European Commission and eHealth
20 Years of Research and Innovation
Past lessons and future plans

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DG Information Society and Media
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Examples of eHealth solutions

1. Clinical information systems
   a) Specialised tools for health professionals within care institutions
   b) Tools for primary care and/or for outside the care institutions

2. Telemedicine systems and services

3. Regional/national health information networks
   electronic health record systems and associated services

4. Secondary usage / non-clinical systems
   a) Health education and health promotion of patients/citizens
   b) Specialised systems for research, public health

*Definition agreed with the eHealth Industry Stakeholders Group reporting to the i2010 sub group on eHealth
**DG INFSO: eHealth research, policy and support to deployment**
- Directive on Information society services, Communications, Recommendation on Interoperability, Lead Market Initiative on eHealth

**DG SANCO: Information to patients / citizens (portals)**
- Directive on patient’s rights (Art 16 on eHealth)
- White paper on health strategy, patient safety Communication

**DG RTD: Nanomedicine, Clinical research, System Biology**
- Innovative Medicine Initiative

**DG ENTR**
- Lead Market Initiative coordination, standardisation
- Medical Devices

**DG JLS: EC/45/96 on Privacy protection, WP 131 on EHR (Art 29)**

**DG MARKT: Professional recognition, e-commerce directive**
Research (Invention) vs Innovation

**Invention**

€ → ideas

**Success factors:**
education, bright individuals
groups/centers of excellence
research infrastructure
(public and private/industrial)

**Innovation**

ideas → € and/or social benefits

**Success factors:**
Policy & political will
Financing/business models
Market / Industry readiness
Legal FW and trust
User acceptance

FP - Framework Programmes

CIP–Comp. & Innovation Prog.
Regional Developments funds
Towards eHealth Deployment: Step 1
Health Information Networks
Connecting providers: Messaging, EHR, HP tools, online services

Region 1
- Mobile, Wireless & Broadband
- Secure Networks

Region 2
- Mobility

Region 3
1. Research and development since 1989 (among the first international funding agencies focusing on eHealth)

2. Support to deployment and coordination with some Member States (1996-)- example: Medcom, Denmark

3. Policy document and proactive coordination of eHealth deployments (eHealth Action plan 2004 -)


5. EC Recommendation on Interoperability (2008)
Emphasis on Interoperability

- Support to projects, events, education on interoperability

- **Mandate (M 403)** given to CEN, CENELEC, ETSI to provide standards on [http://www.ehealth-interop.nen.nl](http://www.ehealth-interop.nen.nl)
  1) patient and health practitioner identifiers;
  2) the patient summary;
  3) an emergency data set.

- **Launch of Large Scale Pilots** on interoperability of emergency and medication data – CIP (7/08)

- **Calls for proposals:**
  - EHR certification (HER-Q-TN see [www.eurorec.org](http://www.eurorec.org))
  - Conformance testing (currently under negotiation with IHE, ETSI)
  - PHS interoperability (currently under negotiations with CONTINA)
EC Recommendation on Interoperability of cross border EHR systems C(2008)3282

- Aims at enabling coordinated care by connecting people, systems and services

- Provides Member States and relevant bodies with basic principles to address the existing challenges in implementing EHR interoperability

- Identifies different levels of actions:
  - Political, Organisational, Technical, Semantic,
  - Important issues: standardisation, certification, conformance testing, education and awareness
• Large Scale Pilot (epSOS)
  23 beneficiaries, 12 countries
  6 national Ministries of Health
  15 Competence Centers
  31 companies through IHE-Eur
  11 Million EC funding
  36 months

• Thematic Network on eHealth Interoperability (CALLIOPE)
  – 27 beneficiaries
  – 30 months
  – 500k EC funding
1) Ensure well thought-out strategy

2) Break the pattern of large scale all at once implementations

3) Ensure commitment of the “leaders”

4) Keep it up... do not just set it up

5) Ensure (legal and ethical) compliance

6) Do not underestimate user acceptance

7) None of the parties can do it alone!

(Authorities, Industry, Users need to share the same vision)

(I. Iakovidis, proceedings of Eurorec Conference, 1999)
Take home messages: #1
Evidence & best practices: Basis for good rollout plans

Support Authorities to keep in touch with reality!

It is a job of all stakeholders (authorities, users, industry) to contribute to a realistic roadmap

Discussions take place easier around convincing evidence

“Our bureaucracy is so vast, we no longer need reality.”
Take home messages: #2

ICT will not do better what doesn’t need to be done

• Sharing/exchanging data is not common practice

• Deployment of Health IT will not induce reorganisation

• Organisational changes are more effective when decided & implemented based on **convincing evidence** of benefits

Three step strategy for successful eHealth deployment:

i) Get over the fear (dialogue, evidence, involvement)

ii) Support existing way of working (although you think is inefficient)

iii) Be there to continuously support the changing way of working (long term contracts and patience when users take in charge)
Take home messages #3

No wide deployment, no interoperability without involvement/commitment of all stakeholders

eHealth market is lacking the bottom line for every business: TRUST among the stakeholders

What can we do about that?

Idea: Structure the dialogue around a convincing evidence of benefits for Patients, Health System, Economy
Step 2
Connecting individuals with Health Information Networks
Health monitoring, access to health information

Mobile, Wireless & Broadband
Secure Networks

Region 1
Region 2
Region 3
Mobility

Health Centre
Hospital
Emergency
Pharmacy
Home
mobile PC
• R&D on personal health systems (wearable, portable) since 1999
• Communication on Telemedicine (2008)
• Large Scale Pilot– *Renewing for Health*, start January 2010
• Special actions on procurement and financing
• “Staff working paper” (EC official document) on legal framework (to be issued in 2010) that shows
  ▪ what are the relevant EU directives and regulations (i.e. that telemedicine is “legal”)
  ▪ not all national legislations are adopted accordingly
R&D Personal Health Systems

Realised as:

- **Wearable, implantable, portable** systems
- **Point of care devices** (Lab on a chip)
- Integration of various components and technologies
  - *e.g.*, sensors, implants, signal processing algorithms, user interfaces, mobile and wireless communications
- Used by the patient or healthy individual
- Coupled with telemedicine platforms to provide personalised services

**Example projects:** MyHeart, HeartCycle, SmartHealth, ..

//ec.europa.eu/information_society/activities/health/research/fp7phs/index_en.htm
A Communication on Telemedicine: October 2008

- Telemedicine experiences exist nation and Europe wide

- Increasing deployment due to:
  - Technical reasons: Broadband, personal health systems
  - Financial reasons: Moving patients from hospitals to home; solutions for chronic disease management
  - Other reasons:
    - Geographical, Patient empowerment, Involving family in care process, Elderly people, Skill shortage

- Challenges: legal environment, reimbursement, business models, evidence, acceptance, awareness, technical
• **Boario telecardiology:**
  - 35-47% reduction in hospital admissions (in various studies)
  - 12% reduction in outpatient visits

• **UK studies:**
  - Wireless Healthcare (2004): Early discharge from hospitals ->
    up to 85% reduction in weekly care costs
  - Cost of telecare at home with 24 hours response = 1/3 of the cost of a
    nursing home place

• **Potential of Mobile Monitoring in Germany**
  - Up to €1.5 billion/year savings through early patient discharge
    (Assuming 3 days less hospital stay for 20% of patients)
Connectivity: to patients’ homes

Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008
Step 3
Seeing the full picture of individual’s health status

Biosensors

Environmental Data

Phenomic data

EEG

Genomic data

Biochips

Integrated Health Records
WHY Step 3?
Factors determining a health status of an individual & population

- Quality/Efficacy of Healthcare services
- Lifestyle: what we eat, drink, breath, …
- Physical and social environment
- Genetic “blueprint” /profile at birth
- Acquired genetic changes

Health delivery system
Exogenous Determinants (Nurture)
Endogenous Determinants (Nature)

ICT contribute to all factors!
The Virtual Physiological Human is a methodological and technological framework that once established will enable the investigation of the human body as a single complex system.

The VPH research roadmap developed by project STEP in 2007:
www.europhysiome.org

- Personalised (patient-specific) healthcare solutions
- Early diagnostics & predictive medicine
- Understanding diseases for the first time across several biological levels
Conclusions

• eHealth is among the top objectives of health systems & authorities – it brings benefits to patients, health systems and economy when combined with proper organisation and skills

• EC promotes invention and innovation in eHealth/ICT for Health
  - FP and CIP programmes,
  - Policy actions and documents such as post i2010, LMI
  - cooperation with Member states and other stakeholders
  - works with experts on the business models

• The new frontier for EC: *ICT for personalised and predictive healthcare*, bringing all factors / information related to health of individual consistently together.
Annex
ICT for Health Unit support for Research & development (FP7)

- **Personal Health Systems**
  € 72 M in 2007, € 63 M in 2009

- **Patient safety & semantic interoperability**
  € 30 M in 2007, € 30 M in 2009

- **Predictive Medicine – Virtual Human**
  € 72 M in 2008, € 68 M in 2010,
Health sector in EU

- Employs 9.3% of workforce, > 15 M people (retail 13.0 M, business services 13.3m)

- Health expenditure > 8.5% of GDP, growth at 4% a year (faster than EU economic growth), potential to reach 16% of GDP in EU by 2020 (Healthcast 2020, PWC)

- Health care is information intensive sector but ICT penetration is low compare to other sectors.

- There is great potential for benefits for individuals, society and economy when ICT, leadership and skills come together
Health sector – some observations

- HC organised around disease / organ systems not around human conditions (one clinical expertise vs shared care)

- Governments struggle to identify/implement priorities (often contradictory)
  - productivity (equity in access to health system activities)
  - health outcome (avoiding disparities in health status)

- Whatever the choice there is need for data to manage properly
  - need for quality information that is captured at the point of care

- Individuals could be better supported in their “health journeys”
eHealth is currently the **fastest** growing industry of health sector, estimated at € 20 Billion, ~2% of Health expenditure

Other EU markets: Pharma € 205 Bill., Medical Technology € 64 Bill.

By 2010, a double digit growth rate of up to 11% is foreseen for eHealth, driven by a search for more productivity and performance (source: Datamonitor 2007 – Trends to watch: Healthcare Technology).

**CHALLENGES**

• Standardisation  
• Interoperability  
• Business model & financing

{EU Market fragmentation}
# National Priorities: Preliminary Analysis

<table>
<thead>
<tr>
<th>Priorities in national eHealth Strategies</th>
<th># of Countries</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electronic Health Records</strong></td>
<td>17</td>
<td>DMP - Dossier Médical Personnel (FR)</td>
</tr>
<tr>
<td>EHR, EPR, Medical Records, Patient Summary, Emergency Data Set</td>
<td></td>
<td>BEHR - Basic Structure for the EHR (DK)</td>
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<td>NHS Care Records Service / Spine (UK), Patient summary (SE, FI)</td>
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<td>SumEHR (BE), eGP file (NL)</td>
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<tr>
<td><strong>Infrastructures &amp; Networks</strong></td>
<td>12</td>
<td>MedCom – the Danish Healthcare Data Network (DK)</td>
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<tr>
<td>Broadband communication networks and associated technology and basic services</td>
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<td>Sjunet (SE)</td>
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<td>National Health Network (NO)</td>
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<td>National eHealth VPN (DE, AT)</td>
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<tr>
<td><strong>ePrescription</strong></td>
<td>16</td>
<td>Apotheket (SE)</td>
</tr>
<tr>
<td>Management and implementation of ePrescribing</td>
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<td>ePrescription (DK, NL, SI)</td>
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<td></td>
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<td>eRezept (DE)</td>
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</tbody>
</table>

[http://www.ehealth-era.org/]
Evidence of cost savings in patient care

- Hospitals in Germany can save up to €1.5 bill per year through early discharge of patients made possible by mobile monitoring services.

- Early discharged hospital patients using mobile services (20% of total):
  - 3.3 mil

- Average costs for one hospital day:
  - €150

- Average number of hospital days saved through early discharge:
  - 3 days

- Total yearly cost savings through early discharge:
  - €1.5 bill

Source: GesundheitScout 24 GmbH and Bayerisches Rotes Kreuz
Example for an e-health “driving hub” in Germany

- German health insurer „Taunus BKK“ carried through a remote patient management pilot study for heart failure patients (TAUNUS-Zertiva)
- Overall 3000 patients (NYHA II-IV) had been included (600 intervention group, 2400 control group)
- The study was running for 1 year
- Parameters remotely monitored: ECG, blood pressure, weight
- Results:
  - Overall costs were 52% lower in the intervention group (€3,065 vs. €6,397)
  - Overall hospitalisation rate was 11% vs. 35%
  - Average hospitalisation time was 49 days vs. 379 days (per 100 patients)
eHealth works
Optimal results when eHealth tools when combined with proper organisation and skills

- **National and Regional Health information Networks** improve quality, efficiency, and will save next year €80 Mil/year in Denmark (Medcom)

- **ePrescription** improves patient safety, saves €70 Mil/y in Sweden

- **Personal Health Systems and Telemonitoring** can provide care at the point of need, reduce length of hospitalisation (by 20 - 40% for heart patient in UK)

- **Direct Online information Services** such as NHS Direct online—empower patients, avoid unnecessary hospitalisation, support lifestyle choices, save €110 Mil/year

www.good-ehealth.org        www.eHealth-impact.org
http://www.epractice.eu
Hospitals – overview

- Hospitals in the EU seem well connected: 98% have internet access, 78% broadband
- Main applications: Hospital Information Systems
  - administration
  - ePrescription & eMedication (treatment support)
  - imaging (diagnosis support)
- Integration of eHealth application components: lacking
  - no ICT plans within the organisation
  - lack of reliable providers (34%)
  - no set standards

Based on eBusiness W@tch (Survey 2006)
• Key learnings:
  – Training, training, training
  – Involvement and commitment of higher management
  – Quality involvement the central goal of e-health projects
  – Break projects down into bite size achievable steps within a clear long-term vision
  – Don’t be afraid!
  – [www.good-ehealth.org](http://www.good-ehealth.org)
  – Report - eHealth in Action
  – 421 further examples at [www.epractice.eu](http://www.epractice.eu)
eHealth use in Europe 2002 - 2007

- GPs engaging in patient data went up from 17% to 63%.

- Transfer of laboratory results (blood, ECG) from 11% to 54%.

- Transfer of administrative patient data to reimbursing organisations went up to 22% from 6% in 2002.

- Transfer of medical patient data increased from 8% to 28%.

- e-Prescribing was done by about 3%, now by about 11%.

- A comparison with the 2007 results for all 27 EU Member States shows that the enlargement of the Union did not have much impact — neither positive nor negative — on the developments in the past five years.
• 6789 interviews with GPs (max 318 inter./country);
• Coverage of 29 countries: EU27, Norway, Iceland;
• Sampling ensuring representativeness / country;
• Stratification by region to enable comparison between groups of similar regions using settlement types like metropolitan/urban/rural;
• Survey organisation: IPSOS
eHealth in EU – Some Good News

eHealth deployment in primary care (EC Study 2007)

- Using PC
- Using electronic patient data storage
- Routinely using PC in consultation
- Internet access
- Connecting with broadband
- Using decision support software for prescribing or diagnosis
- Accessing other health institutions networks
- Occasionally using PC to illustrate to patient
- Regularly using PC to illustrate to patient
- Exchanging administrative data with reimbursing organisations
- Occasionally using Internet and electronic health networks to provide telemonitoring to home-patients
- Routinely using Internet and electronic health networks to provide telemonitoring to home-patients

- 87.4%
- 80%
- 66.1%
- 69%
- 62.5%
- 62.3%
- 55.2%
- 44.4%
- 13.9%
- 15.1%
- 2.7%
- 0.9%
EU GPs using a computer during consultation, in % (EC Study 2007)

Random samples of 6,789 GPs in 29 countries

Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008
Access to broadband in practices

Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008
<table>
<thead>
<tr>
<th>Country</th>
<th>Access to Electronic Systems (% of GPs)</th>
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<tbody>
<tr>
<td>EU27</td>
<td>21</td>
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<tr>
<td>EU27+2</td>
<td>21</td>
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<tr>
<td>IRL</td>
<td>68</td>
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<tr>
<td>DK</td>
<td>62</td>
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<tr>
<td>N</td>
<td>59</td>
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<td>SE</td>
<td>51</td>
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<tr>
<td>IT</td>
<td>50</td>
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<tr>
<td>BE</td>
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<td>NL</td>
<td>34</td>
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<tr>
<td>FI</td>
<td>32</td>
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<tr>
<td>UK</td>
<td>25</td>
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<td>FR</td>
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<td>HU</td>
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<td>IE</td>
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<td>RO</td>
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<td>BG</td>
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<td>DE</td>
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<td>CZ</td>
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<td>LV</td>
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<td>CY</td>
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<td>FI</td>
<td>4</td>
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<tr>
<td>GR</td>
<td>4</td>
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</tbody>
</table>

**Source:** empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008.
Use: storage of medical patient data

Store of identifiable patient data

- Diagnoses: 92%
- Medications: 92%
- Basic medical parameters: 85%
- Laboratory results: 81%
- Symptoms or the reasons for encounters: 79%
- Medical history: 77%
- Ordered examinations and results: 76%
- Vital signs measurements: 75%
- Treatment outcomes: 67%
- Radiological images: 35%

Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008
### IT use among primary care physicians in seven countries

<table>
<thead>
<tr>
<th></th>
<th>AUS (%)</th>
<th>CAN (%)</th>
<th>GER (%)</th>
<th>NET (%)</th>
<th>NZ (%)</th>
<th>UK (%)</th>
<th>US (%)</th>
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<tbody>
<tr>
<td><strong>Electronic medical record (EMR) system</strong></td>
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<tr>
<td>Do you currently use EMRs in your practice?</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>79b,c,d,e,f,g</td>
<td>23c,d,e,f,g</td>
<td>42d,e,f,g</td>
<td>98e,f,g</td>
<td>92g</td>
<td>89g</td>
<td>28</td>
</tr>
<tr>
<td><strong>Does your EMR system allow you to (base: all doctors; percent yes)</strong></td>
<td></td>
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<tr>
<td>Share records electronically with clinicians outside your practice</td>
<td>10b,d,e,f</td>
<td>6c,d,e,f,g</td>
<td>9d,e,f,g</td>
<td>45e,f,g</td>
<td>17g</td>
<td>15</td>
<td>12</td>
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<tr>
<td><strong>Are the following tasks routinely performed in your practice?</strong></td>
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<tr>
<td>Doctor receives alert or prompt about a potential problem with drug dose or interaction</td>
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<tr>
<td>Yes, using computerized system</td>
<td>80b,c,d,e,f,g</td>
<td>10c,d,e,f,g</td>
<td>40d,e,f,g</td>
<td>93e,g</td>
<td>87g</td>
<td>91g</td>
<td>23</td>
</tr>
<tr>
<td>Yes, using manual system</td>
<td>10b,c,d,e,f,g</td>
<td>31c,d,e,f</td>
<td>33d,e,f,g</td>
<td>2e,f,g</td>
<td>6g</td>
<td>6g</td>
<td>28</td>
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<tr>
<td>No</td>
<td>11b,c,d,e,f,g</td>
<td>56c,d,e,f,g</td>
<td>27d,e,f,g</td>
<td>4g</td>
<td>7g</td>
<td>3g</td>
<td>47</td>
</tr>
</tbody>
</table>

**SOURCE:** Commonwealth Fund International Health Policy Survey of Primary Care Physicians, 2006.

**NOTES:** Reading from left to right starting with Australia (AUS), the letter indicates significant differences with the country or countries to the right, as indicated (p < .05).

b Different from Canada.

c Different from Germany.

d Different from the Netherlands.

e Different from New Zealand.

f Different from the United Kingdom.

g Different from the United States.
% GPs connected to secondary healthcare (hospitals and/or specialist)
Electronic exchange of data for at least one purpose
Connectivity: to specialists

Specialist practices

Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008
Connectivity: to hospitals

Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008
Connectivity: to health authorities

Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008
Link to insurers (reimbursers)

Admin data with reimbursers routinely

Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008
GP Attitudes towards ICT use in healthcare

ICT improves the quality of healthcare services

Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008
Purpose of use of internet and electronic health networks: Telemonitoring routinely

Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008
For further information

- INFSO H1 Policy site:

- Research site:

- Interactive Portal:
  http://www.epractice.eu