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Scientists Develop New Model for Estimating Risk of Melanoma

A team of researchers, led by scientists at the National Cancer Institute (NCI), part of the National Institutes of Health, has developed a model for estimating the five-year risk of melanoma, a potentially deadly skin cancer. This model, a first iteration that is subject to further refinement, can be used by health professionals to identify individuals at increased risk of melanoma and help them plan for potential interventions. The research appears in the August 2006 *Journal of Clinical Oncology**

"Melanoma has many features that make it a good target for early detection. It is increasingly common; it has early, visually distinctive lesions; and it can be diagnosed and cured in its early stages with simple surgery," said Margaret A. Tucker, M.D., an NCI scientist who is one of the authors of the study.

An estimated 62,190 new cases of melanoma will be diagnosed in the United States in 2006, and the rate of new cases has been increasing rapidly for many years. Estimated 10-year survival rates for melanoma range from over 90 percent for smaller, thin tumors, to less than 20 percent for larger, thicker tumors that have spread to lymph nodes. Melanomas initially evolve slowly and in a stepwise fashion. Prevention and early detection of very thin lesions are the keys to lowering the number of deaths caused by melanoma.

"Routine screening of the general population for melanoma using complete skin exams is possible," said Thomas R. Fears, Ph.D., the lead author of the study. "But it would be very costly because of the large number of examinations required, and it would be inefficient because of the many negative examinations. Targeting individuals

identified as being at high risk using the melanoma tool would improve efficiencies and help select the appropriate people for interventions." These interventions may lead to detection of early, curable disease or to a decrease in the risk of developing melanoma.

The researchers' model identifies high-risk individuals based on information that healthcare providers can obtain easily during a routine office visit and does not require the patient to fully disrobe. This gender-specific model uses information on skin complexion and sun exposure, and a physical examination of the back and shoulders to estimate the probability of an individual developing a first primary melanoma over the next five years.

The back and shoulders were chosen as indicators of melanoma risk because the evaluation of moles, freckling, or sun damage to these areas is more telling than on chronically exposed areas such as the face; and the number of nevi, or benign growths, on the back are highly correlated with the number of nevi over the whole body. The model is designed for physicians to assess non-Hispanic white men and women between 20 and 70 years of age. If, after using the calculator, a health professional finds a person to be at high risk for melanoma, the researchers suggest that the individual undergo interventions, including a complete skin examination, counseling to avoid sun exposures, regular self- and professional surveillance, or participation in prevention trials. The model is not intended to assess the risk of individuals with a prior melanoma or non-melanoma skin cancer or for those with a family history of melanoma, as they are already recognized as being at high risk.

In order to build a model for predicting melanoma risk, scientists surveyed 718 non-Hispanic white patients with invasive melanoma from melanoma clinics in Philadelphia, Pa., and San Francisco, Calif. The researchers matched these cases with 945 patients without disease from outpatient clinics in the same areas.

The participant survey included questions about the number of sunburns and suntans, and family history of melanoma, along with medical, occupational, residential and outdoor exposure histories. Each participant also had a complete skin examination, during which freckling pattern, skin color, sun damage and counts of small moles (greater than or equal to 2 millimeters in size and less than 5 millimeters in size), large moles (greater than or equal to 5 millimeters in size), and dysplastic nevi (moles that are

considered to be precancerous or more likely to turn into melanoma) were recorded. The physician and nurse examiners who conducted these examinations were uniformly trained and retrained every six months by the same instructor.

From these data, certain elements were selected to define the risk of melanoma in men and women separately, and risk models were developed similar to those developed using the Gail model for breast cancer risk**. Also incorporated into the melanoma model were U.S. rates of new cases and deaths from melanoma for 1992-2001 in different geographic areas, derived from NCI's SEER (Surveillance, Epidemiology, and End Results Program) statistical database. The combination of selected elements yielded an attributable risk (the proportion of melanoma diagnoses attributed to the study variables) of 86 percent for men and 89 percent for women, using at most seven elements. Attributable risks did not vary by age, ultraviolet B exposure, or hours spent outdoors. The observed individual risks varied widely, depending on age, other host characteristics, and geographic area. Ultimately, these observed risks led the scientists to develop a tool for calculating the absolute risk for an individual. The tool is available at http://dceg.cancer.gov/melanomarisktool.

These projections are not intended to identify current melanoma cases. There is broad agreement that primary care physicians should play an important role in reducing mortality by identifying those at high risk of melanoma and developing and implementing effective prevention and early detection tactics for them.

*Fears TR, Guerry D, Pfeiffer RM, Sagebiel RW, Elder DE, Halpern A, Holly EA, Hartge P, and Tucker MA. Identifying Individuals at High Risk of Melanoma: A Practical Predictor of Absolute Risk. *Journal of Clinical Oncology*, August 2006, Volume 24, Issue 22.

** The Gail model for predicting breast cancer is available online at: http://www.cancer.gov/bcrisktool.

For more information about cancer, please visit the NCI Web site at http://www.cancer.gov, or call NCI's Cancer Information Service at 1-800-4-CANCER (1-800-422-6237).