DEVELOPMENT OF HEALTH INFORMATICS IN VIETNAM

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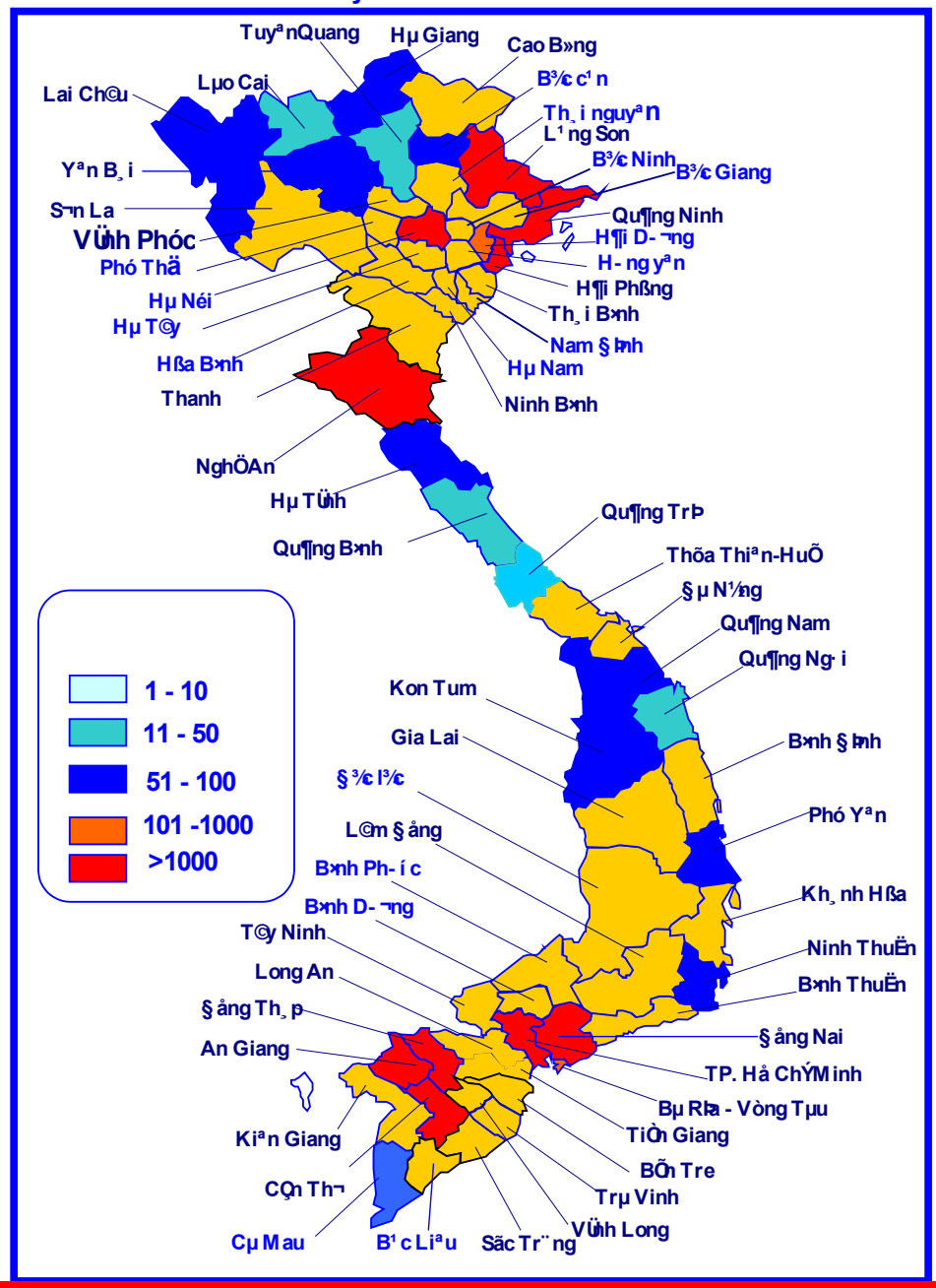
INTRODUCTION

- Vietnam is a developing country in South - East Asia with more 80 million inhabitants and many of them are living in countryside. Living quality has increased and whereas birth rate is not increasing in last years.

- Vietnam Health care System is composed of health units and centers in grassroot levels (village, commune, district) and provincial and national hospitals and reseach institutes. For therapy network there are more 800 hospitals, most of them are public. But the number of private clinics and hospital is increasing at present and also in coming years.

by 31/12/2002


Tuyª nQuang
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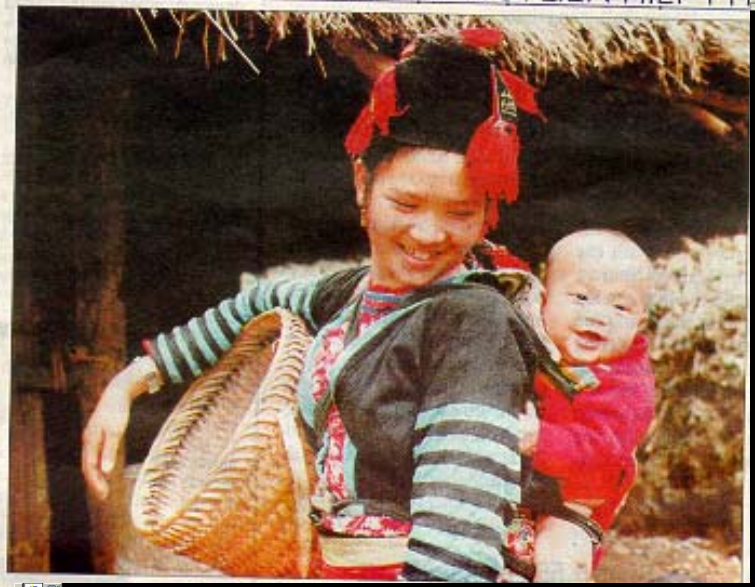
Health Care in villages



Health care in communes

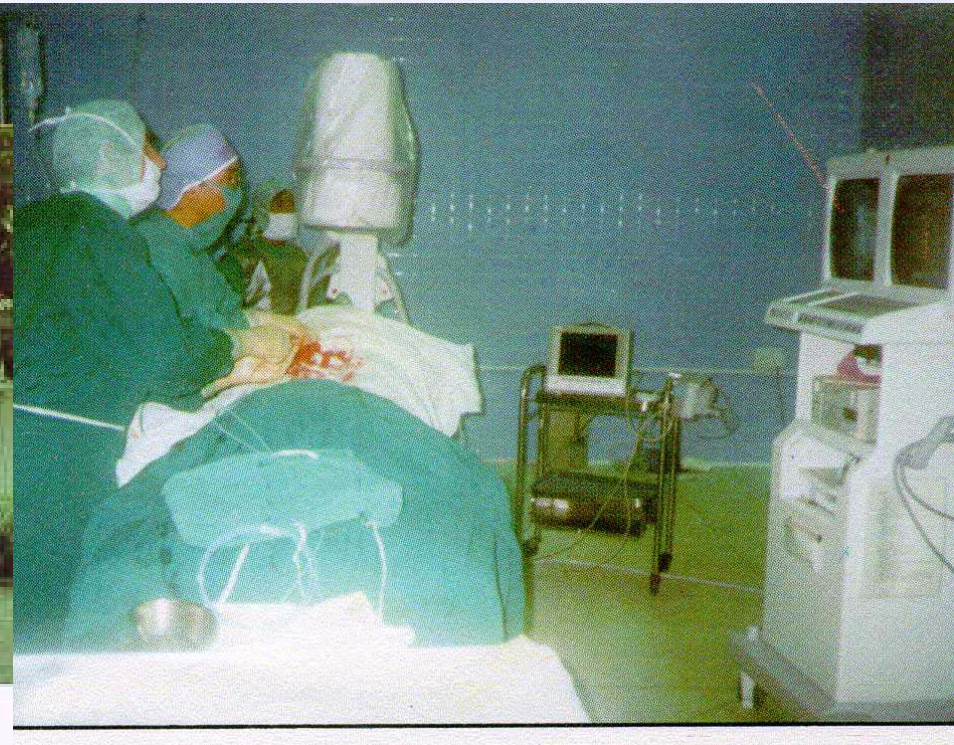
TRẠM Y TẾ XÃ CẨM NHƯỢNG, HUYỆN CẨM XUYÊN (HÀ TĨNH)


TRAM Y TE
TRUONG TRAM
KHAM
CHỮA BỆNH
SỨC KHỎE
SINH SẢN
VỆ SINH
PHÒNG DỊCH
PHÒNG CHỐNG
ĐƯỢC
XÉT NGHIỆM
ĐÔNG Y
MẠNG LƯỚI NHÂN VIÊN Y TẾ ẤP
& NHÂN VIÊN SỨC KHỎE CỘNG ĐỒNG

Health care center
In districts

Health care in Hospitals

BỆNH VIỆN TRUNG ƯƠNG HUẾ



Research and Education

INTRODUCTION

- The application need of information technology in health care is a global tendency in 21st century. In many countries in the world, hospital information systems, clinical decision making systems, telemedicine, virtual reality etc. are applied in hospitals and medical institutions.

- In Vietnam, in recent years, the government, step by step, realized medical informatics applications in some medical sectors and hospitals.

INTRODUCTION

- In this paper, we present the current situation of Information Technology development in health care and discuss about Health Information Technology development orientation for Vietnam in next years.

- We also propose some possible cooperation between Vietnamese researchers and researchers of other countries in Asia and in the world.

CURENT SITUATION OF IT IN HEALTH CARE IN VIETNAM

- Since 1995, under guidance of Information Technology Program Committee of the Ministry of Health of Vietnam, the medical sectors began to develop WANs, LANs in some regions in Vietnam and also in medical institutions such as hospitals, schools of medicine etc. Some hospitals, medical institutions bought, used and developed special software for their use.

CURENT SITUATION OF IT IN HEALTH CARE IN VIETNAM

- For Vietnam, the medical information Technology is a new field, therefore in the mean time, we have to learn this technology and also to develop some primary applications for medical institution. In general, the health informatics in Vietnam has the following points:
-

CURENT SITUATION OF IT IN HEALTH CARE IN VIETNAM

- Advantages
  - The mater plan for development and application of health informatics in Vietnam in the coming years is established by MoH.
  - Government has policy to support and stimulate the application realization in medical organizations and hospitals.
  - A team of MIT workers and researchers is formed and begin to have activities in education, software development….
  - On the other hand, the Institute of Post Technology Science and Institute of Post – communication technology have realized experimental project telemedicine. In recent years, in some hospitals, the hospital information systems were developed to help medical doctors and medical professionals in their health care serves.

CURENT SITUATION OF IT IN HEALTH CARE IN VIETNAM

- The Institute of Information Technology, National Center for Natural Science and Technology of Vietnam had realized some research projects such as “Intelligent Systems in medicine” for modeling reasoning of medical doctors in Cold-Heat diagnosis, syndrome differentiation diagnostic system, integrating Western and Eastern medicine. Some results of these researches were presented at the Conferences in Medical Informatics such as MIF’99 in Vietnam, MIST’99 in Taipei and APAMI’2000 in Hongkong. At the Asian Pacific Association of Medical Informatics conference APAMI-2000 in HongKong and in [3-7]. the Vietnamese medical informatics community joined APAMI as a APAMI member.

CURENT SITUATION OF IT IN HEALTH CARE IN VIETNAM

- Disanvantages
  - In many medical institutions, the officers have no global view of health informatics development need.
  - The Information technology human resource is located mainly in big cities such as Hanoi and Ho Chi Minh city. In countryside and remote areas, it lacks of human resource for computerization of their medical institutions.
  - The materials and equipment of Information technology in medical institutions is not enough i.e. the configuration of computers is low, it not fits to the actual applications.

CURENT SITUATION OF IT IN HEALTH CARE IN VIETNAM

- It lacks of medical software. At present, we are developing some experimental software such as hospital information systems in some hospitals.

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

- For the short-term plan, we are realizing the computerization of administrative applications in medical sectors and health organizations. We realize the networks of all medical organization in the whole of Vietnam.
- For the long-term plan, we will develop special software applications for hospitals, institutions of Ministry of Health.

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

- The detailed plan is the following:
- **From now – till 2005:**
- Educating informatics for employees in medical institutions
- Beginning to apply management informatics for every regions and medical sectors.
- Completing the common criteria of information technology for medical fields.
- Step by step to educate professional employees in medical informatics

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

From 2005 – till 2010:

- Unifying a computerization for all organizations in medical sectors.
- Completing the data base system for Health field.
- Developing all networking for all Health field.
- Promoting professional employees in medical informatics.
- Beginning to realize the projects in different fields of medicine.

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

- **After 2010:**
- ⑩ Focusing to realize application of medical informatics for specialization fields of medicine.

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

- In order to realize the above targets, in the same time, we are doing the followings:
- ***For Ministry of Health***
- "Updating" a consciousness about Health informatics for officers and managers so that they should understand a computerization of activities in medical sectors is necessary.
- Educating human source in medical informatics.
- Investing and funding for medical projects in both administrative and clinical applications.

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

- Promoting a activity quality of the center for Health Information Technology so that the center can take parts in research and consultation of special technology for Ministry of Health.
- Investing enough funding and tight cooperation in research institutions about Information technology and extending international cooperation with regional countries.

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

- ***For medical organizations***
- Establishing concrete rules for computerization of activities in every medical institution. Estimation of realization of computerization of activities in every medical institution.
- Selecting some appropriate institutions of every medical sector to invest and develop typical and standard applications of medical informatics. Then apply this for other medical institutions.

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

- ***For medical employees***
- Stimulating medical employees to use emails as the starting point to use and application of medical informatics.
- Depending on task of medical institutions, a skill of information technology is required.
- Stimulating medical officials and employees to learn medical informatics to get second BS degree in medical informatics.

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

- In order to achieve the above purposes, we think that it is necessary to build research group, application group and education group of medical informatics and educate the leading experts for these groups. They should be key persons in research, applications and education of medical informatics for medical institutions, hospital and medical schools in Vietnam.

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

- ***Research group:*** consists of medical informatics researchers and medical doctors who can conduct research and propose mathematical and informatics methods to solve the problems.
- ***Application group:*** consists of researchers who have a good programming skill. The programming languages are Visual Basic, Visual C and Java are most useful in practical applications.
- ***Education and training group:*** This group takes part in preparing the course materials of medical informatics subjects for students of medical schools and medical professionals at the medical institutions.

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

- We should focus on research and application of medical informatics in the following topics:
- - Administrative applications: to apply administrative and management systems in medical offices.
- - Computer Based Patient records: to store patient records in computer and easy to retrieve and exchange patient data.
- - Hospital information systems: to help physicians and managers at the hospitals in health care.
- - National Health information networking: to share health information.

HEALTH INFORMATICS DEVELOPMENT ORIENTATION

- - Community Information systems: using in preventive medicine and report of epidemic data.
- - Clinical information systems: to help physicians and nurses in clinical diagnosis and therapy.
- - Traditional medical information systems: to store about herbal plants, traditional medical prescriptions.
- - Pharmacy information systems: using in prescription and distributing drugs.
- - Dentistry information systems: help in managing patient data about dentistry.
- - Picture Archive Communication Systems (PACS):

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- In recent years, some international cooperations in medical informatics with some groups in abroad have been established.
- For example, the group of "intelligent systems in medicine" of the Department of Expert Systems and Soft Computing, Institute of Information Technology, National Center for Natural Science and Technology, HaNoi has established a cooperation with Department of Medical Informatics, Kyungpook National University School of Medicine, Daegu,

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- i.e. the Department of Medical Informatics, Kyungpook National University School of Medicine and of the Department of Expert Systems and Soft Computing, Institute of Information Technology exchanged researchers and staffs to conduct some research on mutual research interest as modeling of a mixed reasoning based on the integration of the occidental and the oriental medicine;

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- . Some Vietnamese students are studying MS courses in medical informatics at the Department of Medical Informatics, Kyungpook National University School of Medicine.
- In research, the Department of Expert Systems and Soft Computing, Institute of Information Technology joined the project :"Artificial Intelligent Applied to the Development of the Virtual Medical Office, February 14th , 2003. - João Pessoa – State of Paraíba (Brazil) proposed by Prof. L. M. Brasil [8] . The main objective of this work is to develop a platform for a Virtual Medical Office which may provide the necessary conditions to enable:

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- a) users-patients to fill in a form (the history of the patient) containing the basic information that will be analyzed by an expert doctor later;
- b) experts to consult the possible clinical cases related to patients who suffer from a certain disease, supported by the clinical evaluation (anamnesis and physical examination), laboratorial examinations, analysis of images and biomedical signals related to such illness;
- c) medical students to study and consult information about a specific sickness.

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- The first applications that have been inserted in the process of construction and validation of this project concern the fields of Cardiology and Mastology. At the present stage of the project, the database in these areas is being updated and a HES is being implemented. It is important to state that in the future such platform may be used as a Virtual Medical Office in more areas in Medicine, other than the ones mentioned beforehand. As it has already been said, the Virtual Medical Office platform will not only suggest diagnosis and statistic data, but also help with the medical teaching and with preventive treatment of patients.

CONCLUSIONS

- In this report, we have reviewed some main trends of medical informatics development in Vietnam. We have drawed some activities of research and development of medical informatics in Vietnam at present. For further work, we proposed some orientations of development of medical informatics in more ten years.

CONCLUSIONS

- We have emphazised on international cooperations and hope to have more cooperations between Vietnam and other countries, especially, with the APAMI countries in research, applicarion and edication of health informatics. In the next years, we are looking forward to organize international conferences in medical informatics in co-organization with APAMI countries.
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- **THANKS FOR YOUR ATTENSION !**

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- The specific objectives are:
- - To develop a Virtual Medical Office to permit:
- a) virtual consultations that will enable users either to get suggestions of diagnosis through the system or to get in touch with experts in the pre-defined areas;
- b) a data basis which will be always renewed, based on real cases;
- c) discussions involving high qualified professionals as well as students of different areas related to Health and who have different levels of knowledge;

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- d) access to clinical cases, previously registered, to support the decision of a medical team;
- e) in the fields of Cardiology and Mastology, it permits the definition of a therapeutical procedure for the patients, aiming at inferring, up to the end of the processing, a clinical procedure, a surgical procedure or an interventionist treatment of the patient;
- - To create a kind of software related to the Anamnesis (Patient Medical-Report System);
- - To apply knowledge elicitation techniques both to the Knowledge Acquisition Process (KA) and to the Data Mining;

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- - To define a topology for the Artificial Neural Network (ANN) of the Neural Network Expert System (NNES), which constitutes the Hybrid Expert System (HES), and implement it;
- - To apply the learning algorithm GENBACK to the NNES;
- - To apply the rule extraction algorithm FUZZYRULEXT to the trained and refined NNES, to provide an explanation of the answer given by the connectionist system, generating, then, an explanation of why the NNES has chosen a certain solution to a specific application;

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- - To implement the Rule Based Expert System (RBES);
- - To create an attractive multimedia graphic interface;
- - To study the performance of the HES when it is applied to Medical Decision Support Systems;
- - To study the performance of the HES when it is applied as a research resource for students;

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- - To study the performance of the HES when it is applied to the Virtual Medical Office Platform;
- - To implement the HES in a Medical Center, for instance, *Hospital das Clínicas* (HC-UFPE), in Recife (Brazil) and/or the University Hospital (HU-UFPB), in João Pessoa (Brazil);
- - To publish scientific articles in magazines, Congresses and Symposia.

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- The construction of the platform for the Virtual Medical Office will be based on:
- 1) DATA MODULE:
- - Clinical parameters: divided into database and medical-report system;
- - Signal processing;
- - Image digital processing;
- - Telemedicine.
- 2) HYBRID EXPERT SYSTEM MODULE (medical decision support system):
- - Artificial Neural Network Expert Systems (ANNES);
- - Rule Based Expert System (RBES).

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- 3) INTERFACE MODULE: hypermedia and Virtual Reality (VR);
- 4) EDUCATIONAL MODULE: Intelligent Tutoring System (ITS);
- 5) USER MODULE: divided according to the user profile (health professionals and students, and user-patient)
- The organizational structure of the Department of Expert Systems and Soft Computing of the Information Technology Institute – National Center of Natural Science and Technology (Hanoi, Vietnam) consists of the:

SOME INTERNATIONAL COOPERATIONS OF IT IN HEALTH CARE

- - Laboratory of Development of Expert Systems and Intelligent Systems in the medical area.
- This laboratory involves doctor and master researches and graduation students.
- The research lines developed by this laboratory are:
- - Development of systems for the diagnosis of kidney sicknesses and heart disorders, based on ECG;
- - Development of Intelligent Tutoring Systems such as the ITS for the detection of heart disorders based on ECG;
- - Knowledge based on the analysis of image of heart veins;
-