

SEeHealth: The Roadmap from Concept to Practice

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

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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





eHealth in the European Commission

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)

FP - Framework Programmes

Innovation

ideas → € and/or
social benefits

Success factors:

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

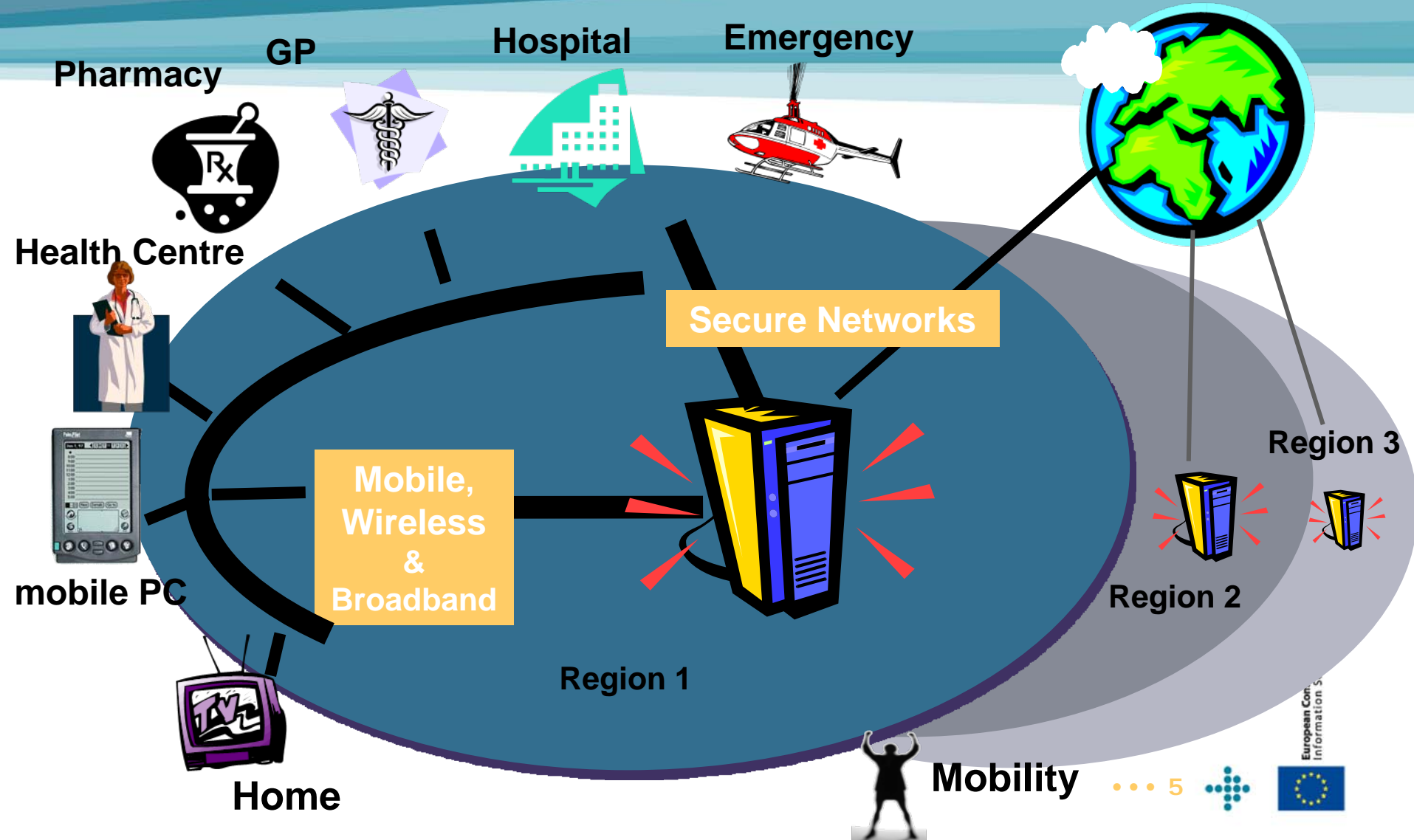
CIP-Comp. & Innovation Prog.
Regional Developments funds



Towards eHealth Deployment: Step 1

Health Information Networks

Connecting providers: Messaging, EHR, HP tools, on line services



EC-DG INFSO Response

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 -)
4. Large Scale Pilot – epSOS on cross border interoperability of patient summaries and prescriptions (2008)
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>)
 - 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)
 - Conformance testing (currently under negotiation with IHE, ETC)
 - PHS interoperability (currently under negotiations with CONTNUA)



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





Competitiveness Innovation Programme Policy Support Programme (CIP ICT PSP)

- **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



Towards wider implementation - LESSONS LEARNED

- 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



“Our bureaucracy is so vast, we no longer need reality.”

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**



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

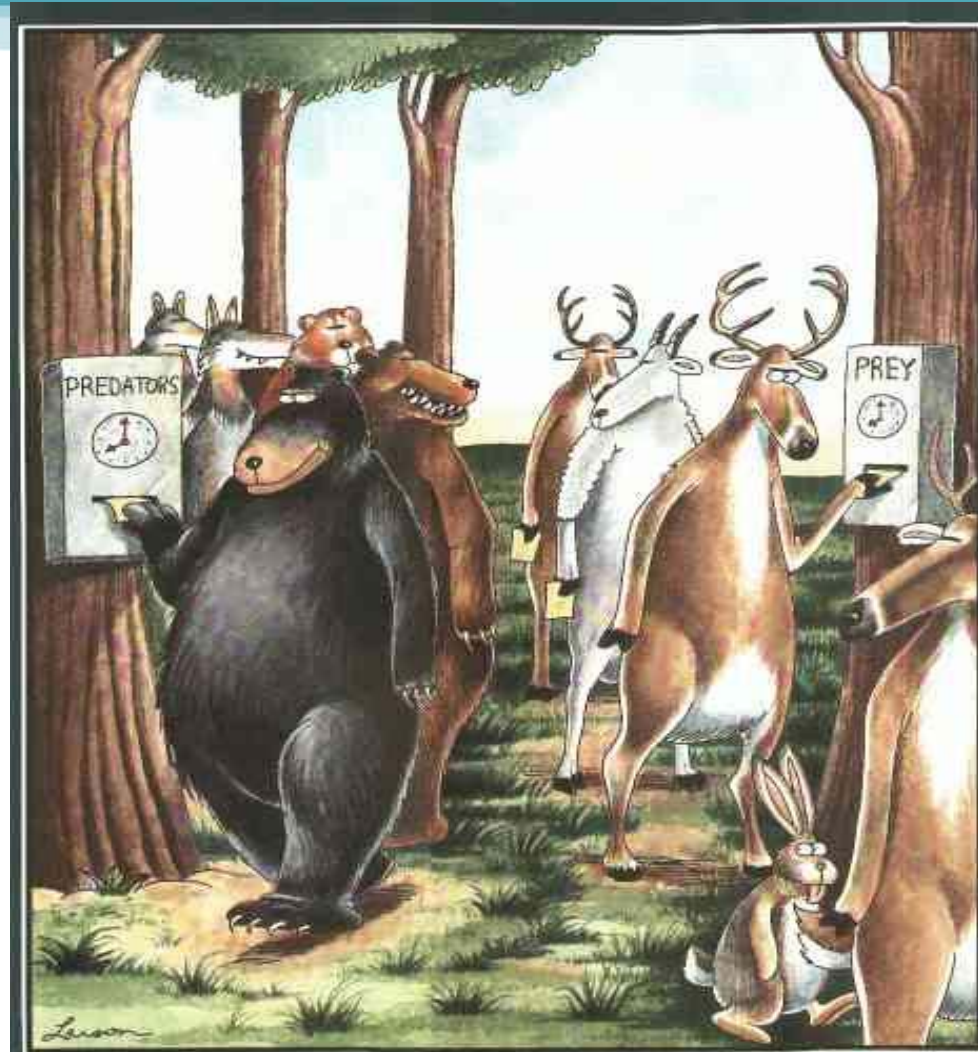
No wide deployment, no interoperability without involvement/commitment of all stakeholders

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**

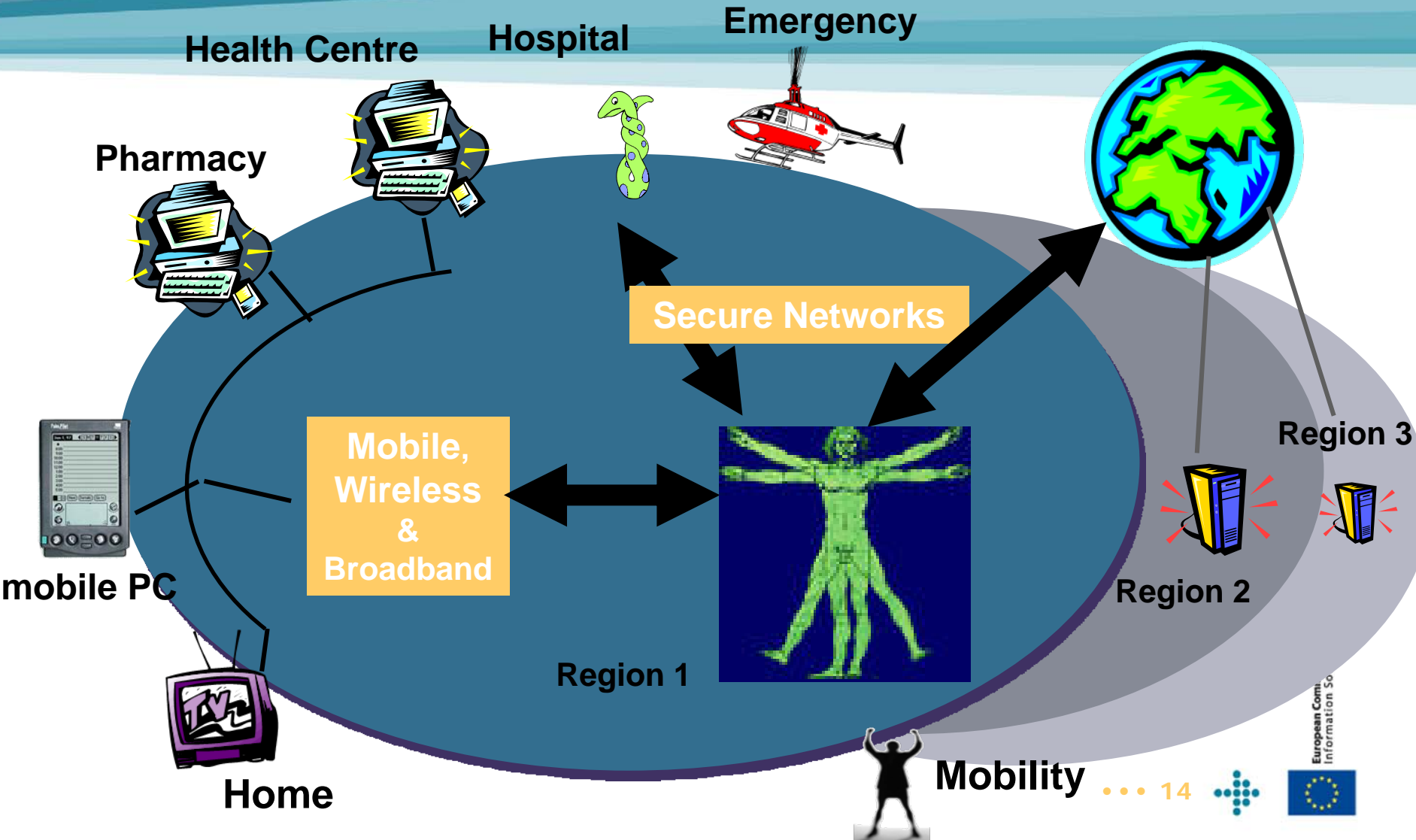


Wildlife day shifts

Step 2

Connecting individuals with Health Information Networks

Health monitoring, access to health information



EC -DG INFSO RESPONSE to Step 2

- 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](http://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



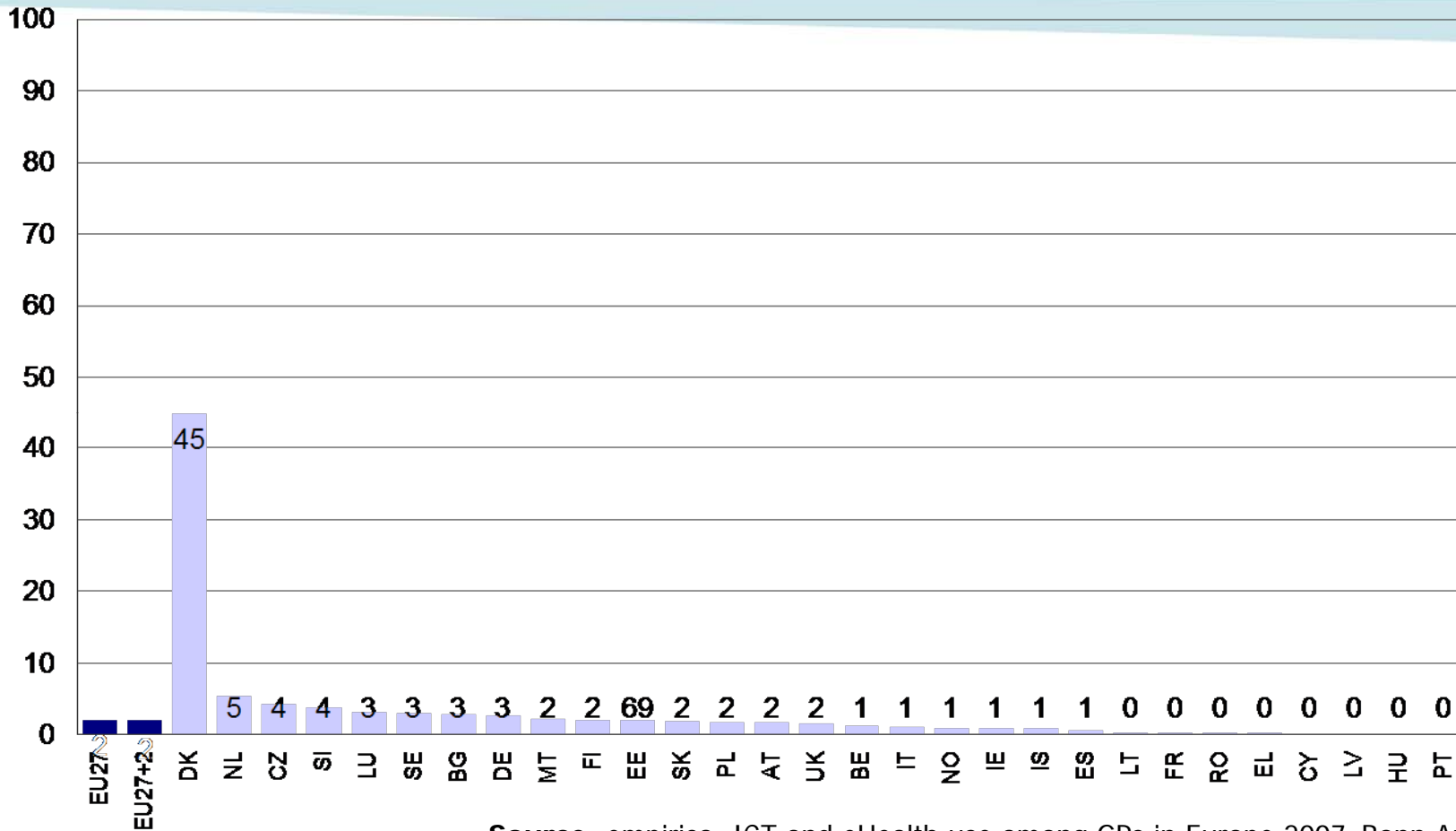
Telemedicine Benefits

- **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) •• 18



Connectivity: to patients' homes

Patients' homes

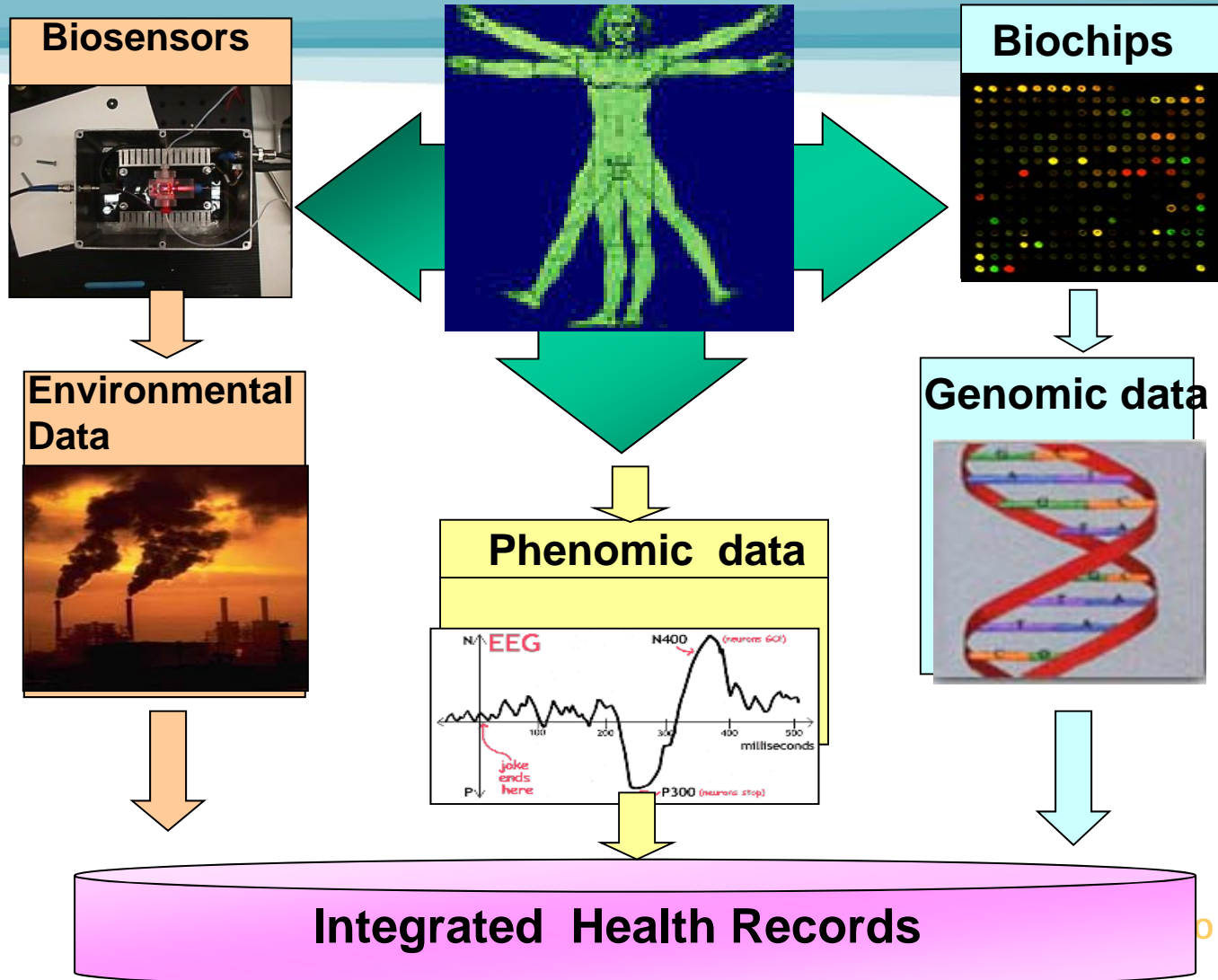


Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008



Step 3

Seeing the full picture of individual's health status



WHY Step 3?

Factors determining a health status of an individual & population

-Quality/Efficacy of Healthcare services

} Health delivery system

- Lifestyle: what we eat, drink, breath, ...

- Physical and social environment

} Exogenous Determinants (Nurture)

- Genetic “blueprint” /profile at birth

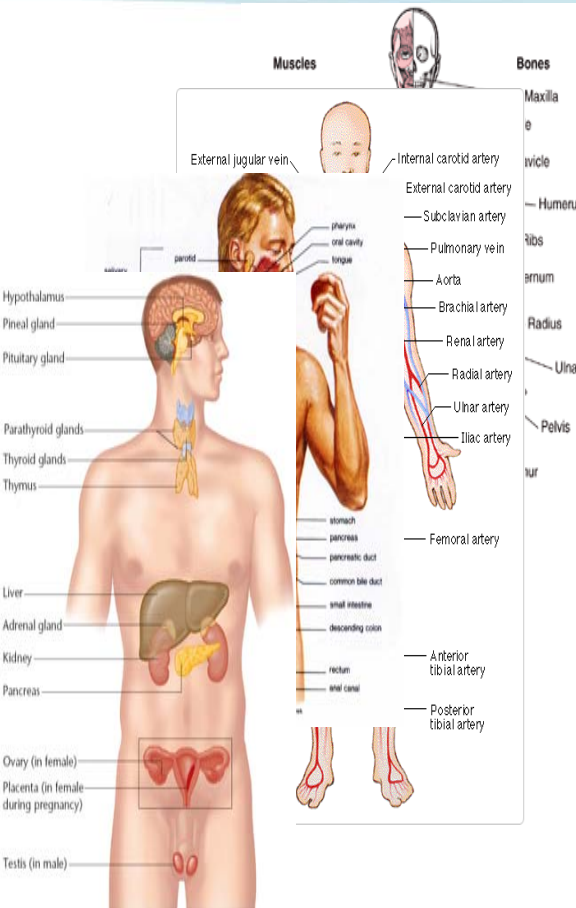
- Acquired genetic changes

} Endogenous Determinants (Nature)

ICT contribute to all factors!



The Virtual Physiological Human (VPH)



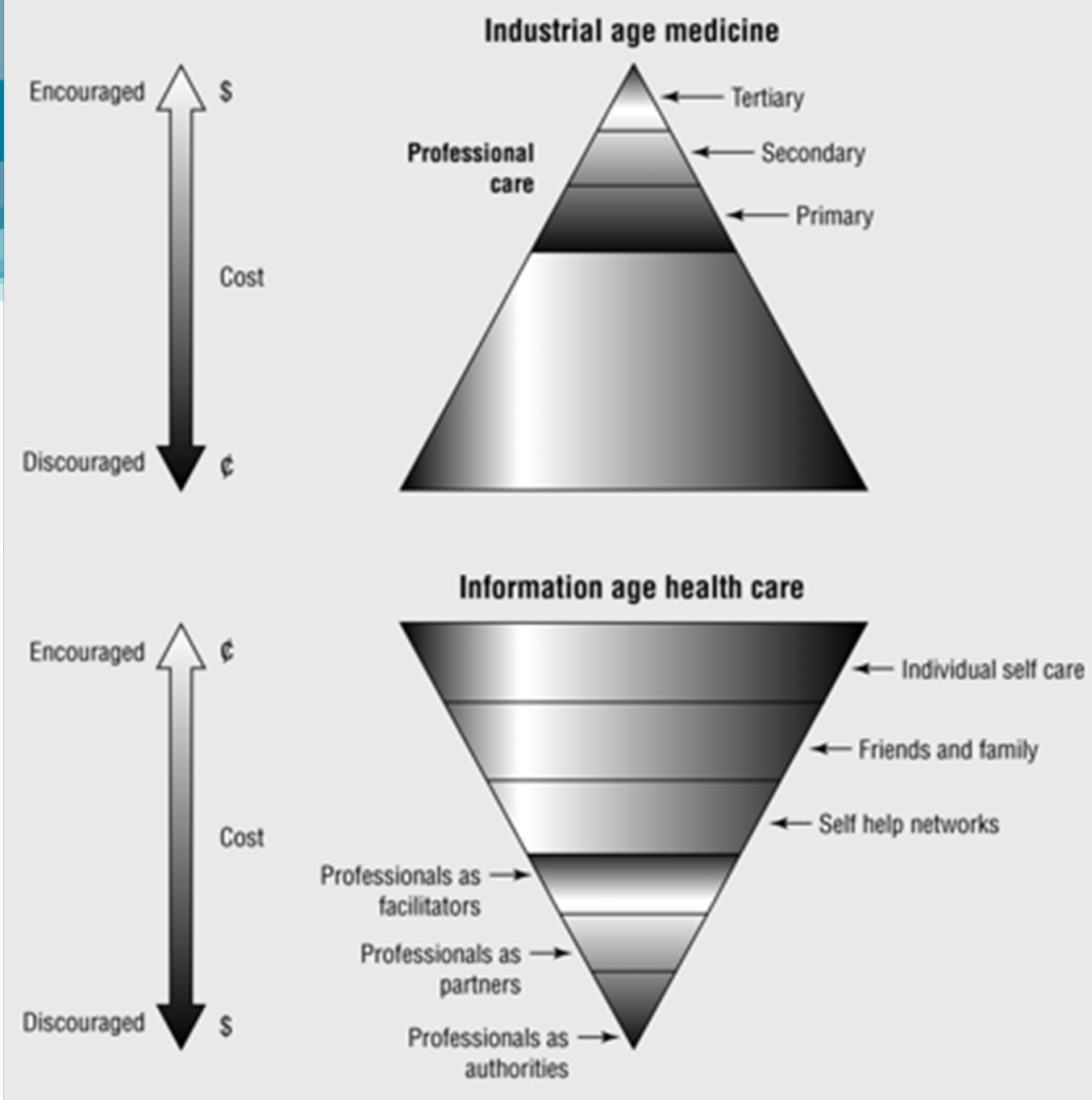
The Virtual Physiological Human is a methodological and technological framework that once established will enable the investigation of the human body as a single complex system.

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





Jennings, Miller, Materna 1997



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 Market in EU

- 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



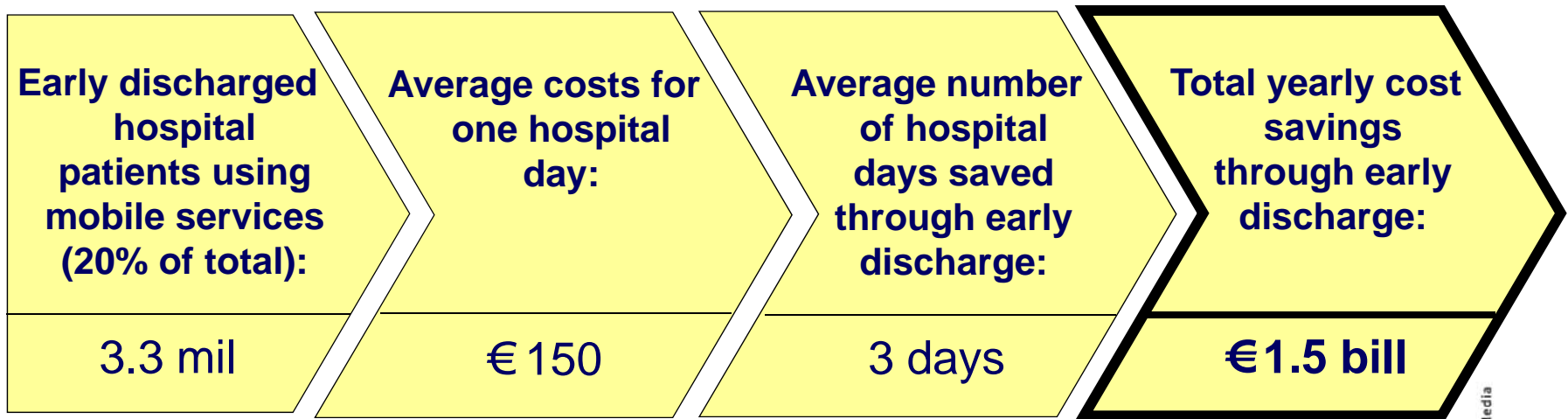
National Priorities: Preliminary Analysis

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



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



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



Good eHealth study (Deloitte)

- 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
 - Report - eHealth in Action
 - 421 further examples at 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.



eHealth in EU – situation on the ground

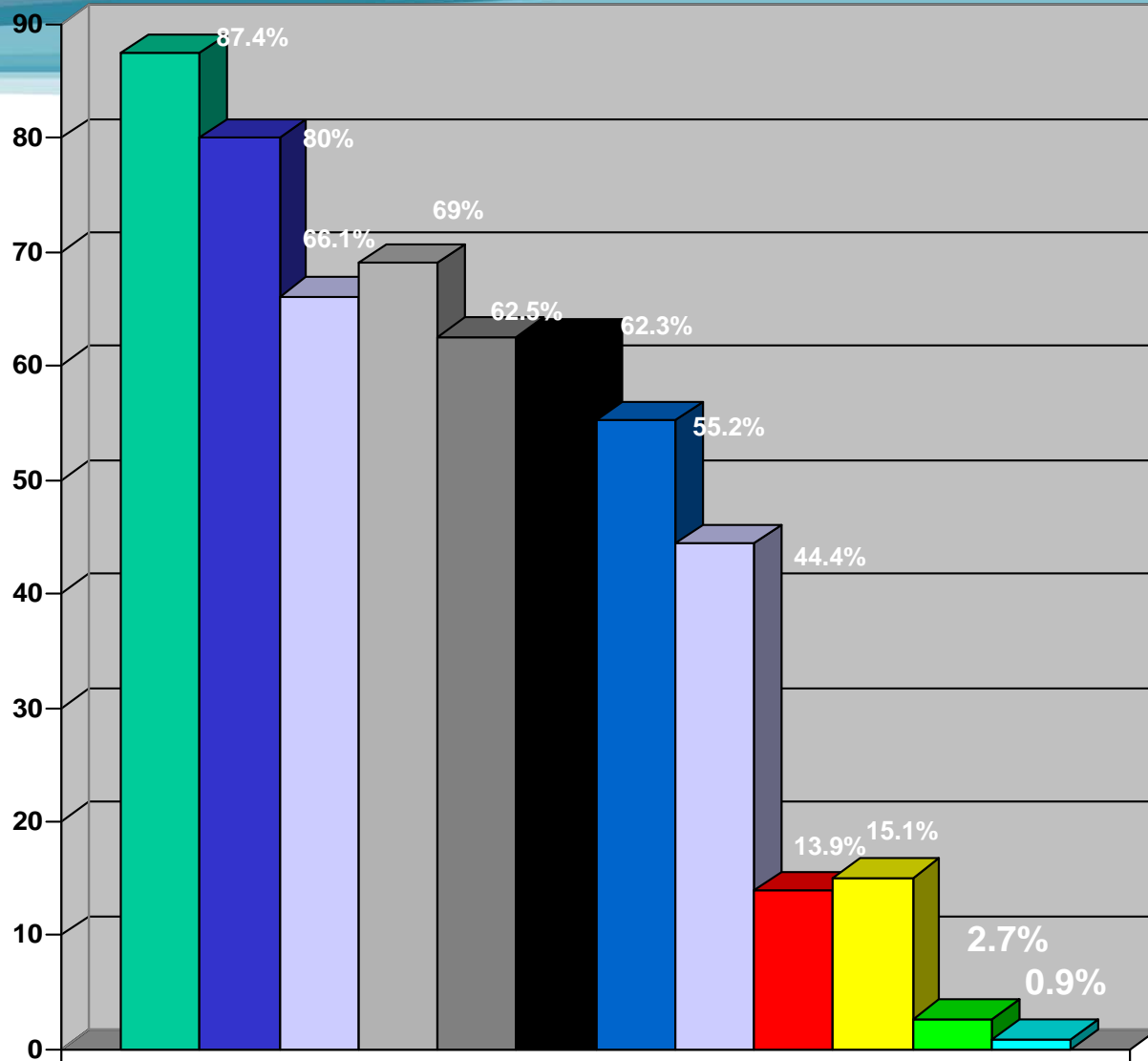
GP Survey - 3rd quarter 2007

- 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

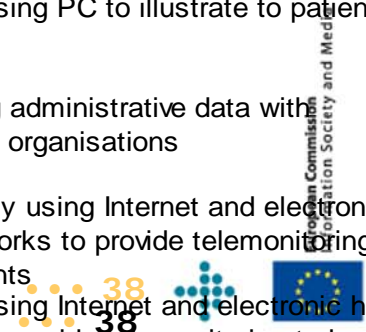


eHealth in EU – Some Good News

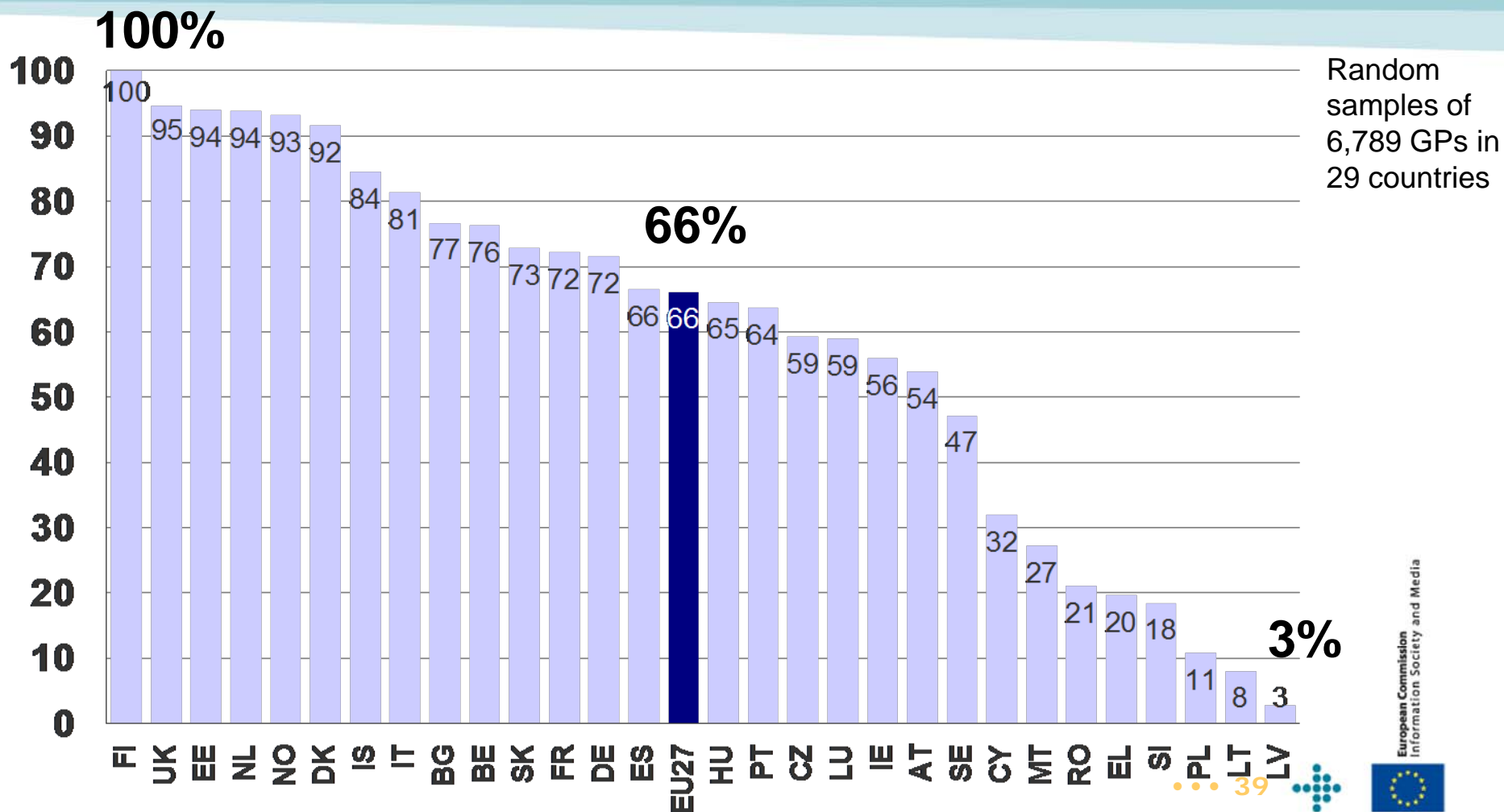
eHealth deployment in primary care (EC Study 2007)



- 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



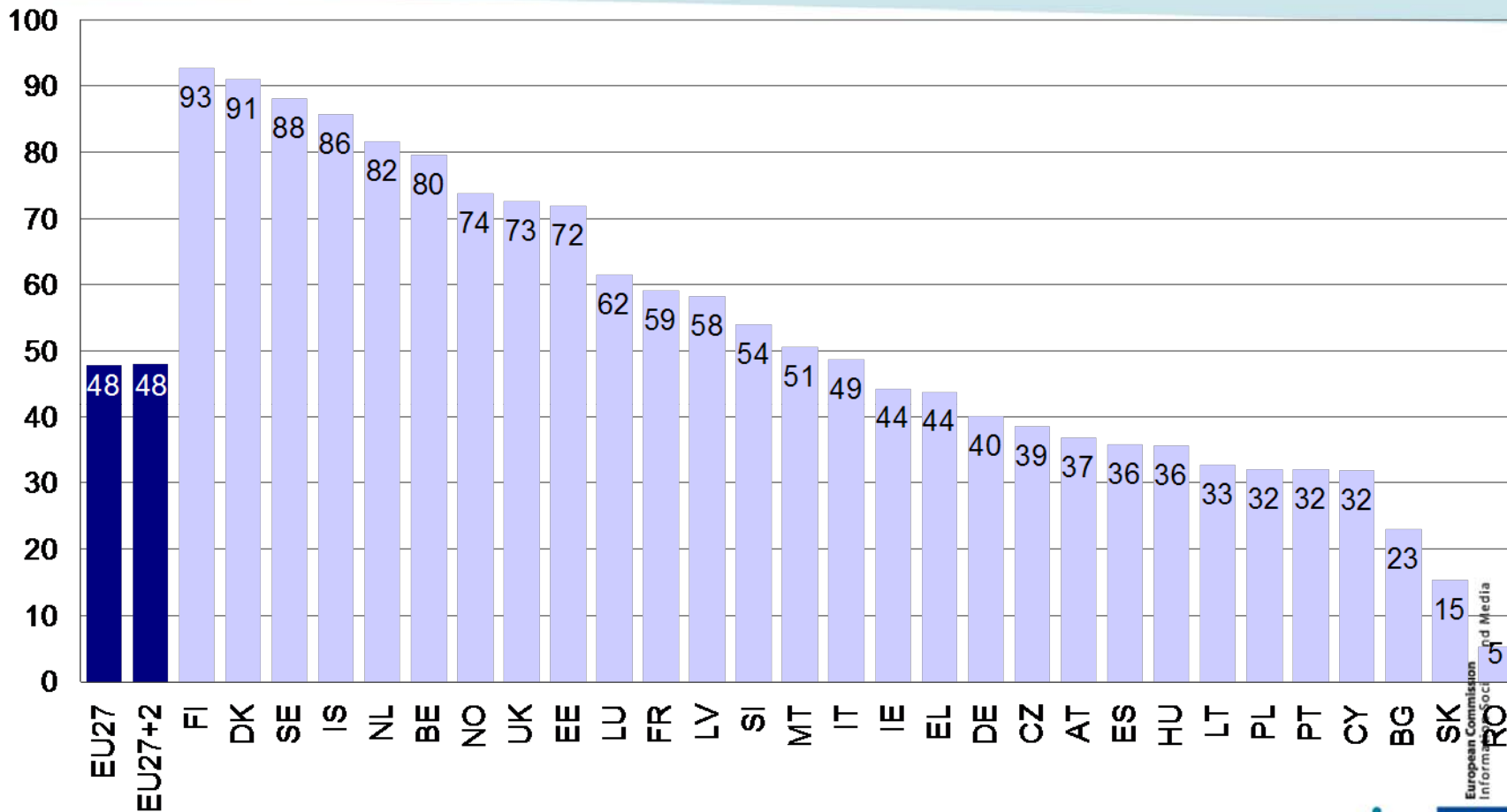
EU GPs using a computer during consultation, in % (EC Study 2007)



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

Access to broadband in practices

Access to broadband in practices

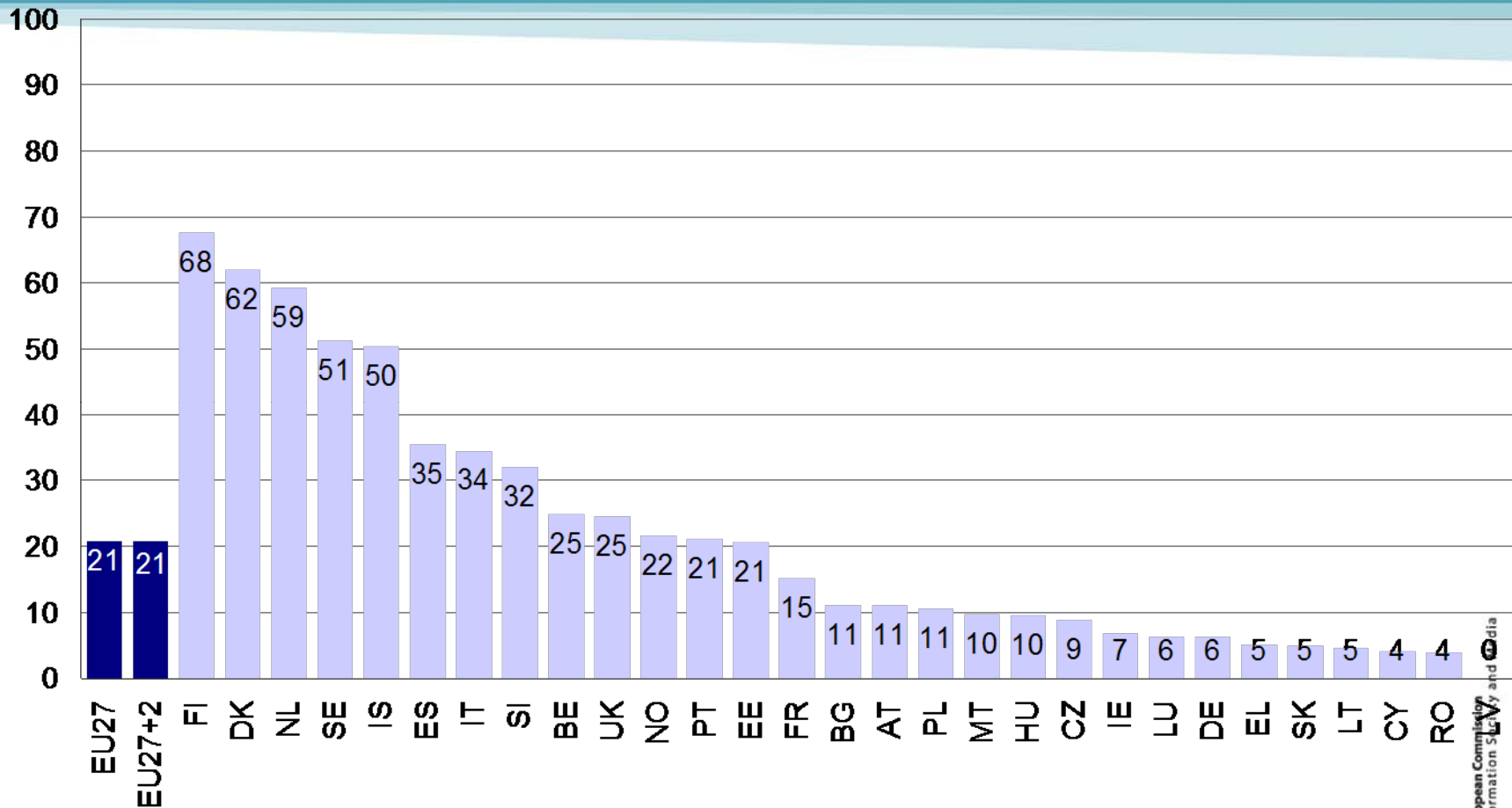


Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008



Connectivity: to other GPs

Access to electronic systems of other health actors: GPs

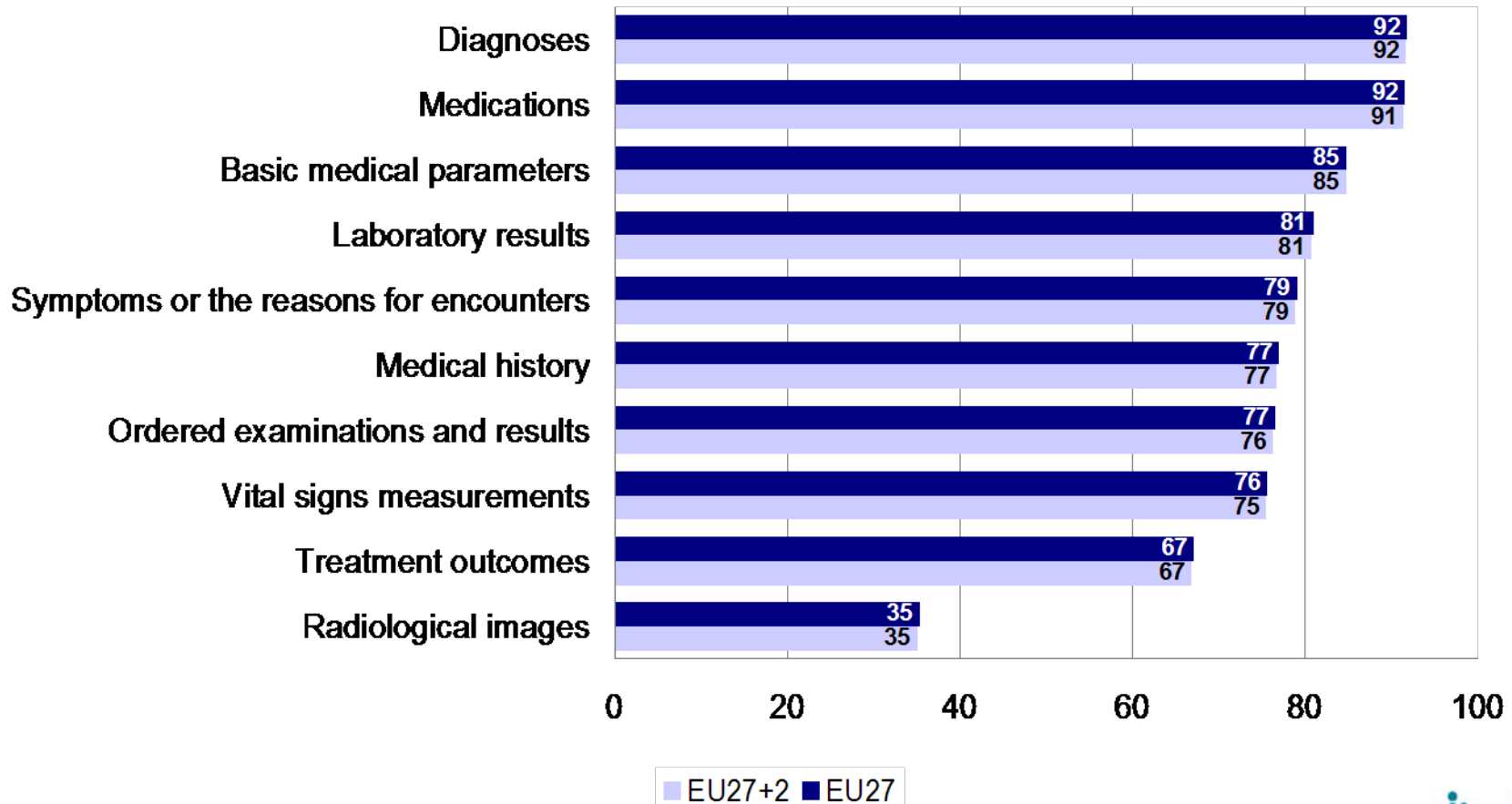


Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008 1



Use: storage of medical patient data

Store of identifiable patient data



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



IT use among primary care physicians in seven countries

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

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.

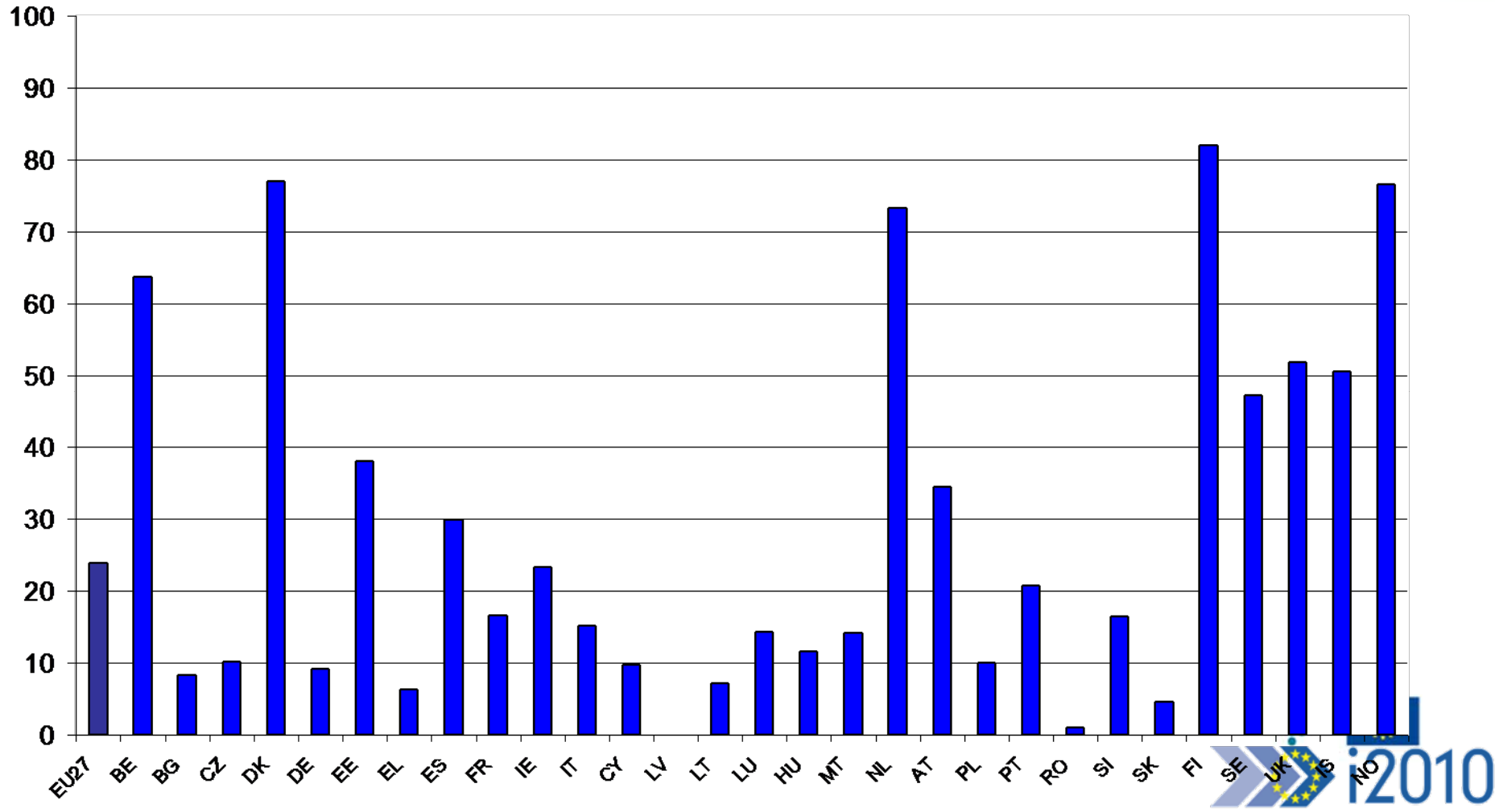
^d Different from the Netherlands.

^e Different from New Zealand.

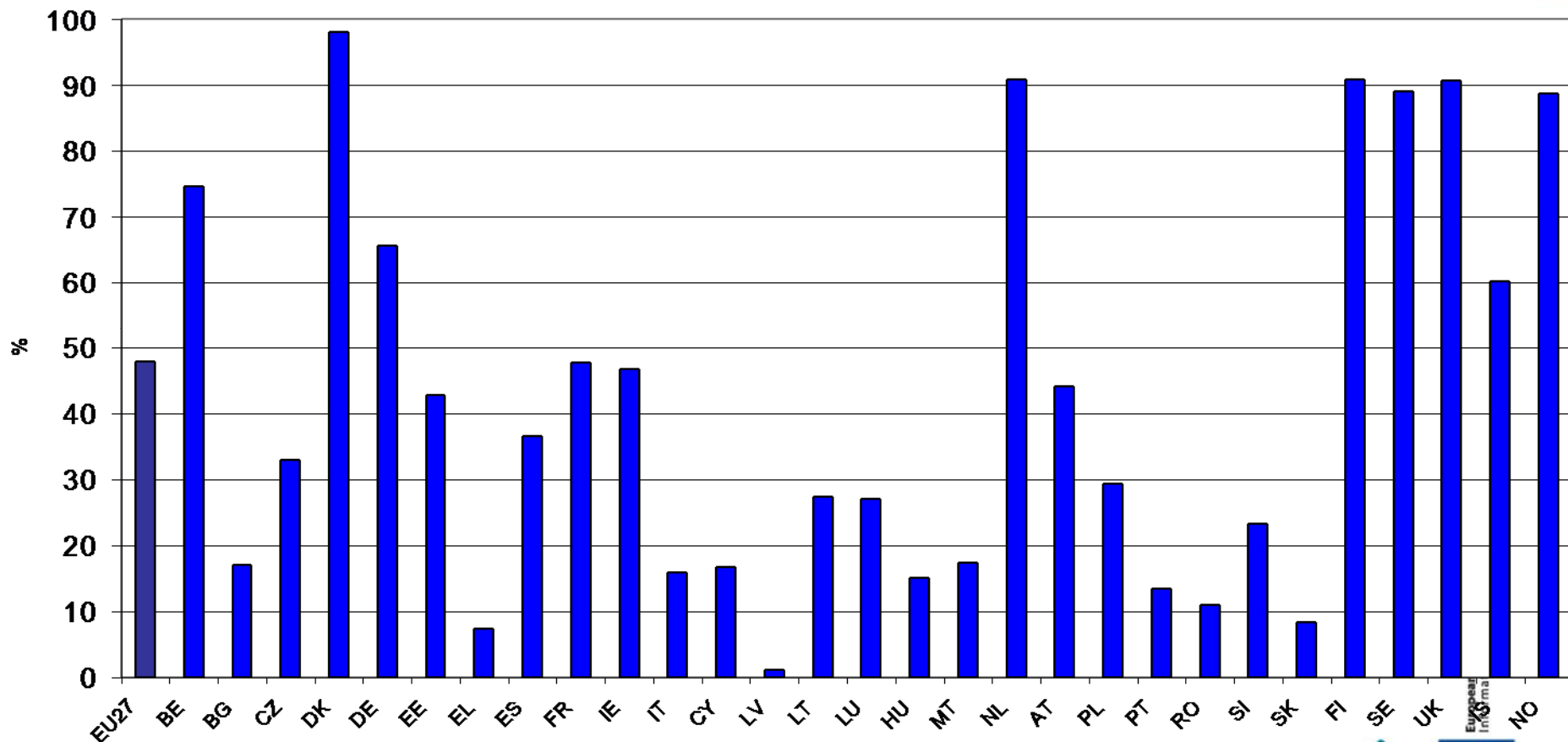
^f Different from the United Kingdom.

^g Different from the United States.

% GPs connected to secondary healthcare (hospitals and/or specialist)



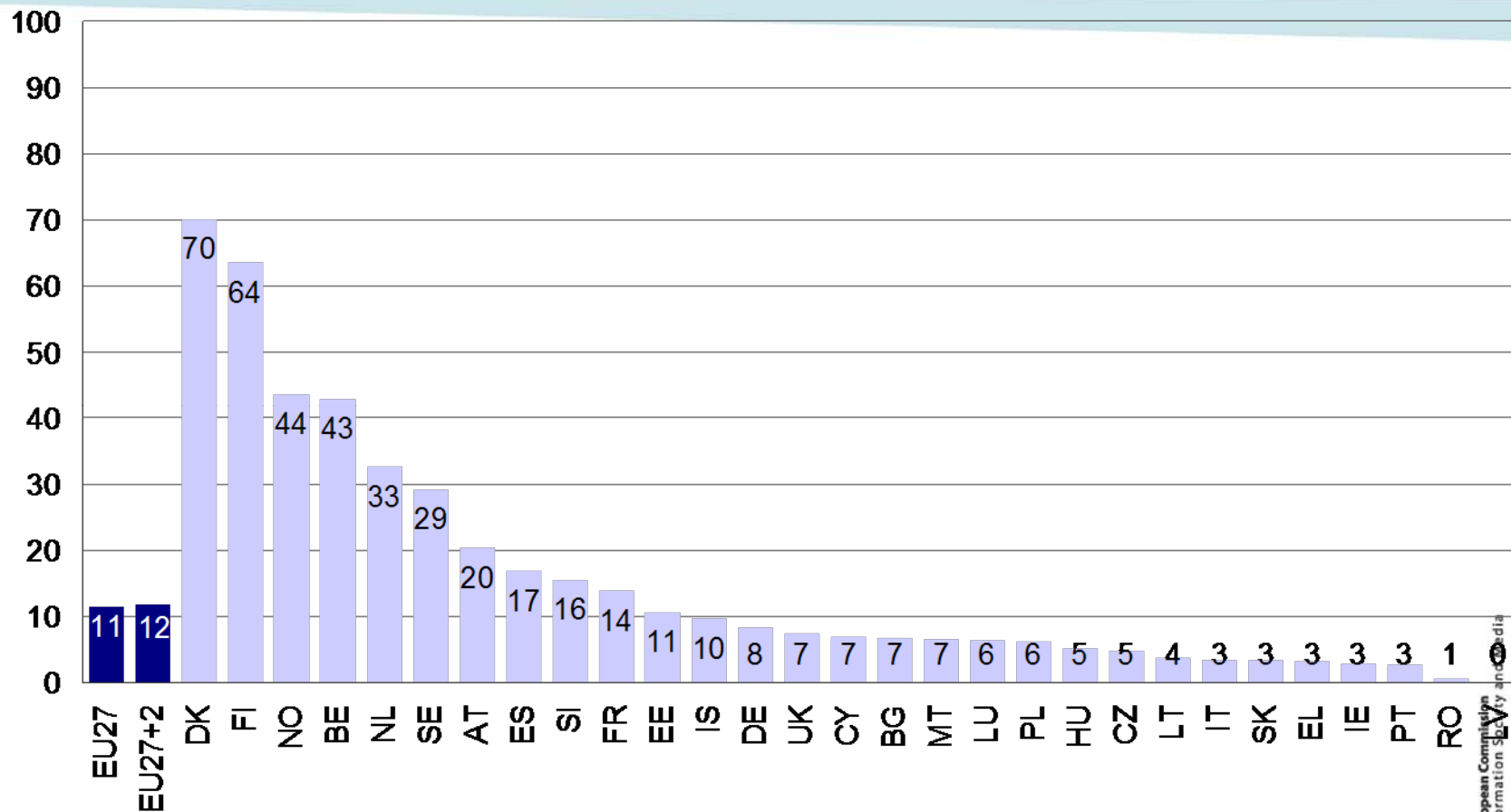
Electronic exchange of data for at least one purpose



... 45

Connectivity: to specialists

Specialist practices

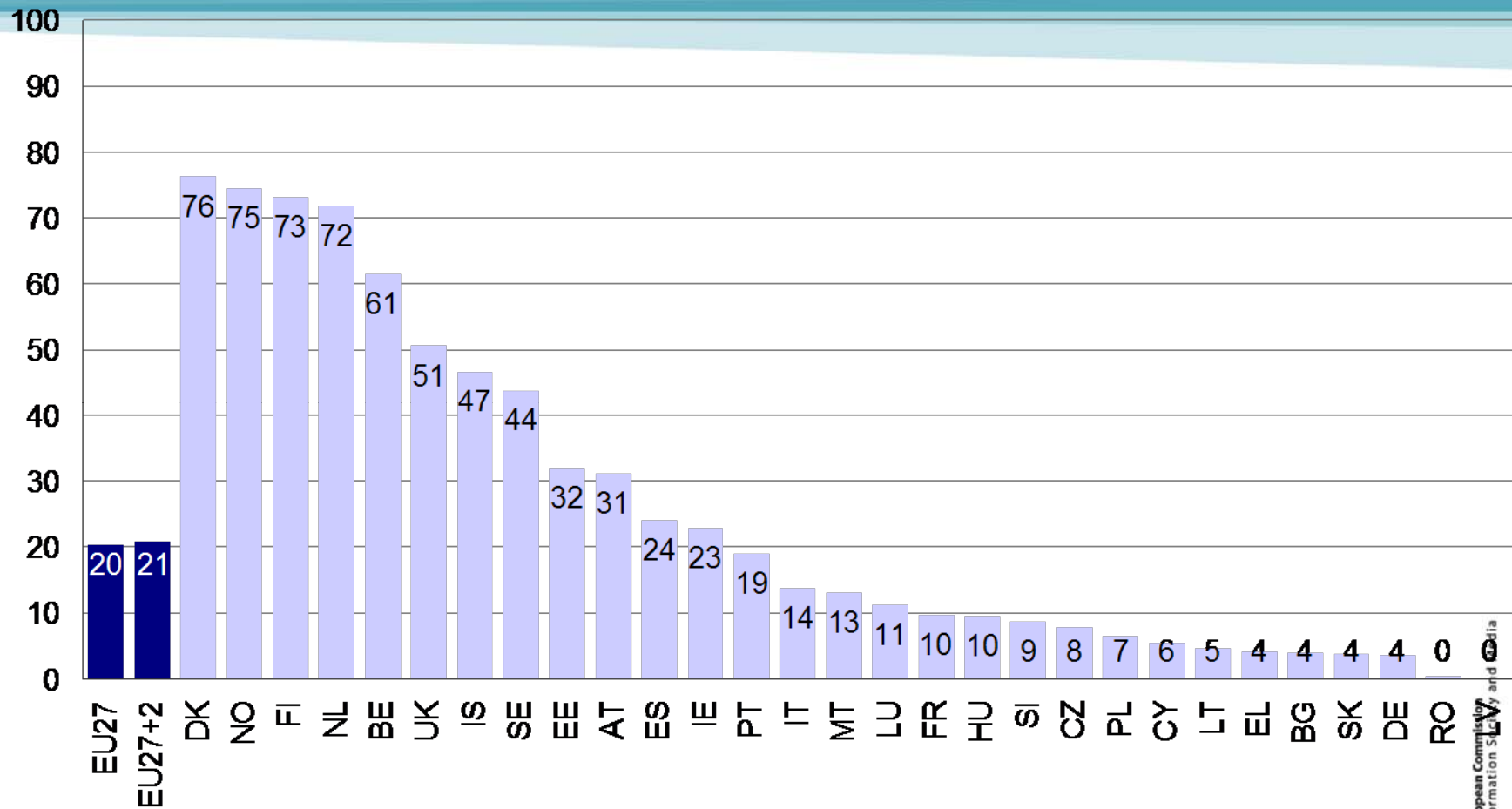


Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008



Connectivity: to hospitals

Hospitals

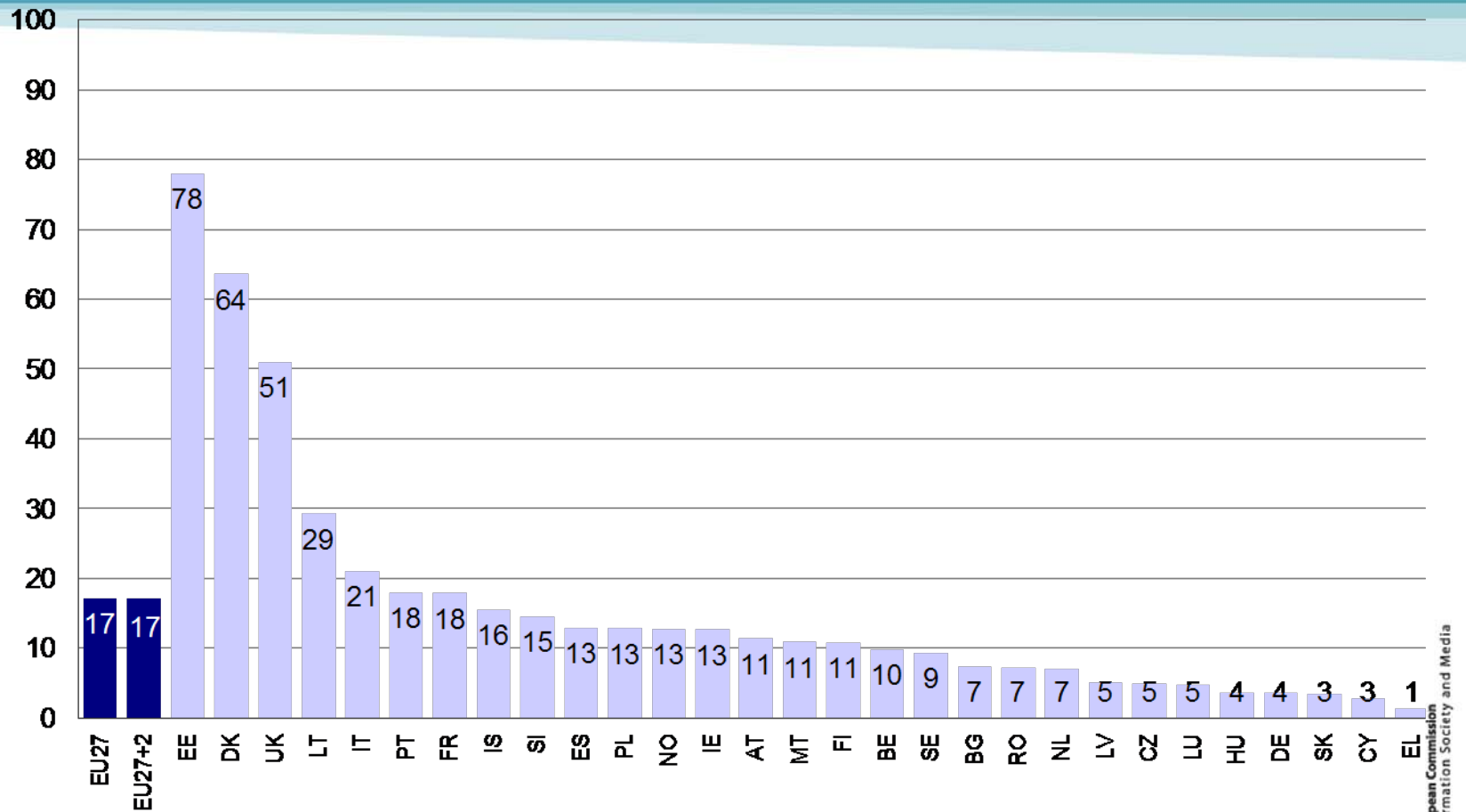


Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008 ⁷



Connectivity: to health authorities

Health authorities

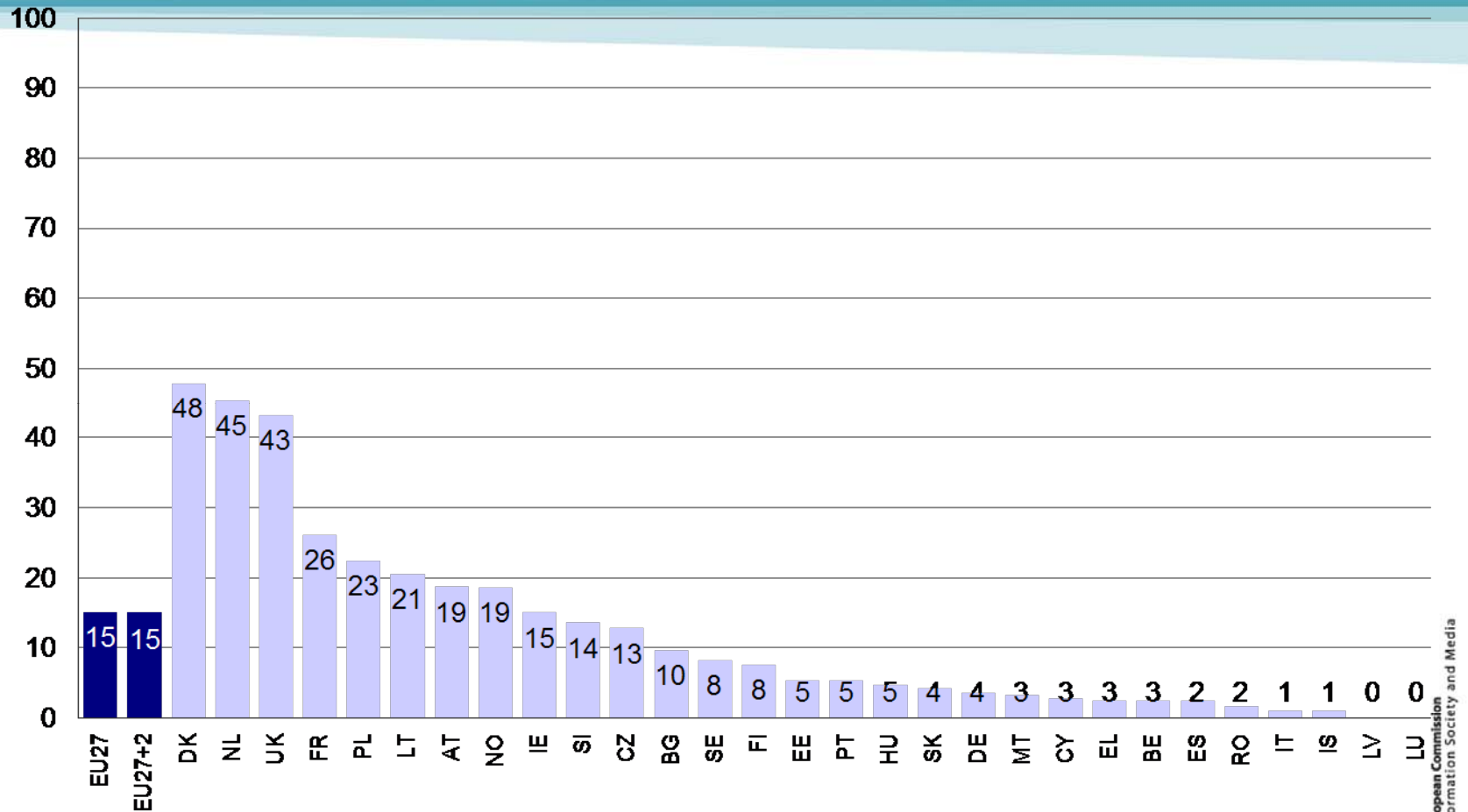


Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008 8



Link to insurers (reimburser)

Admin data with reimbursers routinely

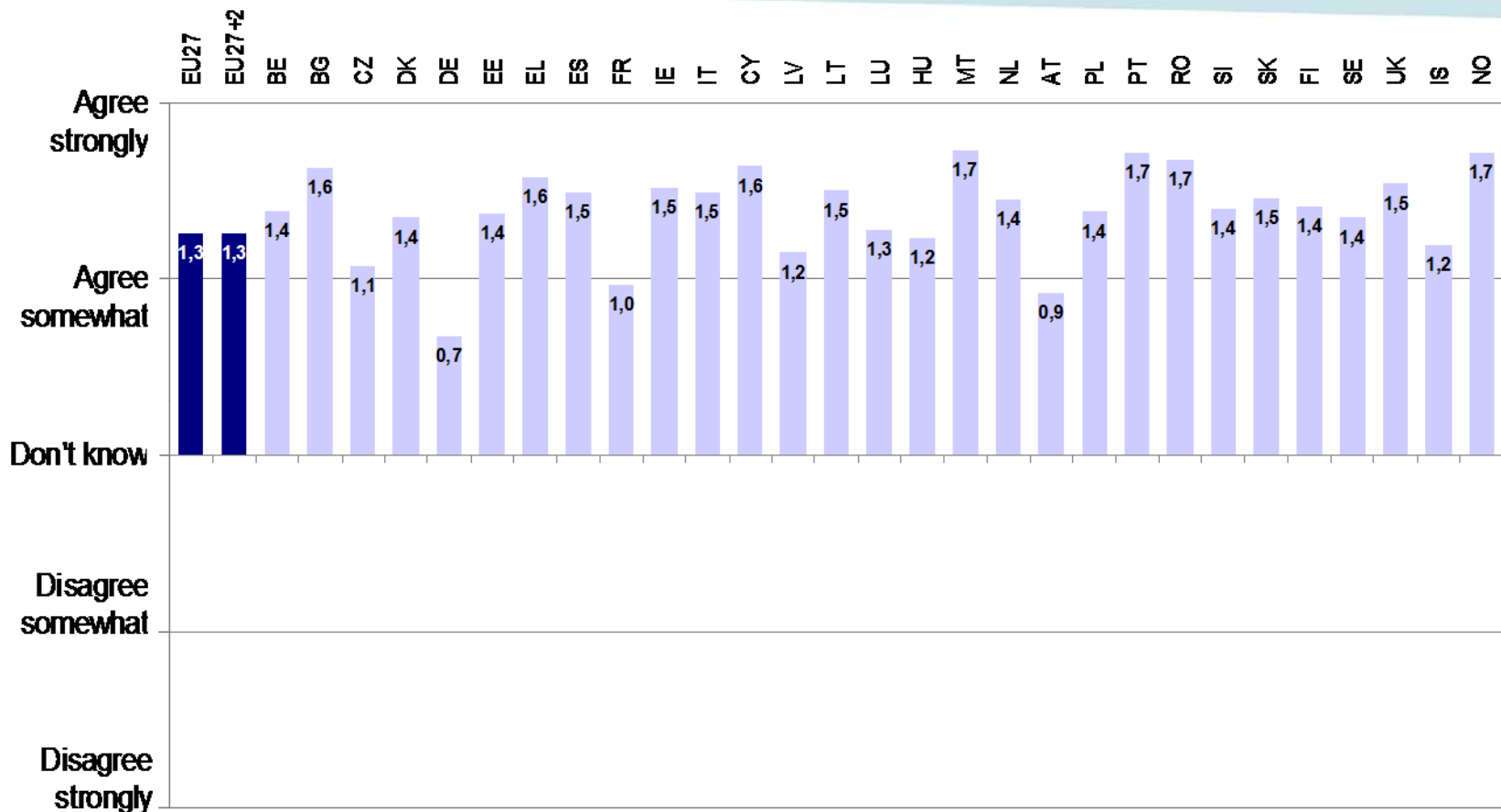


Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008



GP Attitudes towards ICT use in healthcare

ICT improves the quality of healthcare services

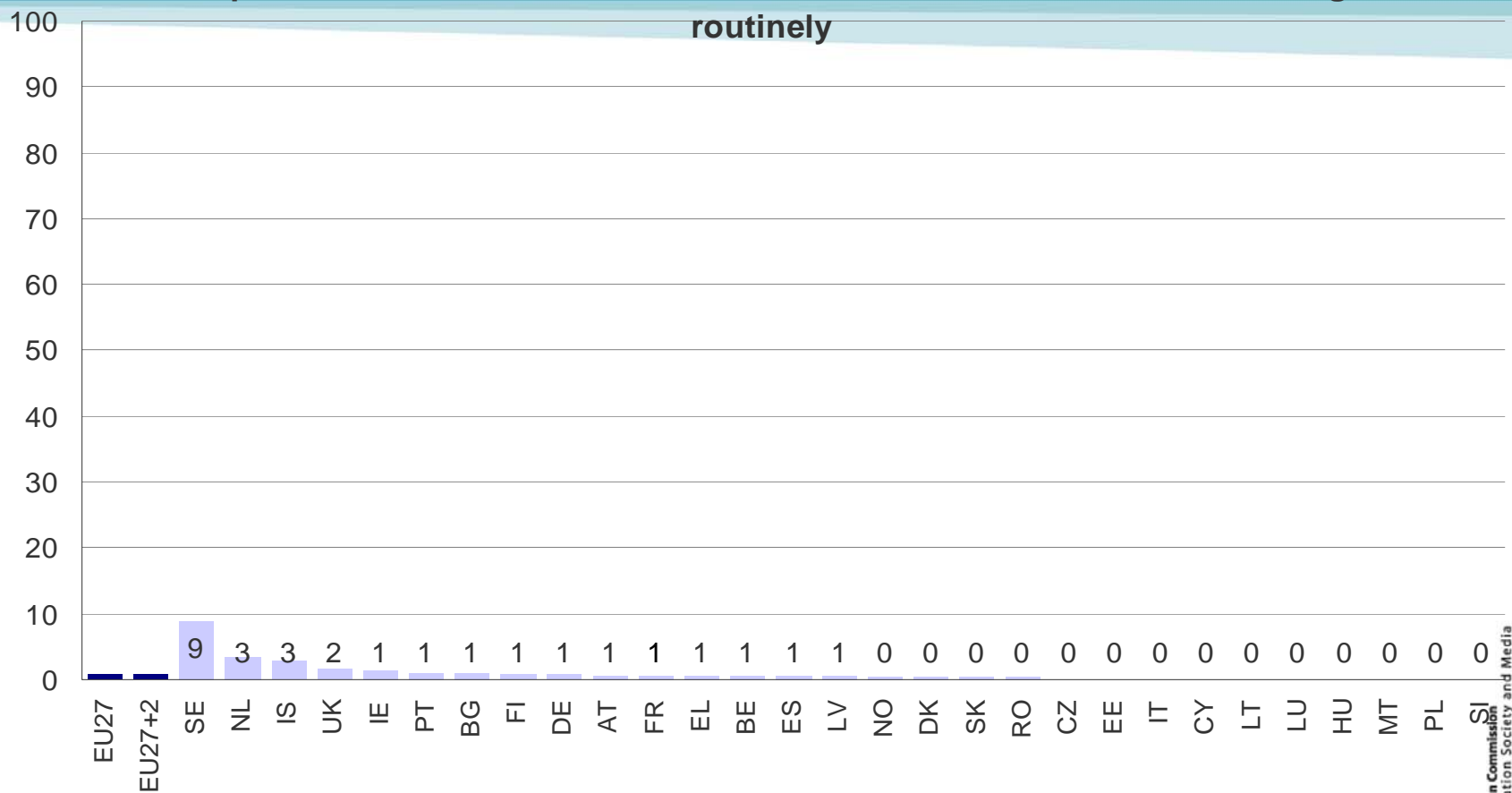


Source: empirica: ICT and eHealth use among GPs in Europe 2007, Bonn April 2008



Networking: telemonitoring

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:**

http://ec.europa.eu/information_society/activities/health/index_en.htm

- **Research site:**

<http://cordis.europa.eu/ist/health/index.html>

- **Interactive Portal:**

<http://www.epractice.eu>

