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ARTIFICIAL INTELLIGENCE SYSTEM FOR RECOGNITION OF OCCUPATIONAL LUNG DISEASE. P. Harber, J.M. McCoy, K. Bailey, P. Coffman, S. Shimozaki. Occupational Medicine Branch and General Internal Medicine Division, University of California, Los Angeles

An artificial intelligence occupational history system (AIOHS), a microcomputer based expert system, was developed to facilitate the recognition of occupational lung disease (OLD). The knowledge base (KB) structure was defined to capture relevant data using only two KB components: Objects (Job, Industry, Agent, Disease) and Relations (between pairs of primary objects of like or dissimilar type). Unlike traditional categorization schemes (e.g., SIC, SOC, ICDA), this permits direct use of the natural language of worker-patients. Forward chain search from case-specific data develops a network of possible causal associations, and backtracking then determines likelihood of causation using predicate calculus methods and disease class models (time, latency, dose-response relation, type, and duration). Additional data (e.g., respirator use) are requested by AIOHS only when relevant. A weighted binary search front-end interface uses SOC codes to find possible matches for jobs. (Empiric testing by two non-professional users with 100 jobs reported by asthmatics showed a mean user rating of accuracy of machine coding of 18.7 using a scale ranging from 1 = exact, through 20 = synonym, to 90 = uncertain). The AIOHS is a C-based expert system, combining features of slot-and-frame, graph, network, forward chain, backward chain, and predicate calculus systems. As a heuristic, it helps define the process used by OLD specialists, and as a practical tool it may facilitate the suspicion of OLD by non-occupational health specialists. (Supported by NIOSH grant OH-2288).