org . The EC-List is searchable, downloadable and an open source. Roughly half of the exposures have no Chemical Abstracts Service (CAS) number. Synonyms include common commercial names. Not all substances with CAS numbers are listed in the EC-List primarily since only substances that have been associated with adverse health effects by users of the list are on the EC-List. The EC-List is currently used by several states involved in surveillance for example, California, Massachusetts, New York, and Washington as well as AOEC member clinics and other clinicians.

As part of their Occupational Data for Health (ODH) initiative, the National Institute for Occupational Safety and Health (NIOSH) has developed a system to be incorporated into commercial software to translate industry narrative into the North American Industry Classification System (NAICS) and the occupation narrative into the Standard Occupational Classification.[2] However, the NIOSH system does not include classification of exposures.

There have been two primary systems used for coding exposure, the NIOSH: Registry of Toxic Effects of Chemical Substances (RTECS) numbers and the American Chemical Society CAS registry numbers. The RTECS system was last updated by NIOSH in January 1997 and currently available only by subscription or fee. CAS numbers is the more commonly used system. However, when used in clinical applications CAS has limitations as the CAS registry numbers only apply to chemicals and not to other exposures such as animal, plants or physical hazards such as heat or noise.

Additionally, most exposures are not composed of a single chemical. Exposures tend to be complex, and the CAS numbers cannot be easily grouped for analysis. Internet resources such as https://commonchemistry.cas.org/ used to identify CAS numbers also reveal that entering a commercial name such as the commonly used herbicide Round Up yields no results.

The design of the EC-list was developed to meet the following criteria.

► Toxicologically similar exposures must be grouped by chemical structure or other determinants of toxicologic effect.
► Physical hazards need to be included in system.
► Codes must allow precise classification of discrete exposures likely to be reported by clinicians but must also be flexible enough for broad definitions.

Each exposure code entry follows the following four rules:
► Everything with a unique CAS # has a unique AOEC code.
► Every synonym is listed only one time.
► Every primary name has one code.
► Each primary name has itself as a synonym.

In 1994, there were 750 exposures in 38 categories and there are now over 2000. Requests for additions are made to the AOEC. In the past 12 months, there have been 26 new codes added and 9 revised. Revisions may be due to changes in asthmagen status, primary name, or synonyms to make searches easier for clinicians. A substance may also be reviewed or re-evaluated by request of a clinic or state entity.

Initially, AOEC hoped to designate exposures that were a pesticide, solvent or asthmagen. Since most AOEC clinics see only adults, the asthmagen designation was limited to those substances causing work-related asthma (WRA). After several years, due to the volume of pesticides and toxicological complexities, it was decided the EPA listings of pesticides was a more efficient tool for clinicians. Solvents also proved a difficult designation to work with as solvents range throughout numerous categories: from 060.00 to 322.22. However, the WRA designation proved to be both clinically useful and within the scope of the listing.

The EC-List is currently the only known list of the causes of WRA that is regularly updated and revised in response to new publications in the peer-reviewed medical literature.[3] Other compilations of the causes of WRA are publications,[4] which become dated or websites such as the World Allergy Organization which has not been updated since 2014.[5]

The initial designation of an 'A' for a work-related cause of asthma was mainly derived from substances listed in the medical textbook Asthma in the Workplace.[6] However, no formal criteria were described for the listed agents.

In 2002, AOEC developed the first criteria for classifying a substance as causing WRA. These criteria were revised in 2006 and the last time in 2008.[7] The 2008 revision included criteria for substances that cause Reactive Airways Disease Syndrome. The original protocol and all revisions were reviewed/edited by AOEC members and approved by the Board of Directors and the clinic members of AOEC.[3] All but 20 of the exposures originally designated in Asthma in the Workplace[6] as causing WRA have been reviewed using the AOEC criteria.

The AOEC database and EC-List has received funding from NIOSH. The criteria for WRA and designation are strictly funded and approved through AOEC.

Unfortunately, disruptions due to the COVID-19 pandemic, EHRs access and the Health Insurance Portability and Accountability Act has interrupted the routine collection of data from the AOEC member clinics. However, the EC-List is still widely used by member clinics, various states, and private entities. Potentially its use could be expanded by its inclusion into EHRs in conjunction with the NIOSH ODH initiative.

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