Possibilistic Medical Knowledge Representation Model MOHAMMAD ALSUN LAURENT LECORNU BASEL SOLAIMAN Medical Decision Support Systems involve two main issues: med ical knowledge representation and reasoning mechanisms adapted to the considered representation model.In [27] R. Seising et al. defined the Medical knowl edge as follows: "The certain information about relationships that ex ist between symptoms and symptoms, symptoms and di agnoses, diagnoses and diagnoses and more complex relationships of combinations of symptoms and diag noses to a symptom or diagnosis are formalizations of what is called medical knowledge." The term "symptom" is used for any information about the patient's state health (anamnesis, signs, laboratory test results, etc.).The major interest of using the possibility theory comes from its capacity to represent differ ent types of information (quantitative, qualitative, binary, etc.), as well as different forms of information imperfections such as uncer tainty, imprecision, ambiguity and incompleteness.Author's address: Institut Tel' ecom, T ' el' ecom Bretagne, ITI Dpt, ' Technopole Brest–Iroise, CS 83818, 29238 Brest Cedex 3, France.The proposed representation, reasoning model and the obtained validation results show a real interest in order to realize various goals of Medical De cision Support Systems such as classification, similarity estimation, etc.Medical Decision Support Systems such as Knowledge Based Systems, Case Based Reasoning Systems, Ma chine Learning Systems and Medical Data Mining Sys tems, have been constructed in order to reduce diagnosis error risks, as well as to help physicians making high quality and reliable medical decisions [4].In addition to the differ ent types of information imperfections, the information can be quantitative (numerical or binary) or qualitative (nominal and ordinal) [17, 29].Starting from the description, realized by an expert of the medical knowledge, describing the relationship between symptoms and diagnoses, the proposed approach consists on building a possibilistic model includ ing the Medical Knowledge Base.These sys tems involve two main issues: the medical knowledge representation and adapted reasoning mechanisms.Medical knowledge often suffers from different forms of information imperfections (i.e., uncertainty, imprecision, ambiguity, etc.).This paper proposes an ap proach to construct a new medical knowledge representation model, based on the use of possibility theory.Moreover, the proposed approach integrates several possibilistic reasoning mechanisms based on the considered knowledge.The medical knowledge, in general terms, has to be con sidered from two points of view: Expert Knowledge related to the physician's description of different rela tionships between symptoms and diagnoses, symptoms and symptoms, and diagnoses and diagnoses.Manuscript received May 30, 2011; released for publication Septem ber 6, 2011.Further more, diagnosis delivering is an error–prone task [3].Experts use their own experience of the medical cases as well as references knowledge sources to define the structure of the medical knowledge base.Thus, the heterogeneity and imperfection of medical knowledge must be taken into consideration while the construction of a Medical Decision Support System.In other words, Medical De cision Support System has to be able to deal with het erogeneous and imperfect knowledge.The validation of the proposed approach is then conducted using an Endoscopic Knowledge Base.Refereeing of this contribution was handled by Jean Dezert.Therefore, diagnosis delivering is an extremely critical, although difficult task. Patient Information is collected from each patient (patient data collecting and structuring).The first is crucial in order to establish Medical Knowledge Base, while the second leads to establish the patient database (i.e.,

Medical Case Base).INTRODUCTION Physician is the direct responsible for health and life of his patients.^ 1557–6418/12/$17.00 ?c 2012 JAIF 1