DXPLAIN - Demonstration and Discussion of a Diagnostic Clinical Decision Support System

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DXPLAIN is a computer-based decision support system which allows the user to enter a set of clinical manifestations (historical findings, signs, symptoms and laboratory test results), and then generates a list of diagnoses which may explain one or more of the manifestations entered.

A PC-based version of DXPLAIN will be used to discuss and illustrate a number of important topics including:

a. The creation and maintenance of the controlled vocabulary used by the system to interpret the user's entry of clinical manifestations, including recognizing differences in word morphology and synonyms, the representation of the clinical manifestations in a hierarchy, and the clustering of manifestations into "super-states". In addition, we will discuss the comparison of the DXPLAIN vocabulary with the META-1 vocabulary of UMLS.

b. The selection, naming and definition of the diseases in the disease list generated by DXPLAIN including the delineation of a more general disease or manifestation from a specific disease entity (e.g., tuberculosis versus tuberculosis peritonitis; angina versus coronary artery disease). We will discuss the potential benefits and problems of clustering diseases in terms of pathophysiological entities, and the issues raised by the addition of new diseases and new manifestations to the database.

c. The assumptions and algorithms used to generate the disease list from the clinical manifestations with particular concern to the use of the prior probability of a disease. The issues regarding updating, enhancement and extension of the knowledge base will also be discussed. We will illustrate the use of a spreadsheet display to allow easy and rapid comparison of the disease descriptions of related diseases.

d. The linking of DXPLAIN's knowledge base to a student computer-based medical record system (CASEBOOK) to provide easy movement from the entry of clinical information to the DXPLAIN description of the disease and list of relevant references.

e. The problems of identifying and keeping current a list of relevant references for each DXPLAIN disease.

f. The use of the DXPLAIN knowledge base to generate a critique of a student's evaluation of a patient case.

g. The problems and potential for dissemination, distribution, and support for a diagnostic decision-support system (via a telecommunications network, a hospital-based network, and a PC-based version).

h. The evaluation of such a decision support system. What is the gold standard for evaluation? We will discuss the comparison of DXPLAIN interpretations with the interpretations of a group of experts.

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