Editorial note

Application of Prediction Models in Occupational Health Practice

The association between occupational exposures and diseases in different industries has been established a long time ago. In general, there are two distinctly different approaches for the prevention of work-related diseases. The first is primary prevention through exposure reduction and exposure control. This is the occupational hygiene approach, which makes use of health based exposure standards for chemical and biological agents in the air and translates these into exposure reduction strategies. Unfortunately this approach is not always possible or difficult to carry out. In such case, secondary prevention approach is required: early detection of occupational diseases through regular medical surveillance in order to allow early intervention and management in the hope to reduce complications from the disease.[1-3]

EVIDENCE BASED OCCUPATIONAL HEALTH PRACTICE

The new paradigm in occupational health, known as evidence based occupational health practice, expects the occupational health practitioner to use the results of appropriate studies that have evaluated cause-effect relationships and the efficacy of prevention strategies. These guidelines stress the importance of interventions focused at population level rather than at the individual level and provides suggestions for policy-making decision.[4]

The British Occupational Health Research Foundation recently produced comprehensive guidelines for prevention, identification, and management of occupational asthma (OA) based on almost 500 original studies.[3] Having all available information collected and rated for quality, the question is how practical these strategies are to be implemented in occupational health practice.[5] Methods commonly used in surveillance programs to identify cases of occupational asthma are respiratory questionnaires, spirometry, and skin-prick testing or identification of serum specific IgE to occupational sensitizers.[1] Nevertheless, no attempt has been made to quantify the prior- and post-test probability of the presence of OA given a test result. For example, after completion of a set of questionnaires, can an occupational physician accurately quantify the probability of OA? Is the probability sufficiently high enough to decide that further medical tests are needed to confirm the presence of OA? Or, is the probability low enough so that withholding advanced tests will not harm this worker?

PREDICTION RESEARCH IN OCCUPATIONAL HEALTH

Prediction research may answer to the above questions. Prediction research is relatively new to the occupational health field[6-10] while it is well established to support decision making in clinical medicine. In prediction research, prediction models are developed to estimate an individual's probability of the presence or future likelihood of occurrence of an outcome (i.e. disease of interest or its related condition). Multivariable regression analysis is usually used to develop the model by evaluating the independency and additional predictive value of a test given the presence of earlier information. The ability of a model to discriminate individuals with and without the outcome is evaluated using the area under the receiver operating characteristic curve.

Prediction models are used to assist clinical decision making for individuals, or to stratify individuals into risk groups with different likelihood for developing disease or disease severity. Prediction models enable objective and standardized quantification of the probability of having or developing a disease without performing (invasive) advanced and costly reference test. With a standard and objective quantification, an occupational physician can identify workers with a low probability of having a disease and exclude them from further medical investigations. Such scientific approach may greatly assist the occupational physician in formalizing the decision-making process. Diagnostic models would also increase the efficiency of the surveillance, as it decreases the number of unnecessary tests. Prognostic models may initiate counseling and interventions and are thus useful for identification of specific groups at risk.

MISCLASSIFICATION ISSUES

Nevertheless, like other medical diagnostic tests, a prediction model may produce misclassified outcomes. It may classify a diseased subject as non-diseased and thus, create a false sense of security. On the other hand, it may assign a healthy subject into the diseased group and thus, leads to unnecessary stress and intervention. Rational decision-making in a surveillance setting is, therefore, heavily dependent on improvement of the clinical outcome as a result of early diagnoses; the burden of disability from the clinical outcome; and adequacy of the cost, accuracy, and acceptability of the surveillance test.[11]

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ERRATUM

The Editorial Board of the Medical Journal of Indonesia hereby apologizes for a disturbing error of the previous edition of Medical Journal of Indonesia. In the article entitled: Morphometry of Deutero Malay Female Nose, only one name of the author was printed i.e. Theddeus O.H. Prasetyono. In fact, the article was written by two authors: Theddeus O.H. Prasetyono and Karina F. Moegni.

We herewith officially announce the annulation of the above mention article entitled: Morphometry of Deutero Malay Female Nose from the edition volume18, number 2, April-June 2009 of Medical Journal of Indonesia, and officially publish it in this edition volume 18, number 3, July-September 2009.