eHealth strategy and implementation activities in Austria

Report in the framework of the eHealth ERA project

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About *eHealth ERA* and this report

This report is the outcome of research in the context of the eHealth ERA project (Towards the Establishment of a European Research Area). The project was implemented by empirica GmbH (co-ordinating partner, Germany), STAKES (Finland), CITTRU (Poland), ISC III (Spain), CNR (Italy) as well as EPSRC and Imperial College (United Kingdom), based on a Coordination Action contract with the European Commission.

The European Commission, Directorate General Information Society and Media, supports this project to contribute towards greater transparency across Member States and other participating countries on eHealth strategies as well as innovation-oriented research and technology development (RTD) initiatives, including the coordination of Member States' eHealth strategy formulation and implementation. Thereby the project aims at fostering the establishment of an effective European Research and innovation Area (ERA) in eHealth. All project results are available on the internet and can be accessed at the *eHealth ERA* website: www.ehealth-era.org.

The status of activities described is generally August 2006.

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Table of contents

Country Report: *AUSTRIA*

1   Executive Summary

Promoting the use of information technologies in healthcare is one of the defined priorities in the Austrian Health Reform Act 2005. As the Austrian health system is organized federally using complex mechanisms in planning, guiding and financing, common goals had to be agreed between the different levels of responsibility. The main coordination body on promoting the use of information technologies is the Ministry of Health.

eHealth is understood as a set of new business models and tools to improve health services. In early 2006 a first draft version of an overall National eHealth Strategy was published by the Austrian eHealth Initiative (EHI). This committee was launched in April 2005 as one of several groups to do conceptual work. A consultation process to discuss and finalise the strategy was started in September 2006.

According to the i2010-Initiative of the European Commission Austria has set up an overall information society programme including eHealth as an important field of application. There is a commitment of harmonising mechanisms of eHealth and eGovernment. The Austrian eGovernment Strategy that has lately been proofed as leading in Europe is putting a special focus on identity management. The Austrian Citizen Card as the basic concept was launched by the Federal Government already in November 2000.

2 Healthcare System Overview

2.1 Basic facts and features of the Austrian healthcare system

The Austrian health care system is characterized by the federalist structure of the country, the delegation of competencies to self-governing stakeholders in the social insurance system as well as by cross-stakeholder structures at federal and Länder level which possess competencies in cooperative planning, coordination and financing. According to the Federal Constitution, almost all areas of the health care system are primarily the regulatory responsibility of the federal government. The most important exception is the hospital sector.

In this area, the federal government is only responsible for enacting basic law; legislation on implementation and enforcement is the responsibility of the nine Länder. In the outpatient sector, but also in the rehabilitation sector and in the field of medicines, health care is organized by negotiations between the 21 health insurance funds and the Federation of Austrian Social Insurance Institutions on the one hand and the chambers of physicians and pharmacists (which are organized as public-law bodies) and the statutory professional associations of midwives or other health professions on the other. The various sectors of the health care system have traditionally been characterized by different stakeholders and regulation- and financing mechanisms. However, in recent years there have been increased efforts to introduce decision-making and financing flows which are effective across all sectors.

Since 2002, all the Länder (except Vienna) as well as some of the private non-profit owners have privatised their hospitals, mainly in the form of organizational privatisations. The various private operating companies have one thing in common: they are responsible for the management of hospitals, whereas the Länder or local authorities as (majority) owners usually act as a guarantor. The Austrian health care system has developed almost completely into a model which is mainly based on decentralized contracts with all service providers.

Health care financing and expenditure

The financing of the health care system is pluralistic in accordance with the constitution and social insurance laws. The social health insurance system, which is the most important source of financing, provided a total of 45.3% of total health care expenditure in 2004. Mandatory insurance is based on membership of an occupational group or place of residence; thus there is no competition between health insurance funds. In 2004, the health insurance funds together had a deficit of €253 million.

In case of need, all those insured within the social health insurance system have a legal entitlement to benefits in kind and cash benefits within the legal framework of the specified range of benefits. There is a wide range of benefits. Alongside statutory obligatory benefits, the health insurance funds also provide various levels of voluntary benefits according to their statutes, such as in the field of prevention, for example, but particularly in relation to exemption from co-payments.

25% of total health care expenditure is financed by the federal government, the Länder and local authorities. 10% of this share was accounted for by tax financed long-term care cash benefits. The latter have been paid out to people in need of long-term care since 1993.

In 2004, around 25% of health care expenditure was financed privately. Private households bore 13.5% of health care expenditure by means of indirect cost-sharing (services whose costs were fully borne by the insured) and 7.6% by means of direct cost sharing (co-payments). In addition, 2.4% was financed by private insurance premiums, 1.4% by private non-profit organizations and 0.2% by employers (for the services of company physicians). 53% of indirect cost sharing was accounted for by hospitals (mainly as private health insurance) and 30% by dental treatment. Direct cost sharing was increased in recent years and affects almost every service provided by social health insurance; however, the outpatient clinics fee introduced in 2001 was withdrawn again in 2005 due to the high costs involved in its implementation and the considerable resistance it had encountered. A large part of direct cost-sharing (47%) in 2004 was accounted for by the services of non-contracted physicians, prescription fees (19%) and therapeutic products (18%). Certain people in need of social protection and the chronically ill are exempted from the prescription fee. In addition, health insurance funds issue their own guidelines on exemptions in other service areas. A total of around 900 000 persons or about 12% of the Austrian population is exempted from direct cost-sharing.

In 2004, Austria spent around €23 billion on health care. This corresponded to 9.6% of its gross domestic product. Without taking the expenditure for long-term care into consideration, which accounts for around 10% of total health care expenditure, the proportion was 8.7%. The current revised data shows significantly higher health care expenditure than with the previous method of calculation, which for 2003 had only indicated a level of 7.5% of GDP and US$ 2257 per capita in purchasing power parities (versus US$ 2951). Seen from this perspective, Austrian health care expenditure no longer appears under-average in comparison with the EU Member States before May 2004, but over-average. Austria ranks in the lower third of EU

countries when viewing the public share of total health care expenditure, with a figure of around 70% (68% according to the old health expenditure calculation method).

Health care delivery system

The public health service is the responsibility of the Länder, which delegate most of the relevant tasks to district administrative or local authorities. The public health service is particularly responsible for health reporting, protection against infection, the supervisory activities of health inspectors, environmental medicine, the mother and child preventive programme and the school physicians' service. Preventive check-ups for young people and adults are financed by the social health insurance system. In 1998, the Healthy Austria Fund was introduced, which finances health promotion initiatives from VAT revenue.

Since 2005, health promotion and prevention are also defined as a subtask of the health platforms which manage the Länder health funds and which are intended to steer health care provision and financing across sectors.

Those covered by health insurance can freely choose between service providers in the outpatient sector, of whom the majority work in individual practices. In addition, outpatient clinics and hospital outpatient departments offer outpatient care. In 2003, only 43% of the 19 209 self-employed physicians in private practice had a contractual relationship with one or more health insurance funds. Around 58% worked as non-contracted physicians. Insured Persons who consult non-contracted physicians are reimbursed with four fifths of the fee which the health insurance funds would pay to contracted physicians.

In 2004, the density of practising physicians was 3.5 per 1000 inhabitants and thus average for the EU (3.5). Compared to 1980, the number of practising physicians and dentists (0.5 in 2003) has risen at an over-average rate, with the figures for both professions actually doubling. There is a considerable variation in the density of physicians between the Länder. The number of nursing staff also doubled between 1980 and 2003 to 6 per 1000 inhabitants. However, it was still clearly below (by 17%) the EU average of 7.3 in 2003.

Hospitals which are listed in the hospitals plan of a Land are subject to public law ("fund hospitals") and have a statutory requirement to provide care and to admit patients. They are entitled to legally prescribed subsidies from public sources for investments, maintenance and running costs. In 2003, the ratio of beds to inhabitants of 6.0 beds per 1000 persons was clearly above the EU average of 4.2 per 1000 inhabitants. In addition, Austria had by far the

highest admission rate: 28.4 per 100 inhabitants. The average length of stay in 2003 was shorter than that of the EU average (6.4 days compared to 6.9 days); the utilization of bed capacity at 76.2% was marginally below (77.5%).

With the passing of the 1993 Federal Long-Term Care Act, Austria reacted comparatively early to the approaching demographic challenges. Long-term care provision in Austria is financed almost exclusively from the federal government's budget and is paid to individuals as a money transfer in seven stages depending on their needs. Like acute inpatient care, long-term care too is a sector where federal cooperation instruments are used, specifically to ensure the uniformity of entitlement criteria and quality standards of long-term care institutions.

Since 2006, pharmaceuticals are licensed by the PharmMed Austria division of the Federal Office for Safety in Health Care in the Austrian Agency for Health and Food Safety. The Federation of Austrian Social Insurance Institutions decides on the reimbursement of the costs of licensed medicines by social health insurance funds. It receives advice on this issue from the Medicines Evaluation Commission. Since 2004, decision-making on pharmaceutical reimbursement is performed according to a box system.

http://www.euro.who.int/Document/E89021.pdf

Main decision making level for health care policy in the country

The Federal Ministry of Health, Family and Youth is the main policy-maker in health care in the country (http://www.bmgfj.gv.at/)

2.2 National level health goals

Major currently running national programmes for public health and healthcare system development

Austrian Structural Plan for Health. In accordance with the basic intention of the new agreement to intensify the integration of the public health service, the Austrian Structural Plan for Health will be developed into an instrument of integrated health planning for the entire field of health care provision, involving inpatient and outpatient care, and acute and long-term care, including rehabilitation as well as the interfaces between the different care sectors and levels. The methodical approach to this is service provision planning, which will replace the traditional planning of locations, the specialties offered and bed supply. The amount of medical services

required (based on more than 400 diagnoses and services) until the planning horizon of 2010 is estimated on the basis of regionally highly divergent age- and gender-specific population forecasts and epidemiological and medical developments which also take regional particularities into account.

The required provision of services is linked to binding criteria (such as staffing levels, available infrastructure and minimum patient numbers to ensure sufficient practice) in order to guarantee an equally high quality of services throughout Austria. The establishment of accessibility criteria is designed to ensure the continued existence of a regionally balanced care provision structure in the future. When these criteria are fulfilled, the provision of services is basically independent with regard to location, but also in respect of the type of institution, that is to say it can be inpatient, day care or outpatient (in hospital outpatient departments or in the private practice sector), and in the public or private sectors. An initial Structural Plan for Health was to have been drawn up by the end of 2005; the relevant negotiations, however, have not yet been completed.

For the time being, the Austrian Structural Plan for Health will contain a service provision plan for the acute inpatient sector and – in this first stage – will describe the actual status of further care provision sectors and levels (outpatient medical treatment, rehabilitation, care of the elderly and long-term care) as far as this is permitted by the currently available data. In this way, comprehensive and comparable information about the existing health care structures in all Austrian regions will be made available for the first time. A total of 32 health care regions were determined for planning within the framework of the Austrian Structural Plan for Health. These are orientated towards the regions as defined by the European Commission's EU-level statistics classification system (NUTS III regions). The health care regions are assigned to four health care zones (west, north, east and south).

http://www.euro.who.int/Document/E89021.pdf

3 Strategic eHealth Plans/Policy Measures

3.1 National-regional eHealth policy

3.1.1 Main actors

Ministry playing a role in influencing national eHealth policy

The main coordination body on promoting the use of information technologies is the Federal Ministry of Health, Family and Youth (http://www.bmgfj.gv.at/).

3.1.2 eHealth Roadmap: Background, Targets, Progress, Prospects

Promoting the use of information technologies in healthcare is one of the defined priorities in the Austrian Health Reform Act 2005. As the Austrian health system is organized federally using complex mechanisms in planning, guiding and financing, common goals had to be agreed between the different levels of responsibility.

eHealth is understood as a set of new business models and tools to improve health services. In early 2006 a first draft version of an overall National eHealth Strategy was published by the Austrian eHealth Initiative (EHI). This committee was launched in April 2005 as one of several groups to do conceptual work. After a public consultation process the eHealth Strategy was re-presented in January 2007.

The Austrian eHealth strategy consists of several main areas:

- Interoperability -standardisation
- Patient identification and archiving
- Network of the health care and social system, infrastructure
- Customer related information systems
- Health care system related information systems
- Telemedicine

"The Austrian E-Health Initiative"-group consists of 7 working groups (more than one hundred members from the Ministry of Health, eGovernment , IT-companies, hospital organisations, social and private insurance companies, chamber of doctors, chamber of pharmacists and universities) which aim to achieve a strategy and roadmap for using information and communication technologies in Austrians Healthcare system. These working groups publish recommendations about several issues. Using e-card for patient identification, constructing

electronic directory of the health service providers in Austria and using SOAP, XML, SAML for messaging are some of these recommendations. In addition IHE XDS is recommended as fundamental architectural framework for HER data interchange. For semantic structuring of the health records CEN prEN 13606, HL7 (V3), CDA, UN/CEFACT CoreComponents, and DICOM (for graphic data) should be further considered and evaluated.

According to the i2010-Initiative of the European Commission Austria has set up an overall information society programme including eHealth as an important field of application. There is a commitment of harmonising mechanisms of eHealth and eGovernment. The Austrian eGovernment Strategy which has lately been proofed as leading in Europe [1] is putting a special focus on identity management. The Austrian Citizen Card as the basic concept was launched by the Federal Government already in November 2000. [2]

eHealth applications are affected by legislation in the various fields of organising the Health System and legislation on data protection. The legal basis for eHealth is the Health Reform 2005 Act, including the "Health Telematics Act", which aims at the secure exchange of individual health data and the "eGovernment Act" [3] of 2004.

The main participants in the e-Health Strategy are:

- Citizen
    - Passive: patient
    - Active: diary of health care activities, sending data from mobile equipment
- Actors, providers
    - Hospitals, ambulatories, doctors, pharmacies, dentists, other health professions (nurses, midwives, physiotherapists, occupactional therapists, logopedics….)
- Financiers
    - Social insurance companies
    - Private health insurance companies
    - National and provincial health care agencies
- Science
    - Health economics, epidemiology
- Politics
    - Planning
- Public
    - Information about quality
    - Information about capacities
    - Medical knowledge

Implementation roadmap, progress and main players expected to participate

Besides a large number of eHealth solutions on a regional level or on a bilateral co-operation basis the implementation activities are mainly focused around the "e-card"-(Health Insurance Card)-System [4]. The nationwide roll out including more than 8 Million insured citizens and 12.000 general practitioners was successfully finalized by the end of 2005. In the first step the e-card is used as the key card for health insurance verification. Starting 2006 the hospitals will be integrated and different additional functionalities will be offered stepwise to all card-users.

The set-up of an eMedication System offered on a voluntary basis will be a first step to an ePrescription System. The e-card System will provide the network and security infrastructure.

As the major mid term eHealth project the set-up of a National Electronic Health Record (ELGA) has been defined. Initial steps, both in 2006, are a feasibility study and the formation of an ELGA project office (see page 26: EHR)

Additional or adjustment of existing legislation will be necessary.

Patient mobility in Austria is mainly a question of health insurance reimbursement, especially for tourists using Austria health services. The e-card is compatible with the Netcard project (*NETC@RDS*) which aims to improve the access of mobile citizens to trans-European health services by using advanced Web-oriented applications either based on IT systems, smart cards or combining both of them.

Public health service institutions give broad information on prevention and health promotion also using the Internet as one communication channel. The Austrian Ministry of Health runs a website with broad variety of themes related to health. There are several Internet portals (even private ones) which provide useful health information for the citizens and health professionals.

Preliminary plans or experiences in extending eHealth implementation to social care

The Austrian Citizen Card project was launched by the Federal Government in November 2000 and is used as the key card for health insurance verification

http://www.buergerkarte.at/index_en.html

http://www.a-sit.at/signatur/rechtsrahmen/e-govg_engl.pdf

Existing or planned eHealth cooperation of Austria with other Member States

Net Cards Project. Aims to improve the access of mobile European citizens to the national health care systems using advanced smart card technology. It also aims to implement and evaluate technical solutions for the European Health Insurance Card electronification and for improving additional services such as the inter-European health costs clearing/billing processing.

Current Phase A2 is the second of four project steps (initial market validation, full market validation, initial deployment, full deployment), and it aims to establish and demonstrate new improved health care administration services for mobile citizens across the E.U.. It also addresses the recommendations from the European Commission to evaluate technical solutions for European Health Insurance Card electronification and for additional services such as health costs clearing/billing processing.

Phase A2 will establish and evaluate a number of large scale "e-EHIC advanced demonstrators". Phase A2 will build on the initial market validation work already conducted by the main Health Insurance Providers and the national clearing houses from Austria, France, Germany and Greece under NETC@RDS Phase A1. The result will be a Full Market Validation/Evaluation and preparation of a consolidated final Business Plan based on live applications in pilot regions within the 10 E.U Member-States (Austria, Finland, France, Germany, Greece, Italy, Czech Republic, Slovak Republic, Slovenia and Hungary).

http://www.netcards-project.com/index.php

3.1.3 Dissemination and co-ordination activities

Activities for making the national eHealth roadmap more widely known

The roadmap for implementing the Electronic Health Card has been published by various means (workshops, journal articles, online information) and by numerous organisations involved. The federal government focuses its eHealth dissemination activities on the Electronic Health Card that constitutes the backbone of the federal eHealth strategy. There is a dedicated website for the Health Insurance Card [4] with information about it.

Means available to the general public for expressing their opinions on eHealth policies and plans

The proposal for an Austrian eHealth strategy developed by the Austrian eHealth Initiative was published for public consultation on the website of the Ministry of Health for a two-months periode. Delivered statements were discussed in the eHealth Initiative and partly integrated in

the text. Operative eHealth activities, such as the set up of the EHR/ELGA has to be adopted by the "Bundesgesundheitskommission", the high level steering body of the Austrian Health system, including the federal and regional level, social insurance and representatives of health-professionals and patient organisations.

3.2 Investment and Reimbursement framework

Investments for the implementation of eHealth systems and applications supported or funded

The federal structure of the Austrian state partly hinders the implementation of country-wide solutions and uptake of eHealth services. Given that most of the decision-making is done by the regional governments, all decisions related to investments and technological systems are taken on a sub-federal level.

The adopted and started ELGA-project (national EHR) and its sub-projects (e.g. on identification, registers, standards, data protections, system architecture) is a national activity, adopted and financed by overall steering body, the "Bundesgesundheitskommission".

Investment from Regional Funds, Structural Funds, World Bank, PHARE Programme, Specific national credit programmes, other sources

There are no projects funded by the following funding sources: Regional Funds, Structural Funds, World Bank, PHARE Programme, Specific national credit programmes.

Reimbursement schemes to support the diffusion and implementation phase of eHealth applications

No reimbursement schemes to support the diffusion and implementation phase of eHealth applications.

Types of eHealth services eligible for reimbursement

The Health Insurance Card System ("e-card) is an e-health service reimbursed at the country.

4 eHealth deployment status

4.1 eHealth infrastructure

4.1.1 Physical networks

Physical networks available for supporting the provision of eHealth services

Austria is well placed concerning the relative development of the Information Society. While Internet uptake is roughly at the same level as the EU15 average, broadband penetration has advanced faster than in most other Member States: 15 percent of the population have access to high-speed Internet in their homes. Similar to the Nordic countries and the Netherlands, the digital divide is considerably below the EU average, which suggests broad participation in the Information Society regardless of gender, age or educational attainment.

Austrian health institutions (hospitals, ambulances) and the Austrian physicians are well equipped with ICT. This provides a good background for the implementation of eHealth services.

In the short to medium-term future new applications of ICTs in medical treatment are expected to play an every more important role. An example is the combination of diagnostic technologies with ICTs to transmit medical measurement data between different actors in the health system

http://www.euser-eu.org/eUSER_eHealthCountryBrief.asp?CaseID=2214&CaseTitleID=1055&MenuID=118

The set-up of a pysical network connecting all inpatient and outpatient health care providers was finished at the end of 2005 (roll out of national e-card).

4.1.2 Legal and regulatory framework

National legislation addressing data protection, telecommunications, digital signatures, eHealth service provision and health-IT product liability

There is national legislation in the country addressing about the data protection and digital signature as Data Protection Act 2000 (Datenschutzgesezt 2000), Federal Electronic Signature Law (2000) and General Act on Administrative Procedure (Allgemeines Verwaltungsverfahrensgestz 1991).

The Federal Ministry of Health, Family and Youth, the Government of the Federal Provinces and the Local authorities are the relevant regional/national bodies and authorities that have the responsibility of overseeing the development and enforcement of the legal and regulatory framework about digital signatures and data protection

The 2005 Healthcare Reform Act, adopted by parliament in December 2004, includes a regulation on healthcare telematics "Health Telematics Law". The law defines minimum standards to safeguard the confidentiality, reproducibility and non-manipulation of communication activities

1. Allgemeines Verwaltungsverfahrensgesetz 1991 (General Act on Administrative Procedure 1991) - http://www.ris.bka.gv.at/erv/erv_1991_51.pdf
2. Datenschutzgesetz 2000 (Data Protection Act 2000) - http://www.ris.bka.gv.at/erv/erv_1999_1_165.pdf
3. http://www.a-sit.at/signatur/rechtsrahmen/e-govg_engl.pdf
4. http://www.euser-eu.org/ShowCase.asp?CaseTitleID=561&CaseID=1198
5. Federal Electronic Signature Law **http://www.a-sit.at/pdfs/SigG.pdf**

4.1.3 Education and training on ICT

Education programmes on the national level to promote the acquisition of general or eHealth-specific ICT skills by the general population

eFIT Austria is the largest Austrian IT-Initiative in the field of education, science and culture within the framework of eAustria. It also constitutes a platform for IT-initiatives and projects aimed to exploit the new possibilities for teaching, learning, research and tools in the fields of education, science and culture. eFIT is composed of four parts (eLearning - school - , eScience, eCulture, eTraining - adult education). It analyses and bundles IT-Strategies corresponding activities for the education in Austria also in the context of the "computer billion", made available by the Federal Government until 2003. eFIT is an evolving IT-platform and is constantly enriched by new projects.

Furthermore, there are numerous education and training on ICT initiatives as

- A particular emphasis in the "**Objective for job-market policy 2002**" of the job market service (Arbeitsmarktservice - AMS) was put on the "support of growth by human resource development". The target was to provide IT qualifications to unemployed

people. The initiatives implemented in this context were directed at a high-quality vocational training in the field of IT. The initial goal of at least 1,956 women involved was achieved and exceeded, as 3,459 women were involved (= 177 %). In year 2002, 49.113 people (32.113 women and 17.000 men) attended training courses on IT or EDP for different occupations,. Courses were run by the Arbeitsmarktservice at local level.

- The association **frida** reacts with the collection of material "**kolloquiA**" ("kolloquiA Frauenbezogene/feministische Dokumentation und Informationsarbeit in Österreich"; Lehr- und Forschungsmaterialien 2001 - "Training and research material on gender issues – 2001") to the gender asymmetry in the Austrian information system, present both in the working practice, in the theoretical basis and in education and training. The development of this research basis and of the training materials aims at a multidisciplinary basis to which it is possible to refer for theoretical, practical, educational and political aspects. (http://www.frida.at/ - http://www.frida.at/kolloquia.htm)

- The Federal Ministry for social security and consumer protection (BMSK) is running the study project **"Women-Technology"** (Frauen-Technologie-Projekt) to prepare and implement measures for the increase of the women's share in the area of the new technologies via some pilot projects run in co-operation with selected companies.

- In the context of the FFORTE initiative (Frauen in Forschung und Technologie – Women in Research and Technology) the Ministry for Science and Research is responsible for a special programme "**Gender IT**", to develop gender-specific and extensive research on the topic "women and technology development". The programme takes into consideration social, cultural, scientific and technical aspects, includes two workshops and a pilot project and will also open the way to fellowships. It will address for instance issues such as to what extent technologies themselves take certain shape, which excludes women (or other social groups).

- The project **FIT – Frauen in die Technik** (women into the technology), started in 2001, aims at informing young women (16-19 year old) about study and training possibilities in the technological field. It is run in 6 locations and co-funded by the ESF and the Ministries. (http://www.tn.uni-linz.ac.at/FIT, http://www.cis.tu-graz.ac.at/fit).

- The **KEBÖ -Project** ("IT-Kompetenzen for EB-MitarbeiterInnen" - IT-Skills for women workers in adult education courses), run by BFI Austria (http://www.bfi.at) aims to provide IT training to women in adult education courses. The number of women participating exceeded the target of 50%. Courses address subjects such as EDP, Internet, ECDL.

- The project "**Bildung ohne** Spr@chgrenzen" (learning without language barriers) aims to improve the job opportunities of migrants via education and training in IT subjects, designed according to the specific needs of this target group. It includes ECDL and has a special focus on women (mailto:Spr@chgrenzen).

- The project "**Bildungspool"** aims to integrating foreign women by increasing their qualifications, by German courses and by flexible and open forms of learning, including in ICT basic skills.

- The project **Interaktiv** is run by the Association of Turkish parents in Austria and funded in the context of the initiative for further learning in ICT. It provides basic IT skills to people with low education, housewives (40+ years old), long-term unemployed and elderly people of Turkish origin.

- The project "**Let's go ... Computer und Internet**" of the BMUKK (http://www.bmukk.gv.at) provides basic IT courses in 7 neighbourhoods in Salzburg, in co-operation with different institutions and opening the way to other courses.

- The **IT4U** training initiative of the Austrian computer society (http://www.ocg.at), result of the co-operation between the Austrian computer society, enterprises and the Federal Ministry for traffic, innovation and technology (BMVIT), encompasses a series of training possibilities such as ECDL, ICT expert skills,…. (http://www.it4u.ocg.at).

- The **Informatik-Akademie** (computer science academy) is a non-profit organisation created by the Austrian computer society (http://www.ocg.at) in 2001. It provides support in IT development programs via transfer of dynamic technology and exchange of experience between science and practice (http://www.ia.ocg.at).

- The initiatives by the **Arbeitsmarktservice (AMS) at regional level** include, among other initiatives:

  o - *IT-Raum/Rampe* (Region: Steiermark): "Pre-qualification" to the training "MEAS" (modular EDP training system), covering the areas of programming, networks, web design, data base development, office, media. The project aims to provide a basic knowledge to the women so to meet better the criteria for admission to MEAS and to try to balance the fact that men have usually a better background.

  o *"Tele-fitness" - EDP course with Internet and teleworking* (Vienna): Course providing basic training on EDP, English, operating systems, spreadsheets, word-processing and on Internet particularly for people re-entering the labour market, the target group re-entering gutter, also with a view to telework.

- o ***ICT Level 1 and 2*** (Vienna): Courses providing basic knowledge on hardware, office applications, simple technical applications, ECDL (European computer driving licence) with certificate.

- o - ***ICT Level 3 and 4*** (Vienna): Courses providing expert knowledge in specific fields, such as communication and computer technology, commercial EDP, network technology, including the recognised certification (e.g. Multimedia, ECDL Advanced, Chart Programmes, personnel and accountancy and administration, programming, data base development, goods and finance programmes).

- o ***IT-Berufsorientierung for women - "Come 2 Technology"*** (Vienna): Promotion of the access into new and promising vocational fields in the area of ICT. The contents include: IT occupation, job conditions in the IT field, necessary skills for EDP, key qualifications, visits.

http://ec.europa.eu/employment_social/knowledge_society/docs/shc_background.pdf

The Graz University of Technology provides a number of high grade education activities:

- Bachelor of Biomedical Engineering (Health Care Engineering, Bioimaging & Bioinst., Bioinformatics, molecular Bioengineering, Control Systems, Biosensors, Biomechanics)

- Master of Biomedical Engeneering (WS 2007/2008) (Health care engineering, Bioimaging & Bioinstrumentation, Bioinformatics & med. Informatics, Molecular Bioengineering)

- Molecular Bioengineering (Postgradual course) (Genomics, Proteomics, Bioinformatics, Biomolecular Engineering, Bio-Nanotechnology, Biomedical Engineering)

The FH Joanneum – Universtity of applied Sciences provides high grade education activities:

Bachelor (FH) „InfoMed / Health Care Engineering" (informatics, system engineering, process engineering, e-health solutions).

The University of Applied Sciences Technikum Vienna (FHTW) offers a number of programs in the ICT and health related area. Within the field of e-Health the graduates shall actively contribute to the communication between medical professionals and ICT specialists by combining knowledge from both worlds. The "Biomedical Engineering" Bachelor and Master programs involve the interdisciplinary areas of biology/medicine and nature sciences/technology. There is a possibility to specialise into medical ICT in both programs.

The university is connected to the "Gesundheitsinformationsnetz" (Health Information Network) which has been built by the Main Association of Austrian Social Insurance Institutions (Hauptverband der Österreichischen Sozialversicherungsträger), via the Chipkarten Betriebs- und Errichtungs GmbH. The students use this infrastructure in hands-on software development courses. The FHTW is therefore the first educational organisation in Austria which provides practical knowledge about the Austrian health insurance card, the e-card.

In a similar way the "Sports Equipment" bachelor and master programs combine medical and IT knowledge. In September 2007 the "Healthcare- & Rehabilitation Technology" masters program starts, also offering e-health related courses. A number of dedicated ICT bachelor programs like the "Information Technology", "Business Informatics", and "Information and Communication Systems" also offer e-Health related content, both theoretical and practical, in a number of courses and in project related teamwork, in the bachelors and diploma theses etc.. Students may then follow up with the "Business Informatics" "Information Management & IT Security", "Multimedia & Software Engineering", master courses.

http://www.technikum-wien.at/en/home/

Education programmes on the national level to promote the acquisition of general or eHealth-specific ICT skills by health care professionals

Nowadays in Austria health professions like nurses, midwives, physiotherapists, biomedical scientists, radiological technologists, dieticians, occupational therapists, logopedics and orthopedists have a relative profound knowledge of e-skills (ECDL) already before their entrance of the specific academies and bachelor studies in health sciences (4.1.3 eFIT).

Students do get further training especiallly in medical informatics (hospital-informationsystems, databases and networktechnologies), presentation techniques.

http://www.bildungssystem.at/article/archive/135//?swlang=en

The Institute for Health Information Systems at the University for Health Sciences, Medical Informatics and Technologies (UMIT) gives some high grade education activities as:

- **Bachelor of Science/Bakkalaureus Biomedical Informatics** (Introduction to Health Informatics, Health Care Institutions, Medical Documentation, Scientific Working, Health Information Systems I, Health Information Systems II, Project Management and Cryptography and Digital Signature).

- **Master of Science/Magister Biomedical Informatics** / **Information Management in Medicine** (Tactical Information Management in Hospitals, Medical Documentation,

Project Management, Strategic Information Management in Hospitals and IT Servicemanagement)

- **Bakkalaureus/Magister Health Sciences** (Medical Informatics 2, Health Information Systems and Project Management)

- **Bakkalaureus/Magister Nursing Sciences** (Nursing Informatics 1 and Nursing Informatics 2)

http://iig.umit.at/e/lehre.htm

The Core Unit for Medical Statistics and Informatics at the Medical University Vienna gives high grade education activities as:

- **Bachelor of Science/Bakkalaureus Medical Informatics** (Medical Documentation, Tactical Information Management in Hospitals, e-Health and Telemedicine, Introduction to Image Processing, Health Data Modelling)

- **Master of Science/Magister Medical Informatics** (Medical Databases, Health Data Networks, Information Retrieval and Extraction, Clinical Signal Processing and Pattern Recognition, Syntactic and Statistical Pattern Recognition, Fuzzy Systems, Strategic Information Management in Hospitals)

http://www.meduniwien.ac.at/msi/

http://www.meduniwien.ac.at/msi/lehre/

The Viennese Technical High-School as well as the College "Spengergasse" offers by autumn 2007 a new course "eGovernment and eHealth", were students can gain a Matura (similar to the British A-level). This will be the first eHealth-education on an undergraduate level in Austria.

Success stories with regard to the provision and acquisition of eHealth-related skills and specific training curriculum available for the qualification of "Health ICT specialist".

The Institute of Health Information Systems provides the next qualifications: Bachelor of Science/Bakkalaureus Biomedical Informatics, Master of Science/Magister Biomedical Informatics/Information Management in Medicine, Bakkalaureus/Magister Health Sciences and Bakkalaureus/Magister Nursing Sciences. All of them are provided by continuing professional education.

The Danube University Krems offers two explicitly to eHealth dedicated postgraduate courses:

- Master of Science in "IT in Healthcare and Life Science"

- Master of Science in "eHealth and Telemedicine"

4.2 eHealth applications & services

Data security

The Healthcare Telematics Act has established supplementary rules for the transfer of health data (confidentiality, integrity and transparency of communication processes), and has also provided for information management concerning matters of health telematics. The 2005 Healthcare Reform Act, adopted by parliament in December 2004, therefore includes a regulation on healthcare telematics. The law defines minimum standards to safeguard the confidentiality, reproducibility and non-manipulation of communication activities. Its provisions also include measures for healthcare information management and the establishment of an e-Health index to facilitate access to healthcare providers. Furthermore, the Austrian parliament has made arrangements to introduce the ELGA initiative, has adopted general provisions to optimise the use of information and communication technologies in healthcare telematics, and has prepared the ground for e-prescription

http://www.srdc.metu.edu.tr/webpage/projects/ride/deliverables/RIDED.2.1.1%20-%20CurrentPracticesAustria.doc

Gesundheitsreformgesetz :
http://www.parlament.gv.at/portal/page?_pageid=908,731734&_dad=portal&_schema=PORTA

Electronic Patient Records

Following the structure of the Austrian Health Care System, where the States are responsible for the hospitals, there exist several large state wide hospital systems that have an almost monopoly for large populations (e. g. about 2 million people in Vienna, 1.2 million in Styria). The electronic patient record systems developed and implemented within these hospital organisations represent the best available approximations to the life long patient record.

Electronic Health Records

The first universal application to be implemented is "electronic health record (ELGA)" project. ELGA was embraced by the Ministry of Health and incorporated into the measures aimed at reforming the Austrian healthcare system.

In the agreement according to Federal Constitution Article 15a on the organization and financing of the health care system 2005–2008, which was part of the Healthcare Reform Act 2005, the contract parties agreed on the priority of conceiving and introducing an electronic health record (ELGA).

On this basis, an ELGA feasibility study was tendered publicly in 2005, which was presented in 2006.

The results of this feasibility study were as follows:

- technically and organisationally ELGA is feasible

- the establishment of a central framework architecture is proposed, consisting of the components master Patient Index, Health Service Provider Index, System of Roles and Access Rights, and the Document Register and decentralised document repositories

- the architecture provides a qualified search system for health data, with decentralised storage of the health data

- search functions are provided within the scope of the IHE framework

- to guarantee a maximum security of investment for regional developments, adaptors (interfaces) must be developed and provided

- a technical and organisational profile of requirements must be developed for data storage in the decentralised repositories

- in addition to the central architecture, lab results, radiology results and images, medical reports (discharge reports) and medication data will be made available via ELGA in the first rollout phase

- the following internationally accepted standards must be observed for all future new and replacement investments: HL7 (3) RIM and CDA, LOINC (lab), DICOM/WADO (radiology)

In parallel to the introduction of ELGA, the establishment of a health portal is proposed. In the first rollout phase as an information portal, it should provide quality-assured information for prevention and preventive health care. In a future expansion it should serve as an access portal for the population (myELGA) and health service provider for personalised electronic health services.

The feasibility study further sets forth that on the basis of the valid data protection regulations, and in particular the strict principle of consent, ELGA cannot be implemented satisfactorily for administrative and economic reasons. Supplementary statutory provisions will therefore be

necessary. Such statutory measures will have to include in particular the measures most recently proposed in work package 131 of the Art. 29 group.

Ensuring the transparency of procedure vis-à-vis the health care providers concerned and communication of all the major implementation steps to the public is regarded as an important socio-political measure in the feasibility study. Therefore the introduction of ELGA should be accompanied by comprehensive acceptance management.

Status quo:

The feasibility study assesses the technical and organisational feasibility of ELGA on the basis of an outline concept. Due to the federal nature of the Austrian health sector, a fundamental resolution by the partners on its implementation is being prepared, which

- includes a mandate for the project management (JV ELGA) to start with the detailed planning of the architectural components; in addition to the necessary technical specifications, these detailed plans must also include a detailed cost analysis and the proposed financing
- includes a commitment for future observation of the proposed standards.

This fundamental resolution is planned for May 2007, so that first invitations for tenders can be drafted and initiated after conclusion of the detailed planning phase by the end of 2007. In accordance with the current status of planning, the first ELGA implementation phase in Austria should be completed by about 2012.

The Health@net Project – For building a decentralized, standardized shared health care network in Western Austria. In health@net, various Tyrolean as well as national stakeholders in health care jointly realize a concept for a distributed inter-organizational EHR. health@net is set up as the eHealth core project within the HITT competence centre in Tyrol.

The electronic exchange of health data between health care institutions has a long history – usually in the form of directed data exchange via encrypted Internet mail messages or through web portals. In the course of this project it became obvious, that more than directed electronic transfer of textual information was necessary to fully support cooperative healthcare. It was found that an ad hoc access to relevant health information from other institutions was needed. A Shared EHR is what is called for. In accordance with these key elements and with the strong requirement for data security in mind, the health@net project team started with the design of a distributed IT architecture, inspired by ideals from GRID technology and in connection with the Austrian GRID national effort.

This EHR concept focuses on information relevant for treatment and is considerate of requirements of the different players in health care like patients and medical personnel, care services, rescue services, insurers, pharmacies or scientific institutions which are partly given access towards this health record depending on their role in different characteristics. Distributed storage of health data, distributed federated index systems, security against misuse and attacks through reliance on authenticated web services, respect of patient consent and features to grant and retract access permissions to documents by the patient himself were the key design criteria. As of Q1/2007 the specified system arichitecture is currently in final development and short before start of a pilot test phase in Tyrol.

http://www.healthatnet.at

http://iig.umit.at/

e-Prescription

There is no electronic prescription system implemented in Austria yet, but the set-up of an eMedication System offered on a voluntary basis will be a first step to an ePrescription System. The e-card System will provide the network and security infrastructure.

Currently a pilot project in Salzburg was established (nationwide roll-out after evaluation).

http://www.chipkarte.at/

http://iig.umit.at/

Health Cards

Currently, the most important initiative in the field of eHealth is the "e-card" [ECARD] project introduced in 2005. In the year 2005 it is stated as more than 8 million Austrian citizens were provided with an e-card and about 11.700 doctors (partners of Social Security) were equipped with the e-card infrastructure. This card is mainly used for the health insurance system and aims to provide advantages for all the actors involved. The basic advantages of the e-card are stated as:

- It will facilitate the access to medical treatment

- It will provide more privacy

- With the e-card the social insurance administration can also be contacted out of office hours.

The e-card is a smart card which will substitute all health insurance vouchers. Medical treatment is planned to in principle be accessible for all insured and their dependants without any paper documents after the starting the use of system. In addition to functioning as electronic health insurance voucher, it serve as an electronic signature and planned to be a used as Citizen Card. By means of electronic signature it will be possible to sign electronic documents to handle transaction.

The e-card is the central component of the system and is designed as a key card. It is the access key to system-supplied services and data. The smart card itself is not a carrier of application data, but contains the necessary data and keys for the identification and control of access authorizations. Only administrative data of the cardholder are stored on the e-card, for instance name, insurance number, data of birth, etc. On the reverse side of the e-card the European Health Insurance Card (EHIC) will be implemented. Additionally, the e-card is prepared for electronic signature. This means that - after purchase of an adequate certificate - the e-card can also be used as citizen card.

Another electronic card that will be used in the system is the administrative professional which is designed as a key card and is the authorization card of the physician. The client-software contains the application-software running on the medical practice unit , by the help of which the business procedures in connection with the consultation of the physician are handled. For the processing of the e-cards and the administrative professional cards a chip card reader is connected to the medical practice unit. Further extensions are planned in the system:

- Integration of hospitals and pharmacies (electronic prescription)

- Integration of the key card functions in connection with electronic signature into the "eSV" internet-portal of the Social Security Institutions.

- Extension of the e-card to a European-wide accepted health insurance smart card (EHIC, substitution of the international treatment certificate E111). Preparations have already been started within the Netc@rds project, in which Austria is participating.

- Integration of Social Security registration procedures

- Application of the e-card as a key card for the transmission of sensitive data on the health sector (i.e. secure transmission of diagnostic findings).

http://www.chipkarte.at/

http://www.srdc.metu.edu.tr/webpage/projects/ride/deliverables/RIDED.2.1.1%20-%20CurrentPracticesAustria.doc

Health Portals

Public health service institutions give broad information on prevention and health promotion also using the Internet as one communication channel. The Austrian Ministry of Health runs a website with broad variety of themes related to health. There are several Internet portals (even private ones) which provide useful health information for the citizens and health professionals

http://www.bmgfj.gv.at/

http://www.healthatnet.at

Risk Management and Patient Safety

In the area of the hospital sector the federal government is only responsible for enacting basic law, legislation on implementation and enforcement is the responsibility of the nine Länder. There are no initiatives on national level in connection with risk management and patient safety, but there are some projects on local and regional level.

Patient Identifiers

On the basis of the existing structures of the identification management, the following recommendations are specified;

1. The patient identification is to be based on e-Card-organization on the basis of the social security number

2. eHVD (electronic directory of the health service providers Austria) is to be developed further such that a technical directory service of all health service providers can be developed.

Personal Wearable and portable communicable systems

Improving the quality of life of elderly people is an emerging issue within our information society for both research and development. Demographical changes in Europe lead us to expect that the percentage of older people within the population will continue to increase in the future. New Technologies, including ambient intelligence technologies, awaken the hope of ubiquitous support in daily life. Most of all, there is a necessity to protect the elderly from emergency situations where possible and to provide rapid assistance when this is not possible. Basically, the use of technology is not always easy; however, elderly people are confronted with a number of additional problems due to its complexity. Further problems are

often caused by physical and/or cognitive impairment. Distrust, fear, anxiety and consequently frequent rejection of technology must be taken into consideration. A currently acute issue is that of delayed calls to emergency medical services, which can lead to increased hospitalization and the necessity for elderly people to move into nursing homes, consequently unnecessarily decreasing their quality of life and also involving considerable expenditure. These challenges are addressed in the EMERGE (EMERGEncy Monitoring and Prevention) project (EU grant number IST-2005-2.6.2 045056). Within EMERGE, the RU HCI4MED of the Institute of Medical Informatics, Statistics and Documentation (IMI) of Medical University of Graz is responsible for the areas Human–Computer Interaction, Usability Engineering and Life-Long Learning of mobile devices. Research within the HCI4MED area integrates – in addition to the necessary technological aspects – human-centered, cognitive aspects of medical information processing.

http://www.meduni-graz.at/imi/

PACS

A particularity of Austria is the early development of PACS (Picture Archiving and Communication Systems). Following large pilot systems particularly in the university clinic in Graz and in a Vienna hospital, those PACS today include many hospitals and in many cases also radiologists in private practice. Graz was one of the first large PACS and today the Styria PACS includes 20 hospitals that share images, patient records and diagnostic resources.

Teledermatology

The Department of Dermatology of the Medical University of Graz has developed remarkable expertise and systems for teledermatology where a pool of international experts provides teleconsultation services to dermatologists and other physicians.

Telemedicine services

Austria wants to establish a nation-wide Disease Management Programme Diabetes mell. Typ2. Within this programme health data will be transferred, therefore adequate tools have to be developed.
http://www.telemedicine.at

4.3 Interoperability and standards

4.3.1 Technical Interoperability

Current status and future plans concerning the adoption and implementation of technical health ICT standards

E-Health initiative group [EHI] consists of 7 working groups. The committee states the following recommendations in the E-Health Strategy document.

1. All agreements over technical methods of electronic data exchange (data formats, exchange mechanisms, coding, identification, authentication, code sets, vocabularies, standards etc.) should be in the context of the engineering standards committee "committee for medical informatics (ON-K 238) of the Austrian Standards Institute (ON).

2. Some developments already published by ON. These are the SOAP interface of the e-Card system, handling character sets (UTF-8).

3. For the messaging, SOAP and the basis standards XML, MIME, SAML, etc. are recommended to use.

For the pilot projects, the IHE profiles are recommended as fundamental framework, especially IHE XDS. For the semantic structure of medical documentations the following international standards are recommended for further evaluation: CEN prEN 13606, HL7 (V3), D-act like, CDA, UN/CEFACT CoreComponents, DICOM (for graphic data).

http://www.srdc.metu.edu.tr/webpage/projects/ride/deliverables/RIDED.2.1.1%20-%20CurrentPracticesAustria.doc

Gesundheitsreformgesetz :
http://www.parlament.gv.at/portal/page?_pageid=908,731734&_dad=portal&_schema=PORTAL

4.3.2 Semantic Interoperability

Decision-making bodies concerning the use of healthcare coding and classification systems

Decisions about healthcare coding and classification systems, as far as they are related to the Electronic Health Card and the national eHealth infrastructure, are made by the E-Health initiative group [EHI] under the context of the engineering standards committee "committee for medical informatics (ON-K 238) of the Austrian Standards Institute (ON).

Use of classifications and reference terminologies

As it is stated above, for electronic data exchange (data formats, exchange mechanisms, coding, identification, authentication, code sets, vocabularies, standards etc.) should be in the context of the "committee for medical informatics (ON-K 238) of the Austrian Standards Institute (ON). SOAP interface of the e-Card of system, handling character sets (Utf-8). The technical "committee for medical informatics (ON-K 238) of the Austrian Standards Institute (ON) has developed a national rule ONR 112203 for the discharge letter, in the form of an XML schema. For the messaging, SOAP and the basis standards XML, MIME, SAML, etc. are recommended to use.

For the structure of medical documentations the following international standards are recommended: CEN prEN 13606, HL7 (V3), D-act like, CDA, UN/CEFACT CoreComponents, DICOM (for graphic data).

http://www.on-norm.at/publish/1173.html?&L=1&L=1

http://www.srdc.metu.edu.tr/webpage/projects/ride/deliverables/RIDED.2.1.1%20-%20CurrentPracticesAustria.doc

4.3.3 Interoperability of Electronic Patient/Health Records

There is not an Electronic Patient Record architecture in place in Austria yet. It is currently under preparation in the course of introducing a nationwide Electronic Health Record.

In 2003, the STRING commission (a group of experts, appointed by the Austrian Ministry of Health in 1995 to advise the minister on healthcare telematics) recommended that concrete plans have to be undertaken to introduce the EHR in Austria. This initiative was entitled ELGA (see page 26: EHR).

Although some pilot projects like health@net in Tyrol exist, there are not a common EHR architecture and structure in use on a regional or national level in Austria yet.

5   eHealth RTD status

5.1   General information on RTD structure

Main actors in RTD policy setting in Austria

The Bundesministeriengesetz (Federal Ministries Act), BGBL.I, No 6/2007 has given Austrian Federal administration in ministries the following structure:

The Federal Ministry for Science and Research is responsible for

- matters relating to universities and for non-university research institutions in the area of basic research and general scientific research.

- co-ordination of international affairs in the research area.

The responsibilities of the Federal Ministry of Transport, Innovation and Technology comprise matters concerning

- industry-related research, technology development and innovation funding

- issues relating to the creation of priority areas of research in national research programmes by the Council for Research and Technology Development.

This ministry also acts as the supervisory authority for the research funds.

The Federal Ministry for Economic Affairs and Labour funds research co-operations between science and industry as well as innovation projects in enterprises under various programmes.

In Austria, each ministry is responsible for research issues within its specialised area of responsibility; at the level of the Federal provinces (Länder), the responsibility for research issues lies with the respective provincial government.

Main groups directly involved in or undertaking RTD activities in Austria

The main groups are:

- Health professionals and providers (hospitals, ambulatories, doctors, pharmacies, nurses...)

- RTD Companies Financiers (Social Insurance companies, private health insurance companies and national and provincial health care agencies)

- Ministry of Health, Family and Youth and Regional Governments

- Universities:

Main focus areas and targets of RTD activities in Austria

It possible to summarize in some points:

- According to the e-Europe activities, Austria has set up an e-government strategy.

- e-Health specific target is to promote the use of information technologies in healthcare.

- Nation-wide roll out of the health insurance card (e-card).

- Introduction of an electronic prescription system connected to the card.

- Set-up of a national electronic health record.

- Definitions of strategies on interoperability for providing e-health online services.

- Public health service institutions give broad information on prevention and health promotion also using the Internet as one communication channel.

5.2 Universities

5.2.1 Medical University Vienna

Section of Medical Information and Retrieval Systems
Core Unit for Medical Statistics and Informatics
Medical University Vienna

http://www.meduniwien.ac.at/msi/mias/eindex.htm

The domain of eHealth is one of the key research fields of the Section of Medical Information and Retrieval Systems. It is also addressed in the section's teaching activities, such as in the course of lectures, seminars, master theses and PhD theses. Working areas within the domain of eHealth are

- Standardization of the electronic health record (EHR)
- Modelling of clinical concepts by means of archetypes and templates
- Semantic interoperability of EHRs by means of thesauri and ontologies
- Analyses of EHRs for the purpose of quality management, epidemiologic research and decision support in health care
- Graphical, user-friendly interfaces for various user-groups such as physicians, patients or researchers
- Practical implementations of international standards (CEN 13606, HL7/CDA) for the purpose of connecting clinical information systems to health data networks.

Based on the research done and the long-term experience in the domain of Medical Informatics and eHealth, the Section acts as a competence centre and offers domain-specific know-how through consultation and participation within various boards:

- The section is represented in the management of the excellence centre for telemedicine at the Medical University Vienna (ETZ, http://www.meduniwien.ac.at/ezt/).

- The section delegates members to the STRING-commission, (http://www.meduniwien.ac.at/msi/mias/STRING/) which acts as a consultant for the Austrian Ministry of Health. It further participated in the development of the MAGDA-LENA guideline, a framework for the development of a health data network within Austria, and the data protection analysis for the Austrian EHR.

- The section occupies the head of the working group "Information models and the EHR" with in the Austrian Standards Institute (http://www.on-norm.at). It further was involved in the project management of various development projects of Austrian standards, which resulted in successful implementations such as within the EDIVKA project, which focused at the administrative communication between hospitals and health insurers.

- The sections delegates three members to the board of the Austrian Scientific Society for Telemedicine and eHealth (ASSTeH, http://www.telemedizin.at) and holds the general secretary of the society.

Core unit education - Medical Media Services

The problem-oriented approach is the unique requirement of new curricula in medical education. This new approach leads to the enhancement of interdisciplinary and multimedia-based medicine, which has to be established outside the education sites. The research area of our group is the "impact" of the new case-based and problem-orientated education on medical routine. The research includes the development of interdisciplinary clinical groups and operates at the interface between science, education and medical routine. It contributes to the development of a „unified" visualisation of interdisciplinary patient data of health records and its possible usage in the Austrian health record ELGA.

http://www.meduniwien.ac.at

5.2.2 Medical University Graz

A focus activity of the Institute for Medical Informatics, Statistics and Documentation (IMI) since its establishment has been the extraction of knowledge from free text reports. Since 2006, it has also been increasingly employed in the (semi) automatic mapping of free text,

originating from routine documentation, into various Austrian - and international - code systems, nomenclatures and classifications.

Building upon decades of experience in this field, our current work puts emphasis on performance support in medical routine. One current area of research regards the systematic evaluation of the suitability of tools in their ability in extracting diagnoses from medical findings.

Aside from the quality of extraction, the possibility of an efficient identification of keywords in a quantity of reports, such as are produced in large hospitals, is also decisive here.

Also, other emphases focus on the extraction of cancer data and inflammation data from pathological findings, as well as the generation of adaptive interfaces used to present results sorted by relevance.

The latter is particularly to be regarded under the aspect of an ever more comprehensive electronic health care record, which is increasingly relevant to only a relatively small amount for the current treatment and therefore will be exchanged only partially in the context of e-health.

http://www.meduni-graz.at/imi/

5.2.3 University of Applied Sciences Technikum Vienna

The University of Applied Sciences Technikum Vienna (FHTW) has been very active in standardisation and strategy work in Austria over the past few years. Academic staff is formally involved in the Standards Committee "Medical Informatics" (ON-K 238) of the Austrian Standards Insititute (ON), the mirror committee to CEN TC251 and ISOTC215, and in the Austrian e-Health Initiative, which provided recommendations for the national e-Health road map over the last two years. A series of research projects have been looking into standards for the electronic health care record, especially CEN prEN 13606. This group is working towards a practical demonstration of archetypes, in cooperation with a partner from industry, T-Systems. The group has submitted numerous comments into the European standardisation process. Another project aims at implementing standardised medical device communication at a neurological rehabilitation center (Neurologisches Rehabilitationszentrum Rosenhügel) in Vienna. It is the intention to further deepen this field, in cooperation with partners from the industry and administration

5.2.4 Innsbruck Medical University

Department for Medical Statistics, Informatics and Health Economics

Innsbruck Medical University, Austria

www.i-med.ac.at/msig/

Since 1996 the department offers an internet based health care information system for citizen and patients. The research topics are the identification of key words and links to standardized nomenclatures like ICD-10 or MeSH to help the non-specialized user finding appropriate information. Furthermore models for the presentation of medical content and linking this content with data about the health care facilities are analyzed. Within the EU project EQUAL very special modules for the assistance of handicapped people finding appropriate health information are developed.

Also since more than 8 years an internet based information system for the social institutions in Tyrol called SoGIS is organized by our department. In this system different organizations of the social sector as well as information from different sources for social care are presented to support people in finding the appropriate social service.

Related to the development of the Austrian DRG system studies about structured documentation of diagnoses and procedures are performed. Special algorithms for the analysis of the data quality in this minimum basic data set have been developed. The quality of structured documentation depends very much on the catalogues available. Therefore the basic framework for a new multi-axial catalogue of procedures for Austria has been developed.

From a strategic viewpoint in the last years we focused on the development of the national eHealth Strategy with special attention to the EU and USA developments. Considering the special situation of the Austrian health care system and also the social care system the main goals of a national eHealth strategy have been worked out together with the main stakeholders who are represented in the so called "Austrian eHealth Initiative". By the analysis of different use cases the necessity of standards from a technical as well as from a content viewpoint with respect to interoperability has been discussed. Very special attention has been given to the electronic health care record and the involvement of the patient. To promote eHealth the benefits of eHealth in an integrated health care system have been analyzed.

5.2.5 UMIT

The Institute for Health Information Systems (IIG), University for Health Sciences, Medical Informatics and Technology (UMIT)

The activities and research topics of the **Institute for Health Information Systems (IIG)** at UMIT focus on architecture and infrastructure for high-quality health information systems. Topics of research comprise trans-institutional information system architectures, supporting

information exchange and information management between different health care institutions (e-Health). Here, UMIT leads a larger Tyrolean project to build up a regional health network based on the health@net infrastructure.

The second research topic of IIG is process management in health care where we have developed methods for comprehensive process analysis, modelling and assessment, in cooperation with local industrial and clinical partners.

The third topic is evaluation and assessment of information systems, including conducting case studies in various clinical setting, combining quantitative and qualitative methods.

The fourth main topic is IT management in health care, especially frameworks for both tactical and strategic management of health information systems.

UMIT is part of the health@net consortium for specification, development and operation of an EHR prototype in Western Austria. The main focus of health@net is the working out of custom-made, simple to use offers for networked online services and service offers in the health care area. Starting with the transfer of results, through to the comprehensive electronic health record as well as integrated appointment and process planning under consideration of peripheral structures such as physician practices, etc, with a global view of patient care. These solutions (information system architectures) should be of benefit to family physicians and patients, as well as hospitals and clinics. For more information about health@net please see Chapter 4.

http://www.healthatnet.at

5.2.6 Danube University Krems

The Danube University Krems has specialized in postgraduate academic studies and offers advanced courses in the fields of economics and management, communications, IT and media, medicine and health, law, European integration and public administration, education and cultural sciences as well as of building and ecology. Being a European model project, Danube University Krems combines high quality in education, research and consulting with excellent customer orientation and service.

The university is committed to international aspects and to cultural diversity along the lines of education and research. The 3,500 students come from 50 countries and are enrolled in over 150 academic courses. The Danube University Krems cooperates with 50 universities worldwide, including the University of British Columbia in Vancouver, Canada, and Case Western Reserve University in Ohio, USA.

Since 2005 the university emphasises the importance of eHealth by offering postgraduate courses, like "IT in Healthcare and Life Science" and, later on, "eHealth and Telemedicine", in addition to the established cross-sectoral collaboration of the university's specialised departments.

http://donau-uni.ac.at

5.3 Research Programmes

Major research programmes in Austria, eHealth RTD programmes

Providing the objectives of the Austrian Government many mid-term measures were carried out by the former Federal Ministry for Education, Science and Culture (BMBWK; since 1.3.2007: Federal Ministry for Education, Arts and Culture; Federal Minstry for Science and Research). They all aim at strengthening Austria's strengths and improving Austria's weakness on R&D structures and outcomes.

Additional Programs (Offensivprogramm II)

The additional program "Offensivprogramm I" of the Austrian Government implemented 2001-2003 is continued by the program "Offensivprogamm II" 2004-2006, financed with a total amount of € 600 Mio. At present with a budget of € 129 Mio the following R&D priorities are financed by the BMBWK :

Development and strengthening of the R&D capacities on sciences**:**

- Quantum optics and Quantum informatics

- Life sciences

- Social sciences, humanities and cultural studies

- Research infrastructures and technical equipment at Universities

- Patent exploitation at universities

- Research on sustainability

- Mid-term research programs of the Austrian Academy of Sciences

- Austrian Genome-Research Program GEN-AU

Development of Austria's R&D Internationalisation:

- Special funds for participation at the 6th EU-framework programs

- Activities on international co-operation and Networking for excellence

Promotion of the Human Resources:

- Additional professorships at universities

- Women in Research and Technologies

- Special programs for scholarships

Co-operations Science-industry:

- Further Development of the Institute of Molecular Biotechnology, a joint venture between the Academy of Sciences, university and the internationally renowned Research Institute of Molecular Pathology, aiming at promoting excellence in molecular biology and genetic research.

Dialogue Science – Society :

- Public Awareness – Promoting the public understanding of science

Other R&D activities set up by Federal Ministry for Education, Science and Culture

Bilateral agreements support scientific-technological co-operations with the following countries: China, France, Great Britain, Israel, Italy, Croatia, Poland, Russia, Slovakia, Slovenia, Spain, Czech Republic, Ukraine, Hungary.

Specific scholarship programmes funded by bm:bwk aim at the promotion and stimulation of highly qualified and young researchers. The specific supporting of women in science, research and technology is the declared objective of bm:bwk with high priority. Awards and special incentives for extraordinary research achievements are further instruments to provide the strategic objective "Strengthening the Human resources".

The bm:bwk supports a lot of research organisations by subsidies and co-financing. The basic requirement for subsidies is a positively assessed R&D conception. For example one of these organisations is the Ludwig Boltzmann Association.

Further R&D Activities are carried out by the "Wissenschaftlichen Anstalten", whose responsibilities and functions are regulated by legal act:

- Central Institute of Meteorology and Geodynamics

- Geological Survey of Austria (Geologische Bundesanstalt)

- Institut für österreichische Geschichtsforschung

- Austrian Archaeological Institute

One of the most important "Non university R&D organisation" financed by public funds is the Austrian Academy of Sciences (ÖAW)

5.4 RTD Funding - National

R&D Funding by Federal Ministry for Education, Science and Culture

Research funding by the Federal state comprises a broad range of financial and intangible measures with direct and indirect effects:

Financial research funding is based on the one hand on basic financing of research institutions, i.e. their personnel and infrastructure costs, and on the other hand on funding of research programmes and projects by publicly endowed research funds and by commissioned research and incentives of the Federal ministries. By financing of membership fees of multilateral research organisations, Austrian researchers are given the opportunity of working in international Centres of Excellence. Taking over the costs for initiating an EU-project or financing the additional costs for implementing an EU-project by Federal ministries, many Austrian R&D organisations get the possibility for participation in EU programmes

"Intangible" funding mainly comprises the following: the provision of suitable legal framework conditions and strategic development on the national level; participation in shaping European research policy and its programmes in accordance with Austrian strengths; designing complementary national activities, and the preparation of specific co-operation programmes under bilateral agreements. Supporting the dialogue between science and the public promoting research articles in print media and electronic media should help to improve the research climate and to increase the acceptance of science and research in Austria.

The funding range is supplemented by funding research scholarships for young scientists which enable them to acquire "know how" at renowned institutes abroad; by funding scientific conferences and symposia, and by funding publications in which research results are presented to experts. Research awards for excellent R&D results should pay tribute to the scientists and should motivate them to compete and to improve the quality of their works.

Indirect research funding is mainly effected by a set of fiscal measures for companies not only carrying out R&D but also contracting out R&D as well as by tax privileges for private donations to research institutions to carry out research and teaching tasks.

Priority Areas of Research Funding by bm:bwk

Research funding benefiting directly researchers and R&D Organisations focuses on the realisations of projects and programs in the framework program Offensivprogramm II. The framework program lays the emphasis on the strategic fields "Promoting young researchers", "Internationalisation of R&D" and "Modernisations of R&D infrastructures" on universities and non-university organisations.

The global budgets of the universities (GUF) containing already all R&D expenditures of the universities belong to the indirect R&D funding. Part of the indirect R&D funding is also the basic financing of the Austrian Academy of Sciences, of the Wissenschaftlichen Anstalten und of a great number of non-university organisations. In future, granting basic financing to research institutions the bm:bwk will include regular assessments of the medium-term strategies and conceptions of funded research institutions and regular evaluations by international experts.

Amount of annual funding available for R&D related activities on the regional and national level in Austria

Austria is one of the few EU-countries which proceed successfully as the recent estimate of Statistics Austria shows. In 2006 the R&D rate will attain 2,43 %, which corresponds to a volume of 6,24 billion Euro. In comparison with 2005 that is an increase by 8 %.

Already in 2004 Austria's R&D rate (2, 24%) has surpassed clearly the average of the EU-25 (1,9%); thus the Austrian R&D rate was the fifth highest in the EU-25 ranking.

Additional Promotion of the Research, Technology and Innovation System 2001-2006

In 2001 the Austrian Government has started an additional financing programme for the RTI sector with a volume of 1,1 billion € (Offensive Programme I and II). With a share of about 400 million € the Federal Ministry for Education, Science and Culture has provided programmes and activities focused on the following strategic fields:

- Strengthening the R&D capacities in science, increasing the competence level within the universities and "Fachhochschulen"

- Providing the human resources in S &T

- Improving on R&D internationalisation

- Cooperation Science – Business

- Dialog Science - Society

R&D funding beyond 2006

The additional financing programme for the RTI sector will be continued by a further volume of 1 billion € in 2005-2010. Already 125 million € have been granted for important activities (e.g. university infrastructure, new excellence institute, basic and applied research) by the Austrian government. 875 million € will be distributed on the recommendations of the Austrian Council for Research and Technology Development (Offensivprogramm III).

The Austrian Research Promotion Agency (Forschungsförderungsgesellschaft FGG)

The main consequence of the restructuring of the research funding system in the year 2004 was the foundation of The Austrian Research Promotion Agency (Forschungsförderungs-gesellschaft FGG) on 1 September 2004. The FFG is the central agency for the promotion of research, technology development and innovation, and in this capacity provides those companies and institutions engaged in research with a broad portfolio of carefully co-ordinated funding measures and services. It stands for the comprehensive management of programmes and initiatives. The main challenge in the European and International Programmes division is to support and serve Austrian participation in the EU Research Framework Programmes.
http://www.ffg.at

5.5 Technology transfer & Innovation Support

Initiatives on national level to promote and support eHealth technology transfer

The second step of the broadband initiative by the Federal Ministry for Transport, Innovation and Technology aims to stimulate the deployment of applications and services using broadband technologies in public interest.

Support actions employed to promote eHealth-related innovation on the regional or national level

The Special Directive "Austrian electronic network" constitutes a contribution to the implementation of the objectives mentioned above. http://www.bmvit.gv.at/telekommunikation/politik/breitband/sonderrichtlinien/at_net.html
Specially Thema 3 in this programme supports the deployment of applications and services in the eHealth sector. Thema 3 supports for example electronic services that promote health and

help prevent illness, improve access, increase quality and cost-efficiency of health care delivery.

5.6 Industry Strategies and Programmes

Companies of multi-national ownership active in the area of eHealth and related RTD

Siemens http://www.siemens.com

IBM http://www.ibm.com

ICW http://at.icw-global.com

http://www.chipkarte.at