izip INTERNET ACCESS TO PATIENT HEALTH RECORDS

Czech Experience with Implementation of Personal Electronic Health Records

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IZIP History
from individual EHR to public services

- 1999 – 2000
  - development of the concept and principal ideas similar to internet banking services
  - Search for strategic partners
- 2001
  - Establishment of the legal entity and structure
  - HW & SW development, security testing
- 2002 - 2003
  - Regional pilot real-life phase for testing of the interest of patients, health care professionals and managers
  - Testing phase of the data and speed capacity, HW and SW interoperability,
- 2004
  - Routine practice with deployment to all regions of the Czech Rep. and data collection
  - Linking to smart-cards
  - International recognition: eHealth awards, EHTEL, NICTIZ, …
- 2005
  - Launching functional overlays: digital signatures, messaging, alarming, benchmarking, other statistics
  - The Best e-Content Product of the World (WSIS Award)
- 2006
  - Contractual and legal fixation
  - European recognition – reference EU project
- 2007
  - International project involvement: Health+, TEN4Health, DebugIT, epSOS
- 2008
  - Integration with public services: ePrescription, Czech Points

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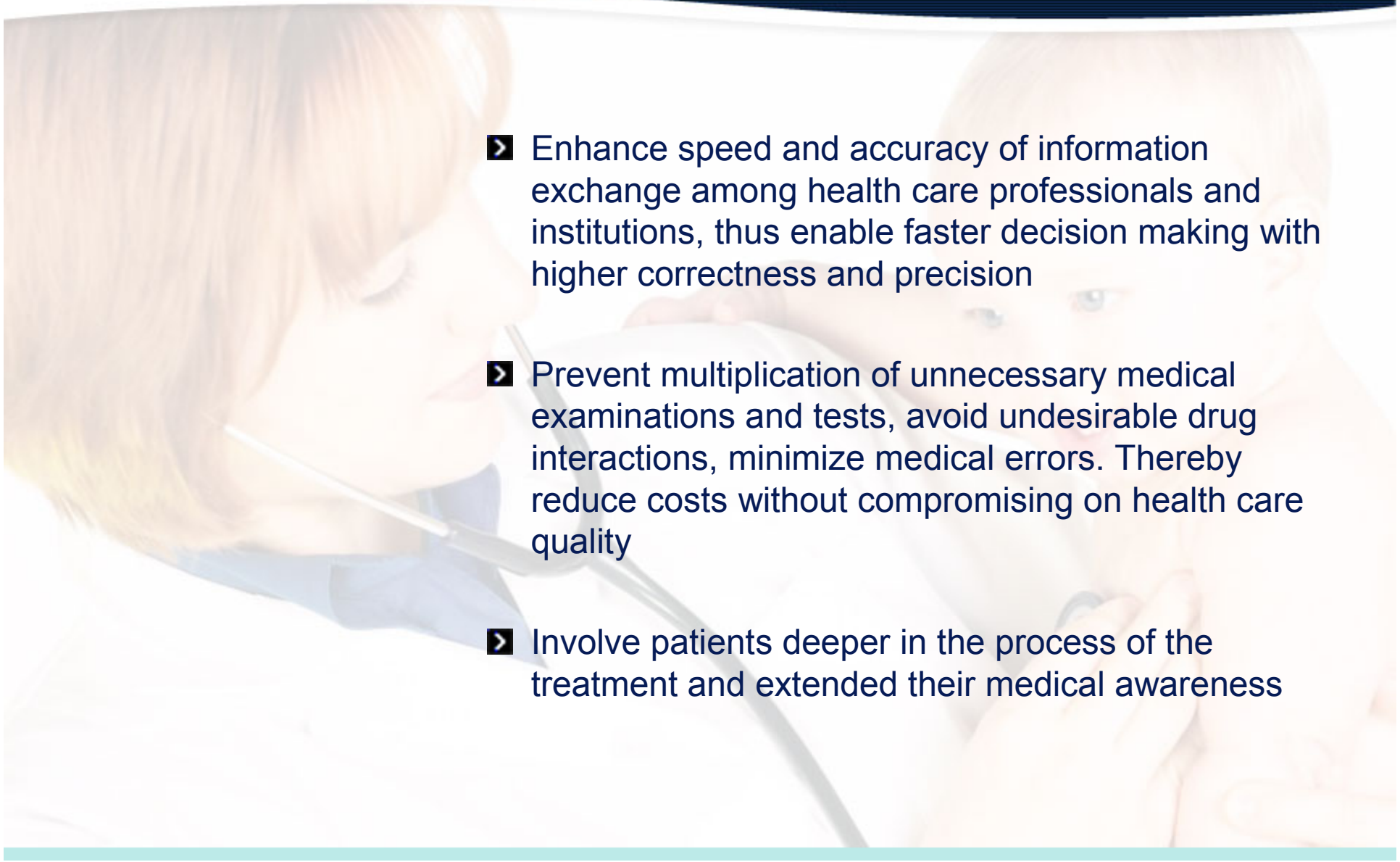
System IZIP Objectives

Improving Quality of Health Care Provided to Patients



- Enhance speed and accuracy of information exchange among health care professionals and institutions, thus enable faster decision making with higher correctness and precision
- Prevent multiplication of unnecessary medical examinations and tests, avoid undesirable drug interactions, minimize medical errors. Thereby reduce costs without compromising on health care quality
- Involve patients deeper in the process of the treatment and extended their medical awareness

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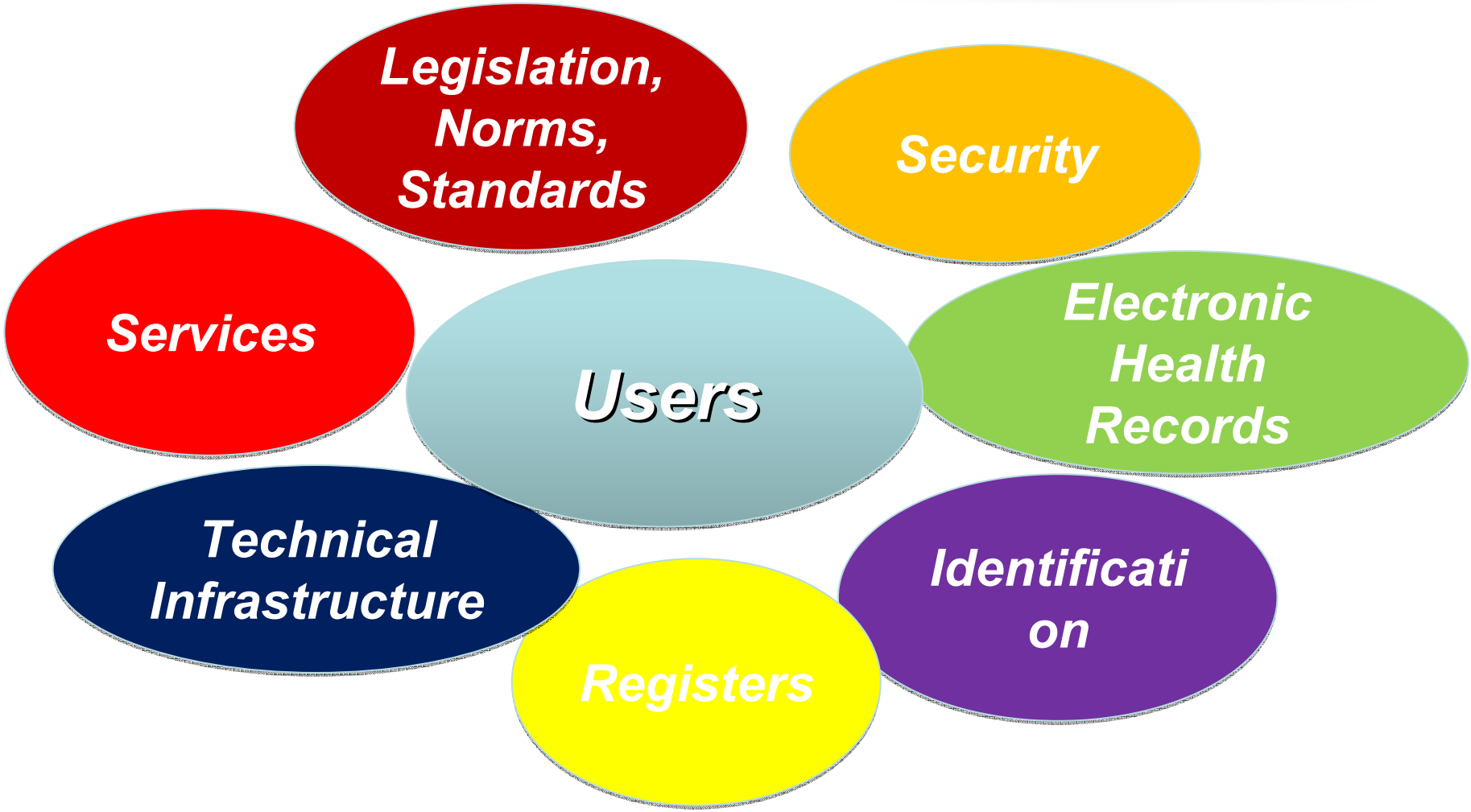
Environment for Implementation
of eHealth services in the Czech Republic



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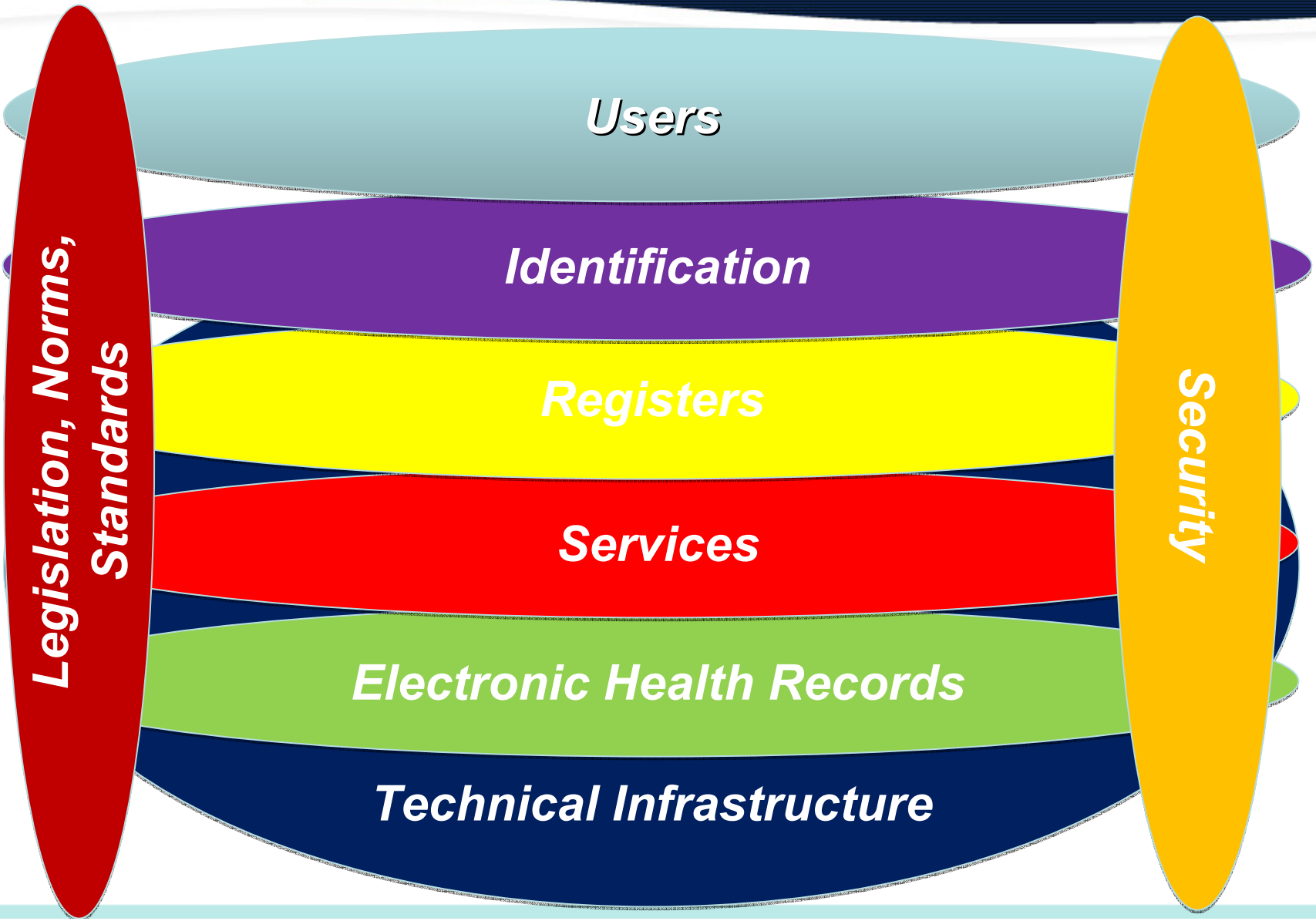
eHealth „Architecture“



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The IZIP Concept

Establishment of Electronic Patient Health Records

- Registered membership is required
  - patients
  - health care professionals
- Created on patient's/doctor's request – voluntary
  - with patient/doctor consent
- Accessible via secure internet
- Health care professionals (from hospital or/and outpatient, labs, pharmacies, etc.) registered in system IZIP are authorized for writing and uploading data in patients' health records/files
- Health records contain
  - **medical history, diagnosis, results of lab and medical examinations, scans, conclusions, recommendations, therapy, medications, ….**

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Access Management

For data upload or submission:

- All registered health care professionals

  physicians, hospitals, laboratories, pharmacies…

For data reading:

- Only the patient – the principal owner of the record
- Health care professionals authorized by the patient
- In cases of emergency, registered emergency physicians

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Data Security

Security elements according to patients' demand

- Unique identification number – social security number
- PIN code
- Personal passwords
- Digital signatures
- GSM tokens
- Biometrics (fingerprints)

Security arrangements

- SSL protocol, HTTPS
- Location, processes and physical security
- Systems: firewalls / special programs

Utilizing electronic certificates and digital signature

- Authentications
- Authorizations

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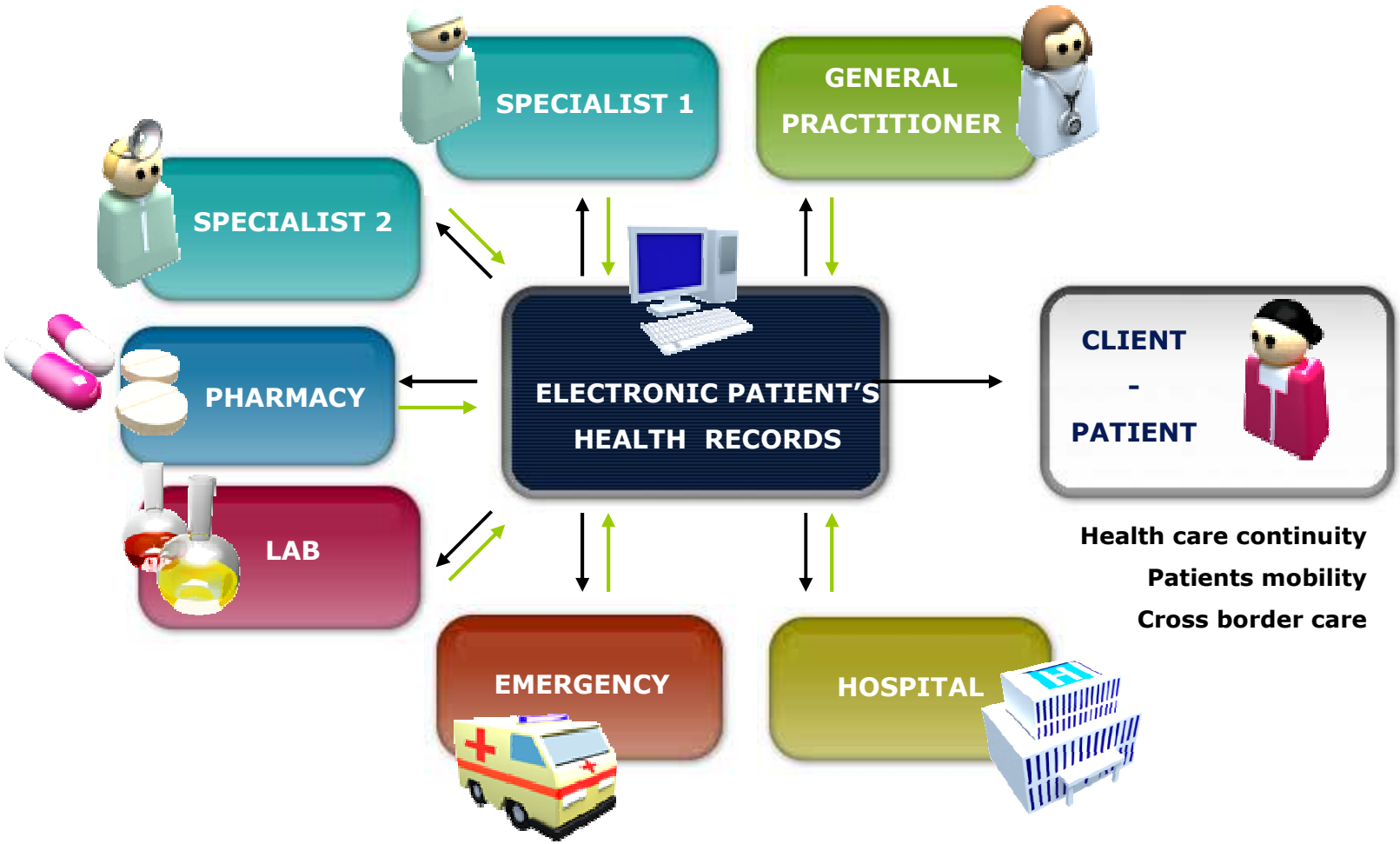
System IZIP Philosophy

Patient Centered



Health care continuity

Patients mobility

Cross border care

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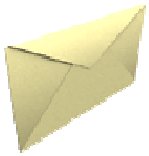
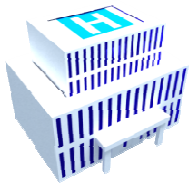
Current Number of Registered Users

- **Clients** **1.024.000**



- **Medical data entries** **9.300.000**
  - Harmonized interfaces for direct data export from majority of information systems used in hospitals, labs, pharmacies and out-patient offices
  - **Over 20 millions of prescritions, 50 millions procedures, …etc**

- **Health care professionals** **9.000**



- **Health care institutions** **5.500**

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Use Case – Hundreds of Thousands

Patients Often Access Their Health Records

Period September 2008	No. per month
Registered clients	**1 020 000**
Clients' individual accesses	**128 656**

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Health Care Professionals Accesses

Doctors Share Data with Patient's Consent

Period September 2008	No. per month
Registered Health Care Professionals	**9 050**
Individual accesses by HCPs	**98 443**
Total number of transactions	**1 194 223**

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Human Factor Engineering

- Optimized for working, patient friendly,
- Chronological order
  - *Firstly the newest*
- New record highlighting
- Modes - *Preview / Detail / Print*
- Filters and Search
- Individualized system front-end (i.e. for emergency operators)

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Technical Background

CORE DATABASE

- **Semi-centralized database**
- **ORACLE 10g, Microsoft, DB2**
  - High stability and security for personal sensitive data protection
- **Secured Data and Data-flows**
- **Modular-based conception**
- **3-stage information handling**
  - Collecting (grabbing) information
  - Parsing / Storing
  - Distributing (Views, Messaging)

DATA STANDARD

- **HTTP, HTTPS, SSL, XHTML**
- **IE and Mozzilla web browsers**
- **Flexible system**
- **Adapted to Czech conditions from current international & European data standard**

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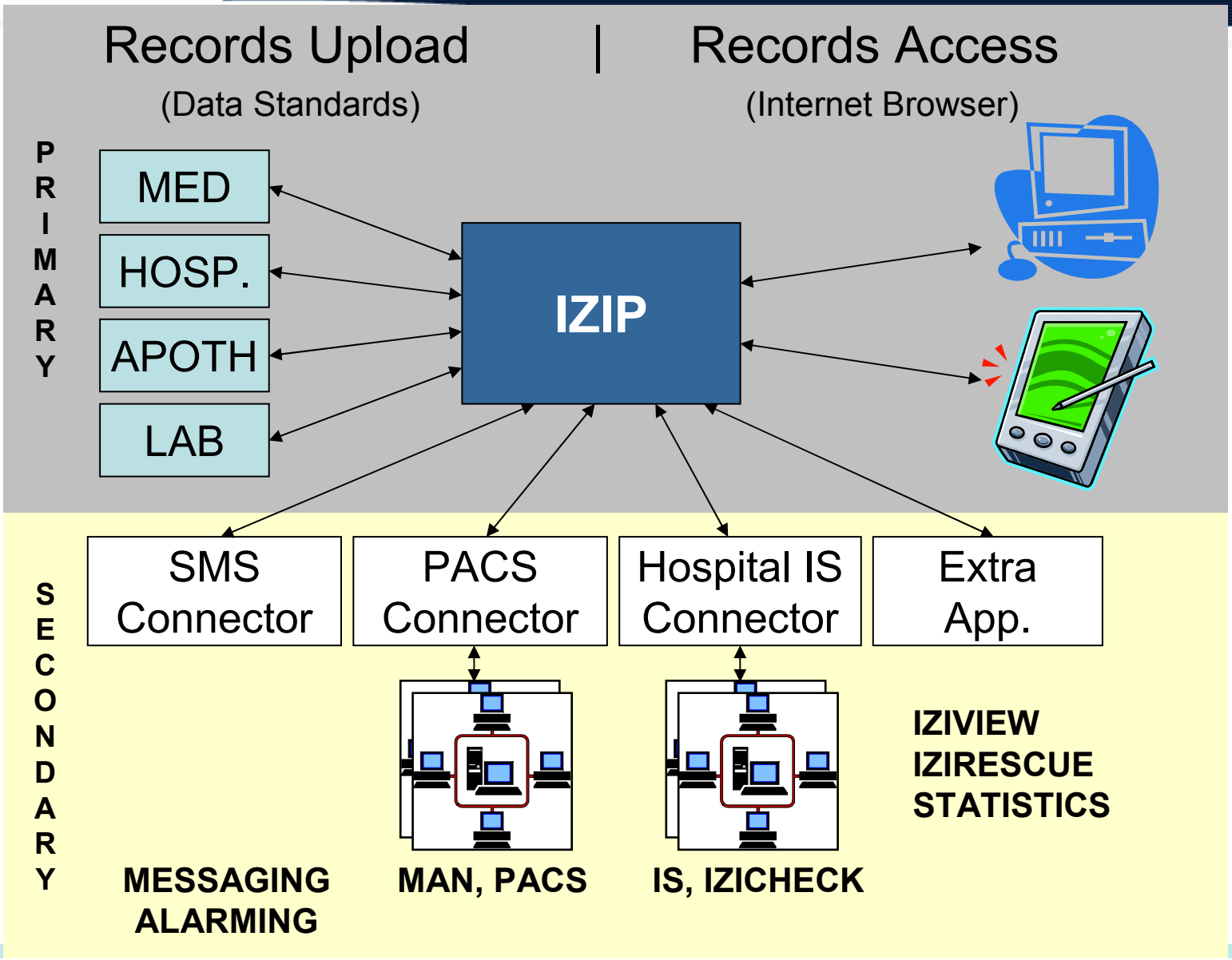
Data Flow



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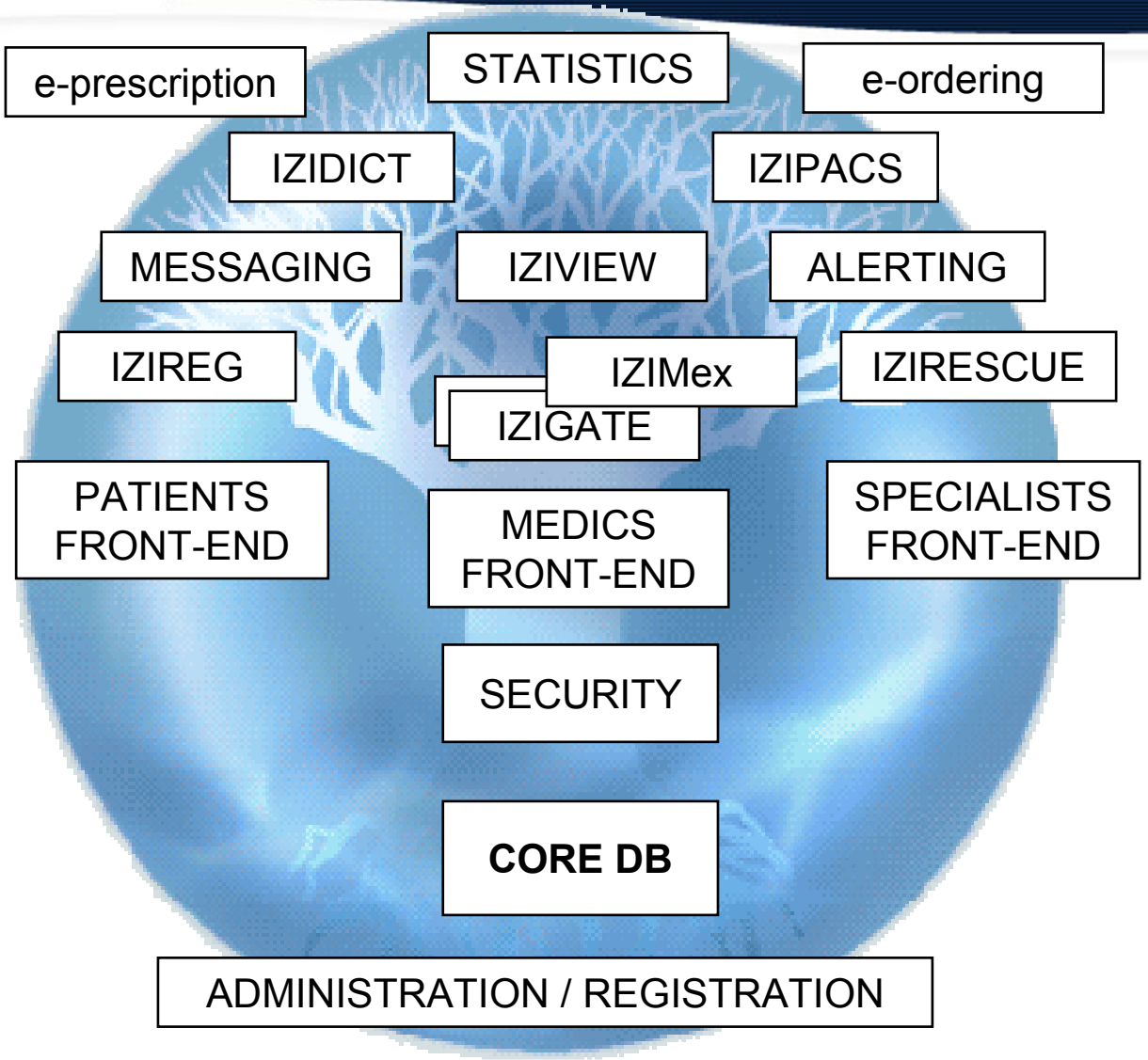
Tree of Functions



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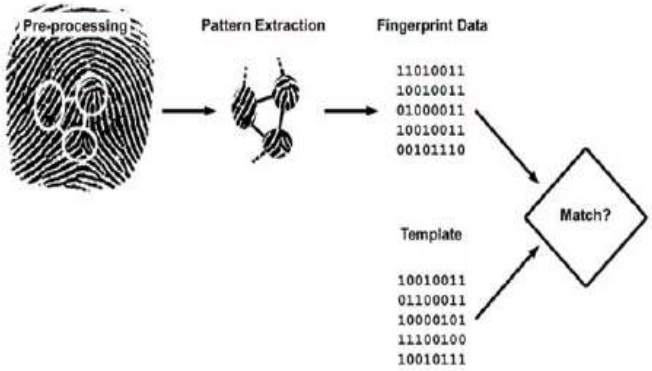
Utilization of Electronic Certificates, Digital Signatures and Biometrics

- Function
  - Access authenticity
  - Record authorization
- Benefits
  - Security element
  - Full-value legal validity of the records
  - Background establishment for electronic orders and prescriptions
  - Availability of the full-value on-line registration



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Emergency Services

Utilization of Biometrics and Digital Signatures

- Intended for critical situation when correct and „on time“ information about patient’s health condition may significantly contribute to life saving
  - Case, when Emergency and Rescue Service is called out to patient or accident and casualty is unable to communicate - is the one when doctor is allowed to view certain part of the internet medical file of the casualty. Knowing the casualty’s medical file might be lifesaving
  - Pilot project of the internet medical files usage by Emergency and Rescue Service in East Bohemia
  - The ER doctor obtain special access code
  - Doctor identifies the patient according to his ID number
  - Enables reading of patient’s records even without his approval
  - The whole process is tracked and the inspection if the unauthorized access was reasonable is made
  - One of the main authentication elements is biometry – doctor thumb’s fingerprint

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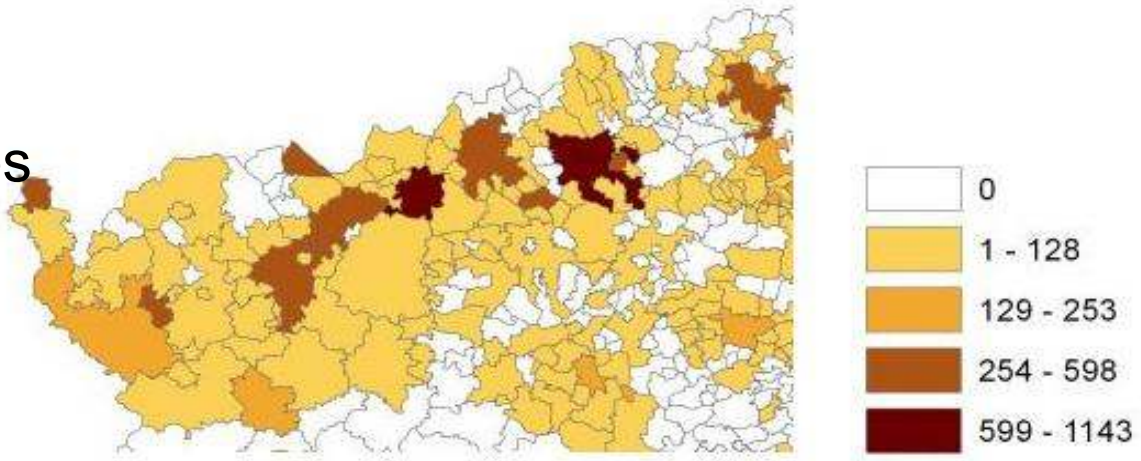
Statistics - Alarming

- Individual clinical and economical summary for
  - Managers
  - Doctors
  - Patients

- Anonymous statistic on-line data evaluation according to
  - Diagnosis
  - Drugs prescription
  - Indicated procedures



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Statistics - Benchmarking

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Přihlášený lékař: Dan Testovski, odb.: 001, MUDr. Metelka, PLD

Datum: 10.06.2008

Přihlášený klient: klient není zadán.

Analýza preskripce

- :: Volba klienta
- :: Základní informace
- :: Přehled zpráv
- :: Lékaři v IZIP
- :: Zařízení v IZIP
- :: Seznam klientů lékaře
- :: Provedená vyšetření
- :: Profil zdrav.pracovníka
- :: Zajímavé informace ▶▶
- :: Provozní řád
- :: Aktuální sazebník
- :: Analýza preskripce
- :: Ukončení práce

Zadejte údaje pro zobrazení analýzy ?

Odbornost: 002 - praktický lékař DD

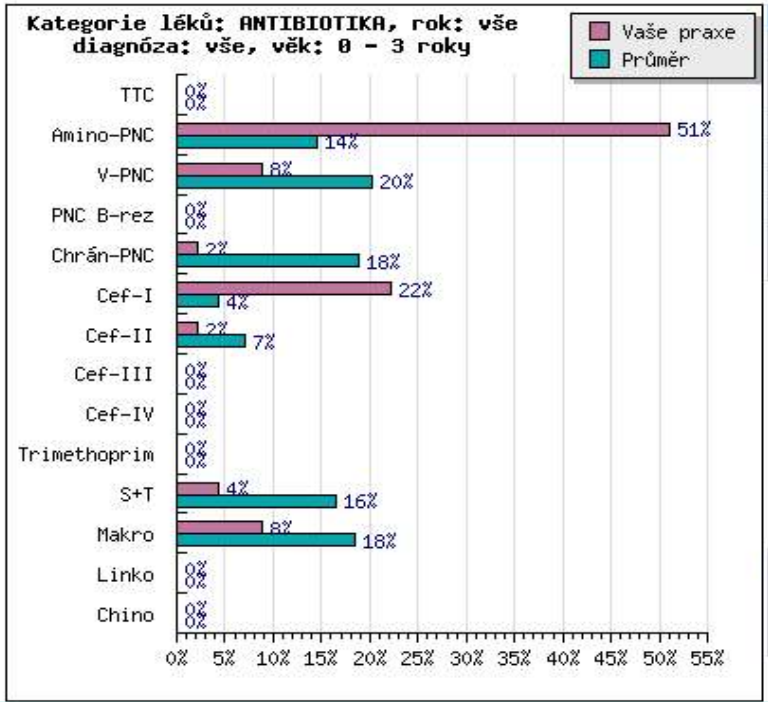
Kategorie léků: antibiotika

Skupina diagnoz: vše

Vek: 0 - 3 roky

Rok: vše

Zobrazit



Charakteristika souboru dat		
Počet lékařů	1428	
Počet	Průměr	Vaše praxe:
klientů	10963	282
záznamů	29645	710
zázn. s léky	16191	353
zázn. s vyb.léky	2443	45
Podíl záznamů vyb.léky / léky	15.1%	12.7%

Doporučené dg a ter postupy pro:
Kategorie léků: antibiotika
Skupinu diagnóz: vše
jsou ZDE

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Messaging

- Sending e-mails and SMS messages on patient's request via cell phone operator's networks
  - Reminders for prevention
  - Results of examinations and tests
  - Messages from health care professionals
  - Information for relatives concerning emergency medical help

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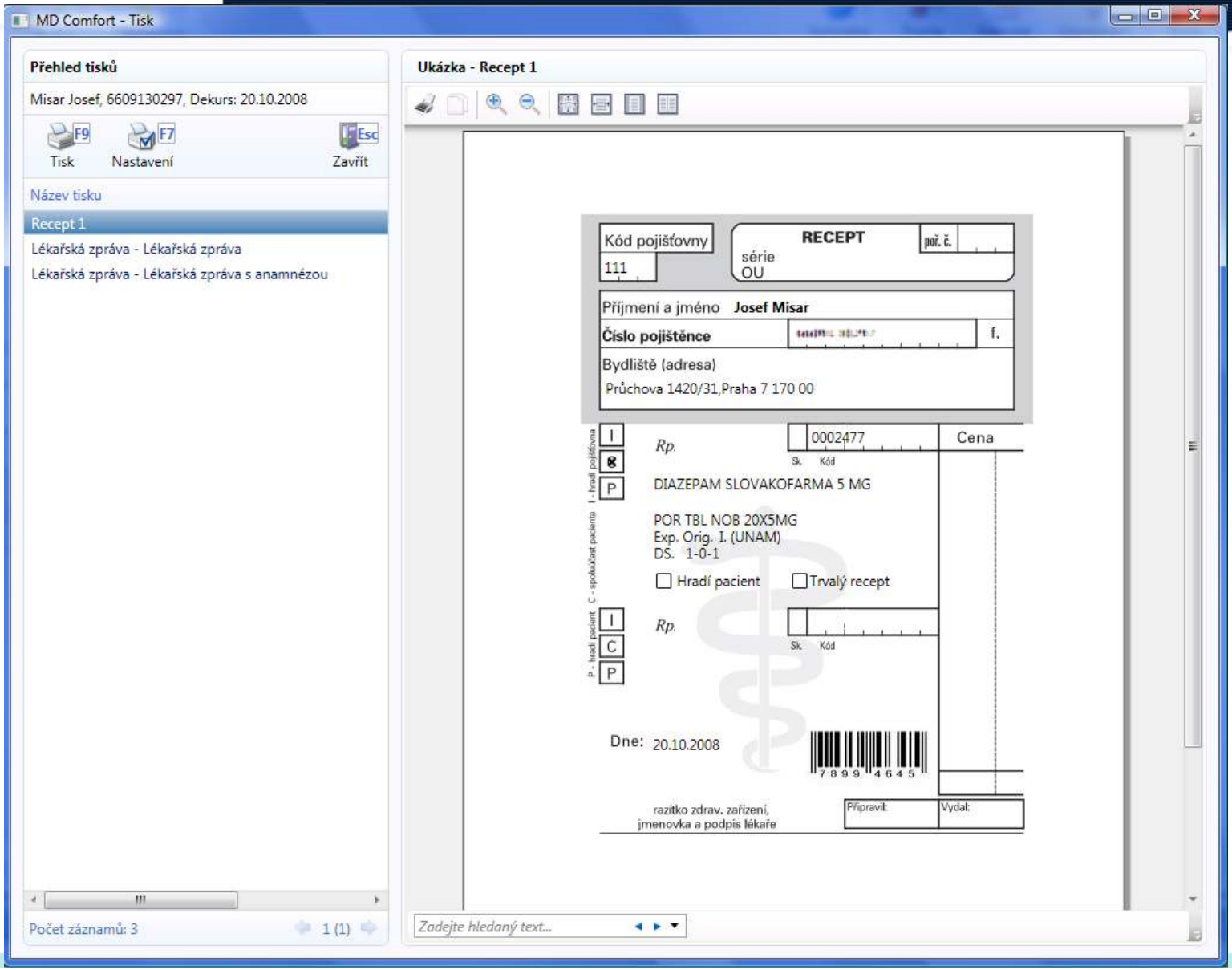
Accessing ePrescription
for Health Care Professionals



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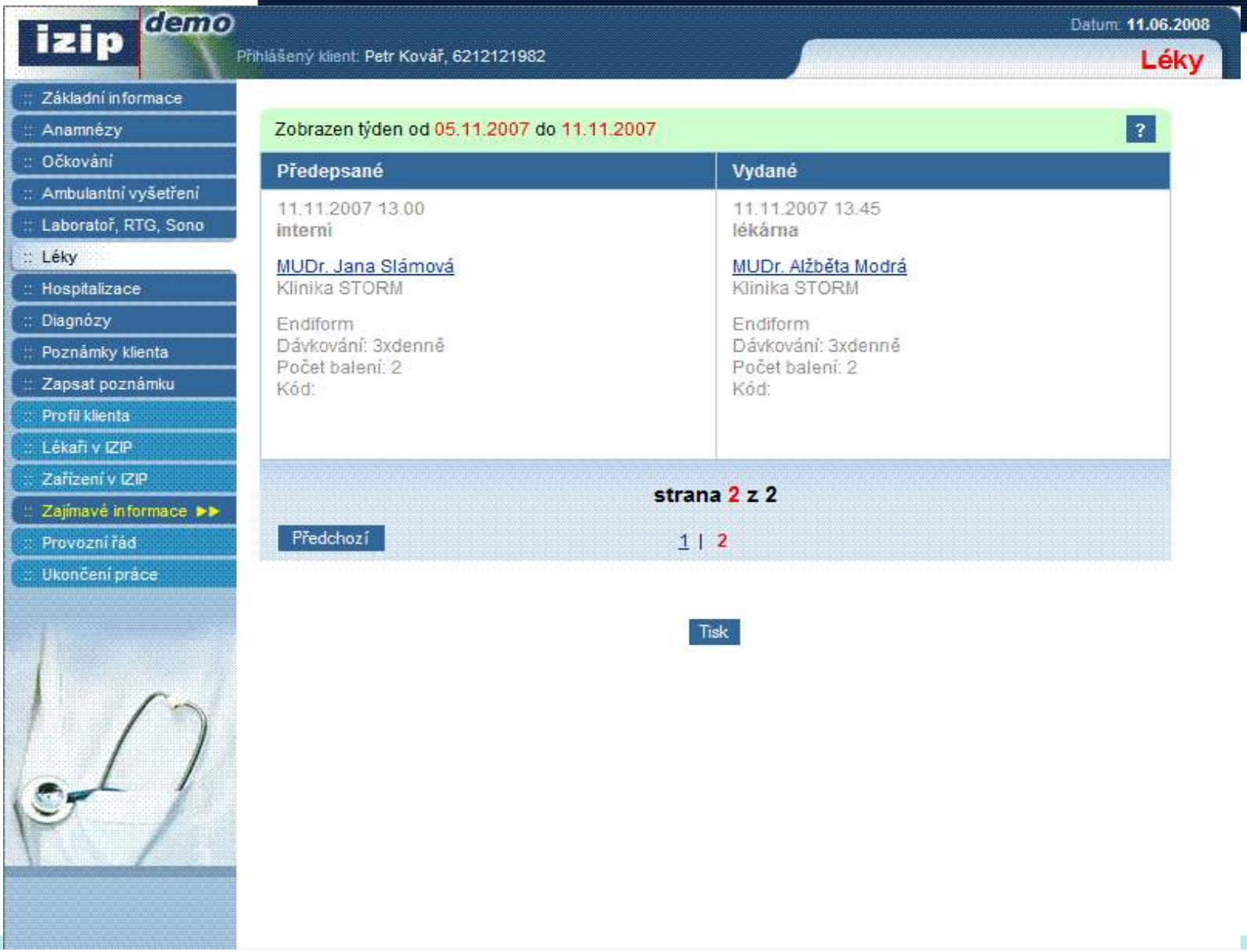
Accessing ePrescription
for Patients



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IZIP Economic Impact Evaluation

By European Commission

www.ehealth-impact.org

ehealth-impact@empirica.com

Empirica Communication and Technology Research

TanJent Consultancy, UK

Kadris, France

Jagellonian University, Poland

ESYS Consulting, UK

Information Society

eHEALTHIMPACT

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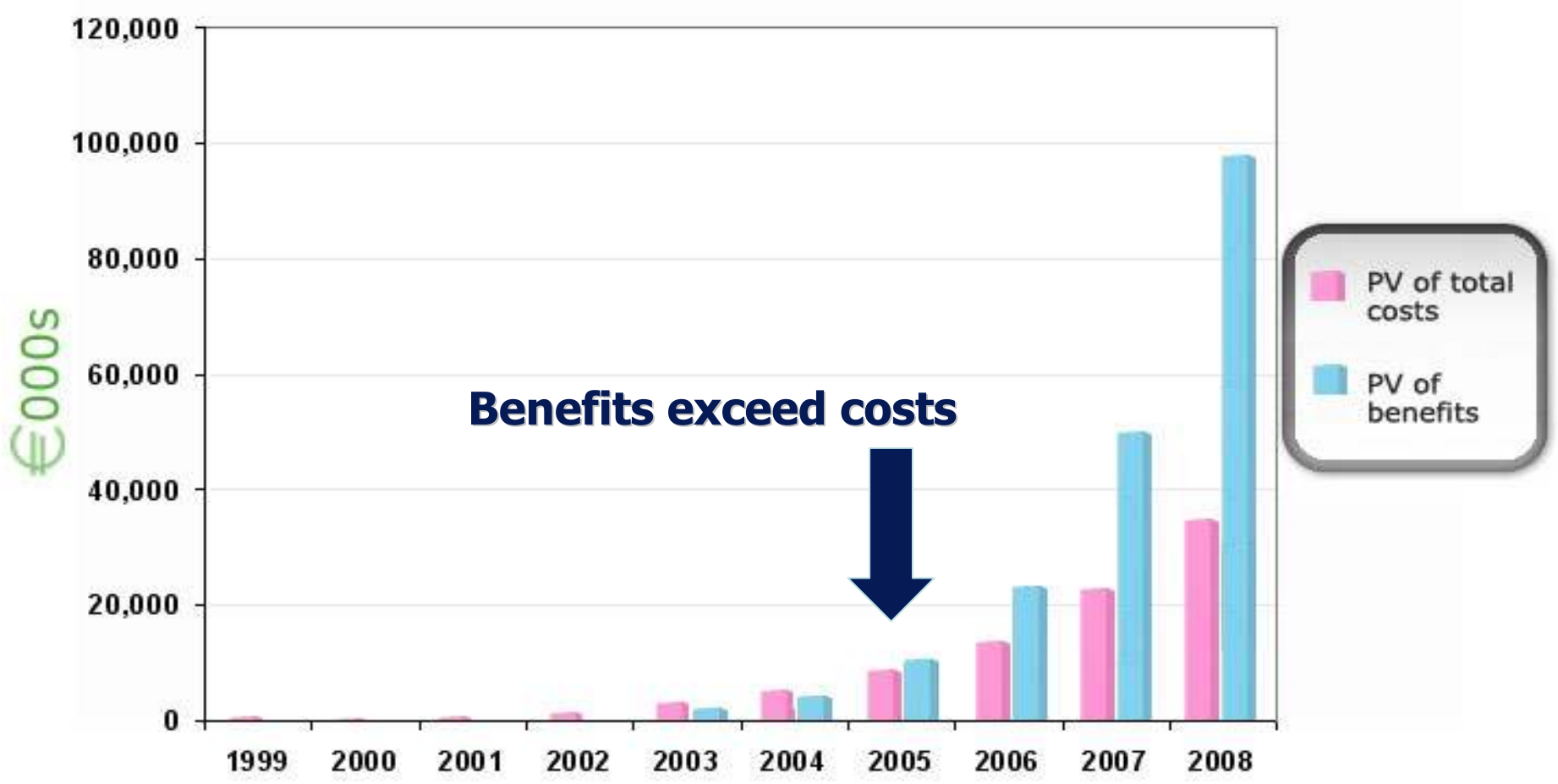
Annual Coasts and Benefits



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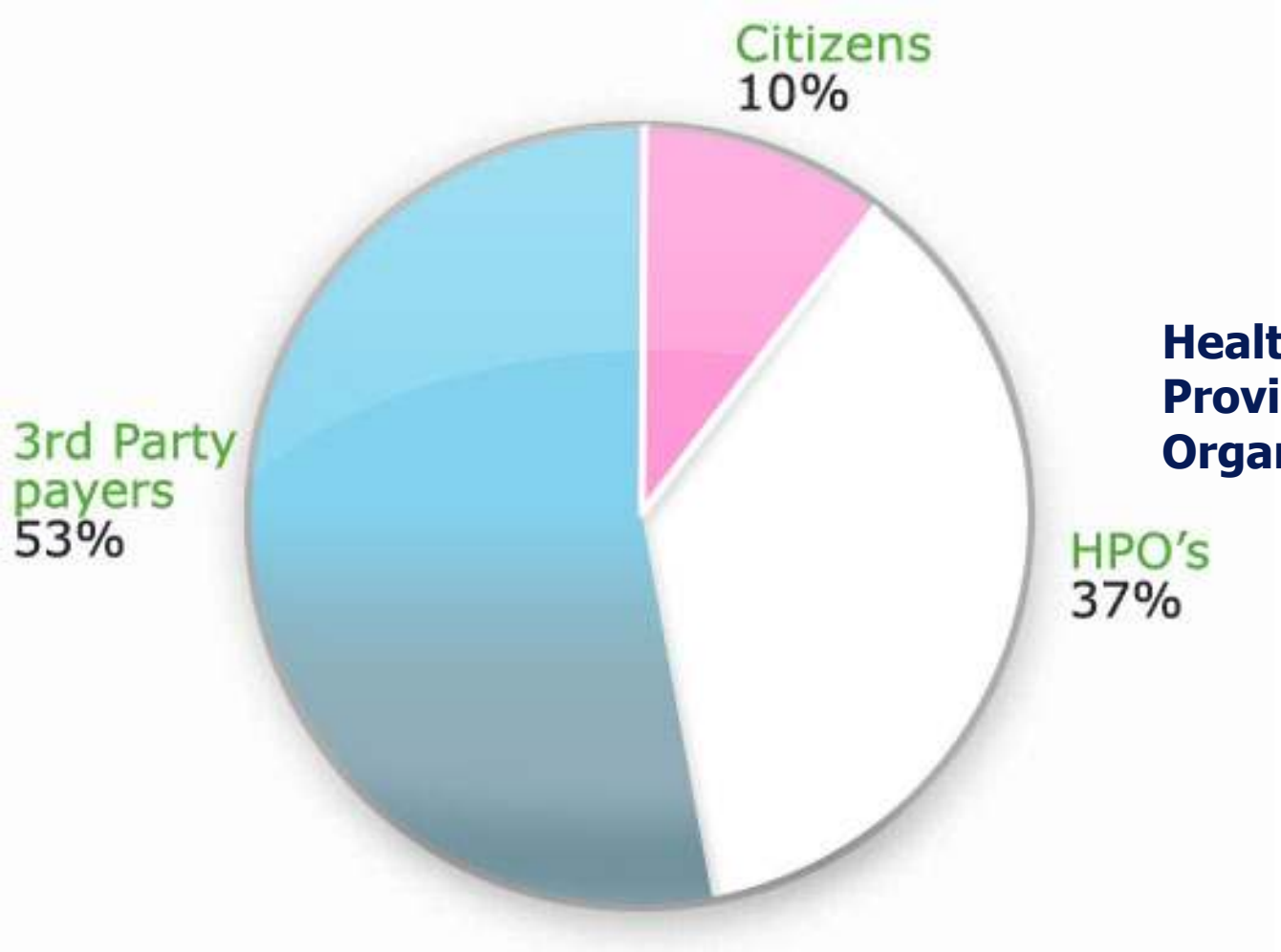
Distribution of Benefits



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Summary of Economic Performance

- **First year in which benefits exceed costs: 2005**
  - 3 years after start of full operation
  - 6 years after start of planning
- **First year in which cumulated benefits exceed cumulated costs: 2006**
  - 7 years after start of planning
- **Estimated net benefit in 2008: € 60 million**

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Integration in Europe

- **TEN4Health Project**

  EC support through eTEN
  expansion of existing solution to other member states
  facilitates the patients´ cross-border mobility

- **Health+ Project**
  Diatetary recommendations based on clinical knowladge

- **DebugIT Project**

  funded by EC under 7th Framework
  IT against resistance of antibiotics

- **epSOS – Large Scale Pilot Project**
  funded by EC under CIP
  cross-boarder utilization of Patient Summary + ePrescription

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IZIP System Delivers

For patients

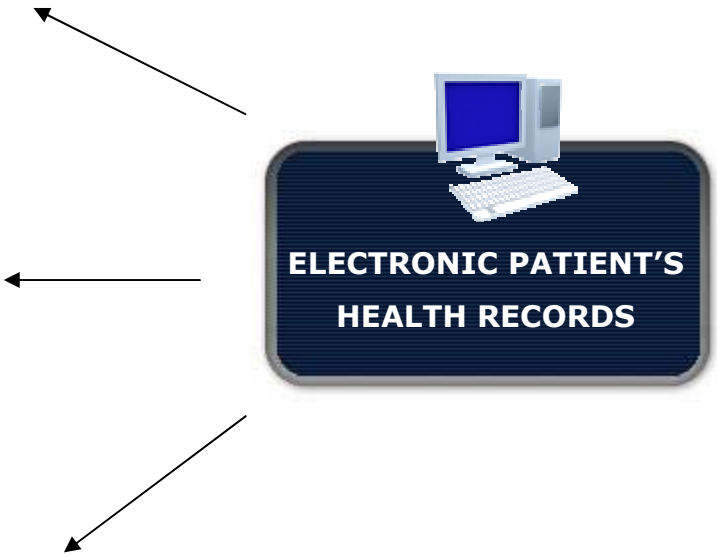
- Better and faster treatment
- Higher engagement, better awareness
- Messaging and Alerts
- Free choice and access to treatment across regions

For health care professionals

- Relevant information on the right place and on time
- Faster diagnosis establishment
- Avoiding hand written errors
- Decision support
- ePrescription, Electronic requests and ordering,

For managers

- Minimization of unnecessary or doubled health care services
- Reduction of medical errors
- Anonymous statistics and “Flag up” alarms
- Benchmarking and comparative outcomes
- Open gate for e-prescription and chip cards utilization



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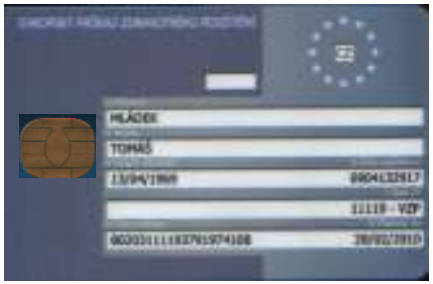

Thank you for your attention

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