

## Design of a Knowledge-Structured Personal Health Record for Application in Preventive Care for the Elderly

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The French national project P2VIE (*Prévention et Prise en Charge du Vieillissement par l'Information Electronique*; Prevention and the Management of Aging by Means of Information Technology) will provide a set of Web-based resources for senior citizens, facilitating the management of preventive action. These resources are organized into 3 interacting modules: a Medical Information Server (MIS) providing knowledge about diseases and their prevention, a Social and Administrative Information Server (SAIS) providing information about services and legislation and a Personal Health Record (PHR) for the storage and display of the user's own medical data.

We developed an architecture based on the interaction between the PHR and the MIS, for dynamic definition of the structure and content of the PHR. Any medical item required for the personalization of prevention advice is present, by design, in the MIS knowledge base. These items are structured as medical data modules (MDM) and stored in a data dictionary. The response made to a given MDM by the senior citizen is stored and can be reused in many different contexts.

in the knowledge bases.

Individual medical data modeling in P2VIE knowledge bases is based on MDMs. MDM are sets of metadata such as

- A label (e.g. systolic arterial blood pressure)
- The type of data: numeric, Boolean, nominal
- Acceptable value range (for numeric data) for preventing typing errors
- Standard unit (e.g. mmol/l)

- Full text questions making it possible to obtain values.

The PHR processes the MDMs, to obtain a response from the user. The response is stored in the PHR as a triplet {MDM id, value, value date}.

Interactions between knowledge servers and the PHR are shown schematically in figure 1. Users wishing to obtain personalized prevention advice must run through the various steps of a decision tree. The system checks whether the answer to the question in the first step is already stored in the PHR. If it is, the question is bypassed and the system goes to the next step. Conversely, if no answer to that question is stored, the system uses the MDM attached to the tree node to question the senior citizen.

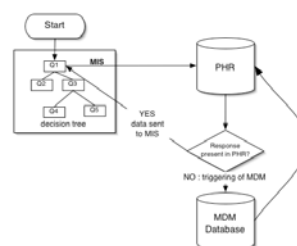


Figure 1 : PHR / knowledge bases interaction

MDMs are connected by a network of relationships and logical constraints.

P2VIE is currently at the prototype stage, with its first application in the field of nutrition of the elderly.