

Dissemination of EHR in hospitals – an experience from Slovenia

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Agenda

- An overview
- Current projects
- Developing EHR
- Examples

Slovenia – some general facts

In the middle of Europe



Total population: 1,984,000

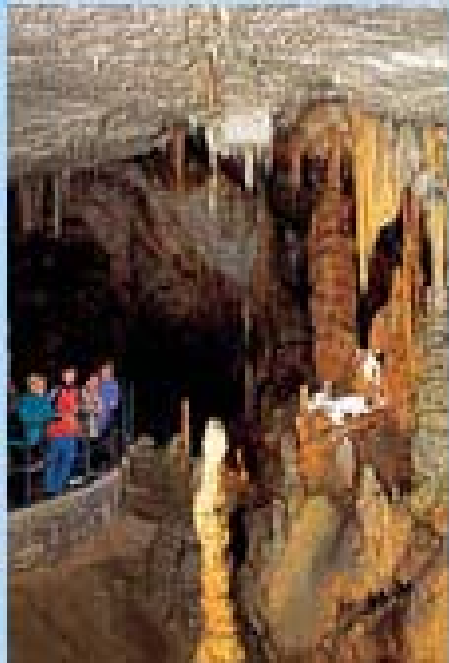
Area: 20.000 m²

GDP per capita : 9.800USD

Life expectancy at birth m/f
(years): 72.1/79.5

Healthy life expectancy at birth
m/f (years): 65.1/70.3

Slovenia – beautiful country



Postojna



Piran



Bled

Slovenia – some special facts

Health



Hospitals: 27 (16 general
hospitals)

Physicians: 4500

Dentists: 1200

Nurses: 14200

Total health expenditure as %
of GDP: 8.6

Infonet – some general facts

Software provider for health informatics



Founded: 1991

Ownership: private

Employees: 29

Annual turnover: 3 mio EUR

Sphere of activity: developing,

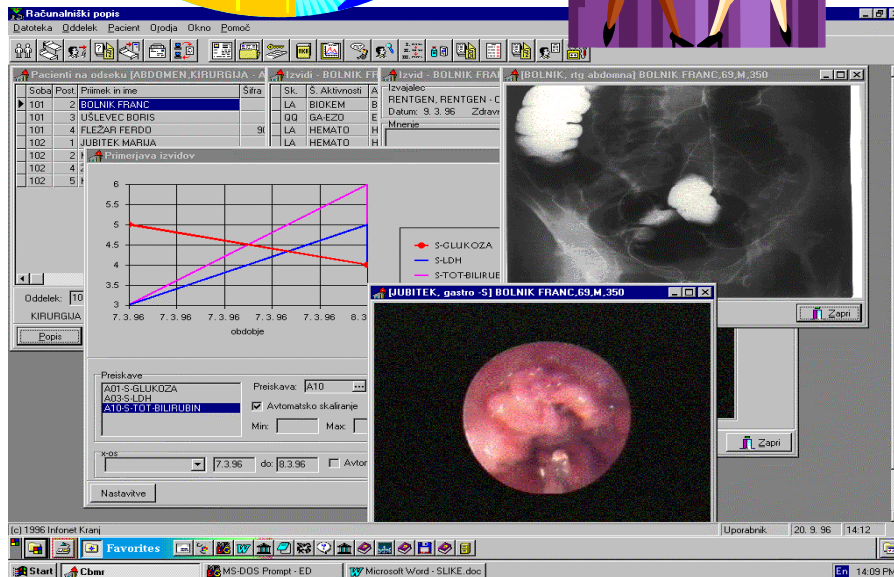
implementation and

maintenance of information

systems for health providers

Infonet – some special facts

References



Basic fields of interest:

- hospital information systems:
18 hospitals
- information systems for Primary Health Care and GPs
37 health centres and 412 private doctors
- pharmacy information systems
82 pharmacies
- IS for microbiological labs
5 labs, 1 institute

Main players in medical informatics

Health Insurance Institute

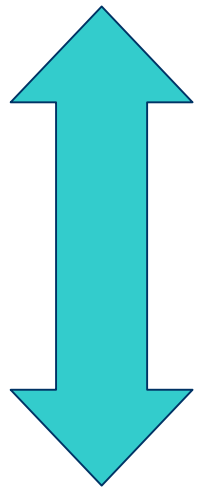
- Delivered 2750 computers and basic application - 1991
- Initiated EDI for invoices (EDIFACT standard) 1993
- Introduced Health Insurance Smart Card at national level 2000

Public Health Institute – national and regional

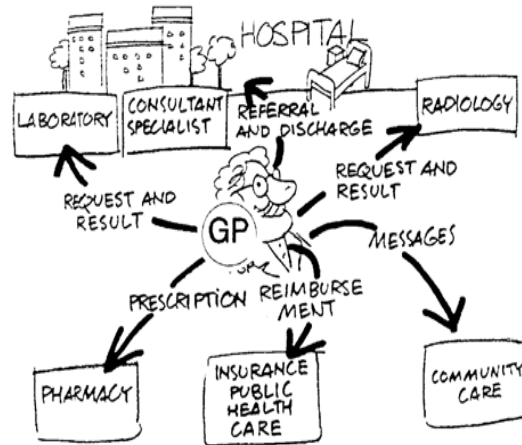
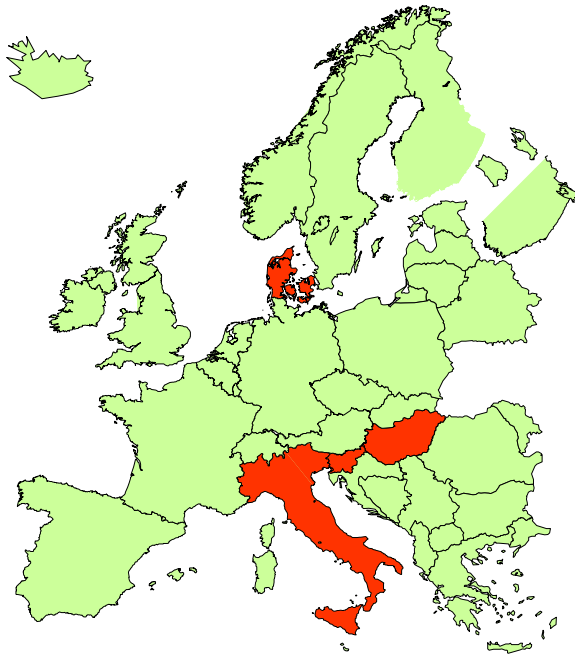
- Health statistics
- Prenatal Information system
- Register of sick leaves

Ministry of Health

- Health sector management project



Important international experiences

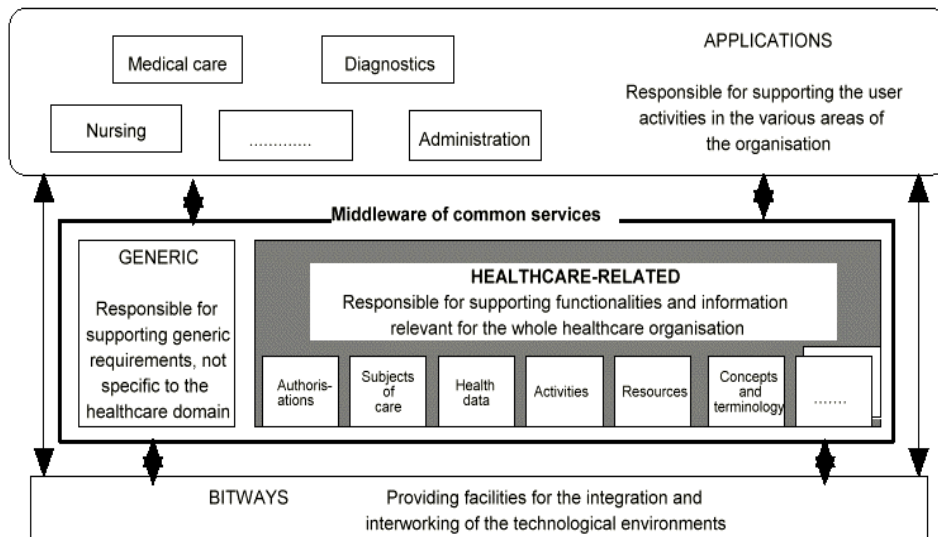


Primacom

Primary Care Physician's
Communication Network

- To supply health care professionals with systems and infrastructure for enhancement of communication between primary and secondary care.
- Co-operation between researchers, health care authorities and industry.
- To use European communication standards and electronic mailbox systems.

Important international experiences (2)



HANSA East

develop a prototype application on the top of DHE

HISA STANDARD

- To learn and familiarize with the DHE middleware
- To evaluate the DHE middleware (capabilities, possibilities)
- To use the DHE middleware as a basic layer for the development of a prototype application
- To support a real life needs of our users (industrial initiative)

Health Sector Management Project (2001-2004)

The HSMP contains four inter-locking components

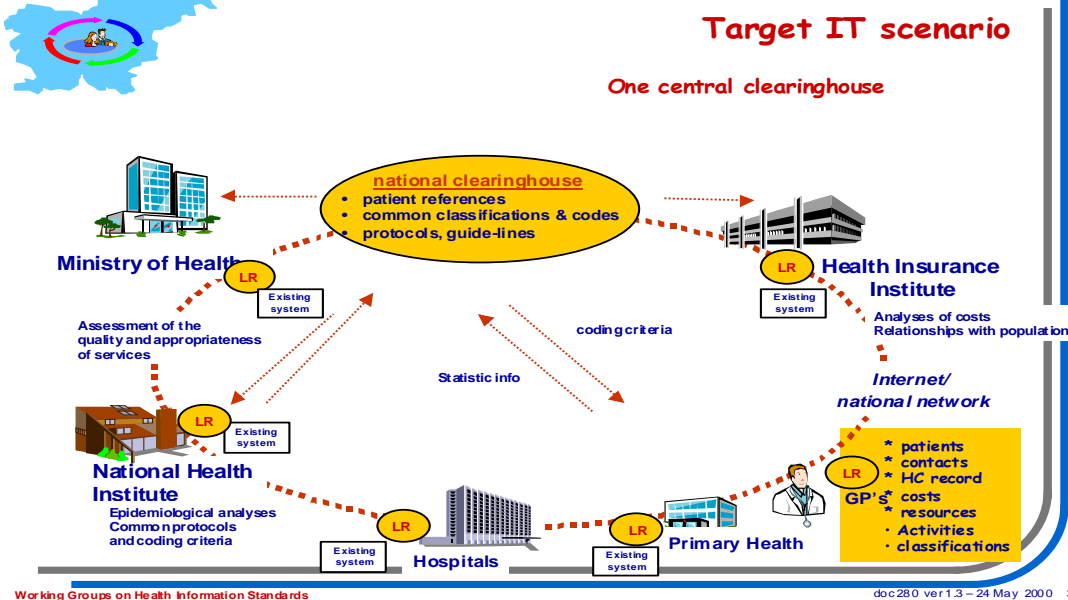
- **Component 1 - Health Policy Support Component**

- C11 - Reimbursement System
- C12 - Healthcare Management
- C13 - Clinical Guidelines Development

- **Component 2 – Health Information Standards Component**

- **Component 3 – Health Information Systems Implementation**

- **Component 4 – Project Management and Professional Support**

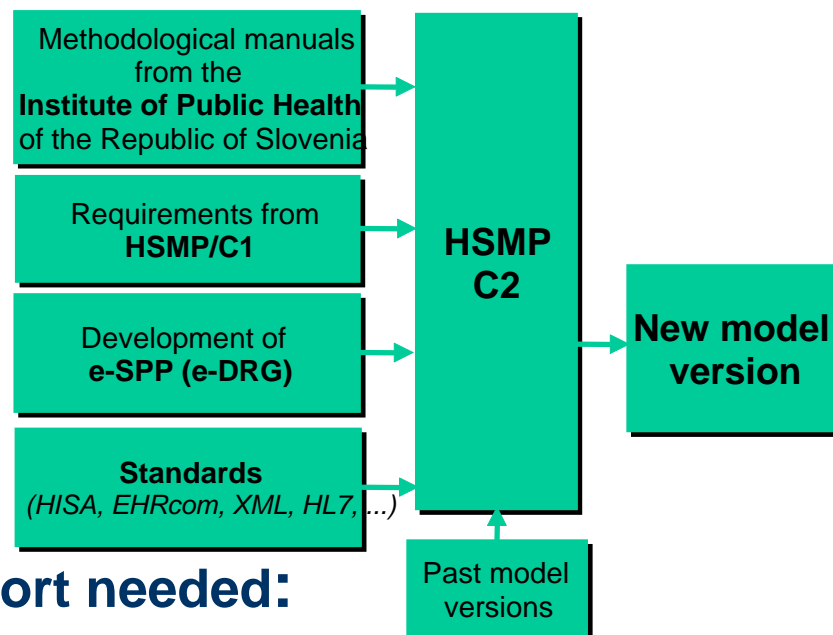


Working Groups on Health Information Standards

doc280 ver1.3 - 24 May 2000 3

HSMP – results

- AR DRG model was introduced as a new financial model for hospitals
- The definitions and the data model were harmonized
- New DRG/SPP reporting system was developed
- A rather demanding IT support needed:
 - at the health care providers side
 - at the national level.



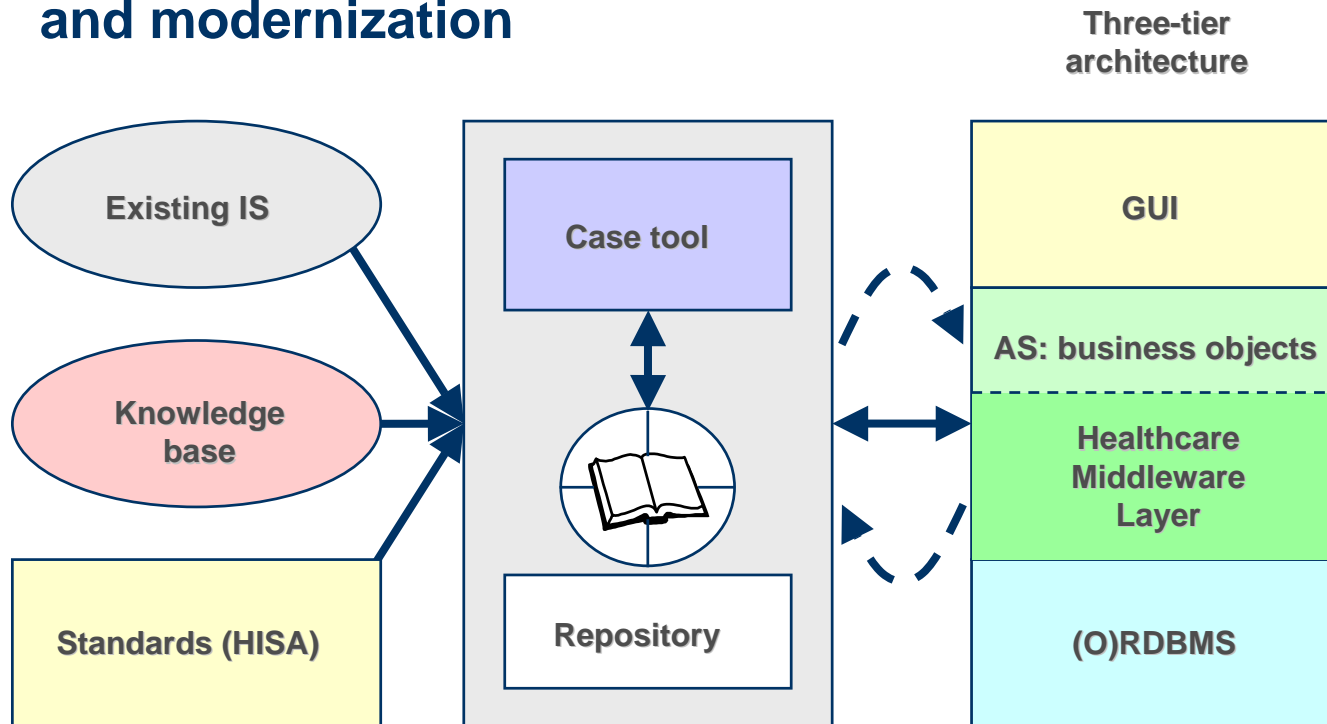
Development of IS in HealthCare in Slovenia

Key principles of IT strategy

- Information is person-based (unique ID key-e.g. Health Insurance code - HIC)
- Systems are integrated (data need to be entered in the databases only once)
- Information is secure and confidential (accessible only to those who are authorised to know it)
- Information is shared across the Slovenian Health System

Development of IS in HealthCare in Slovenia

The process of migration, standardisation and modernization



- member of CEN/TC 251 Working Group 1 (WG I)
- participation in Task Forces TF 13606 - EHRcom and Task Force HISA.
- a member of HL7

Administrative data and segments of EHR in legacy IS

Administrative data:

- Patient personal data
- Administration data (contracts, service units)
- Statistics and accounting

Health characteristic (medical) data:

- Anamnesis and status
- Diagnoses – main and additional
- Clinical procedures (requests for activities, also to other units, and reports - medical results)
- Medicines
- Other therapy
- Requests for additional treatment (GP, specialists or hospital)
- Sick-leave.

Electronic Health Records in Slovenia

Many attributes (doctors notes) are still explained as free text

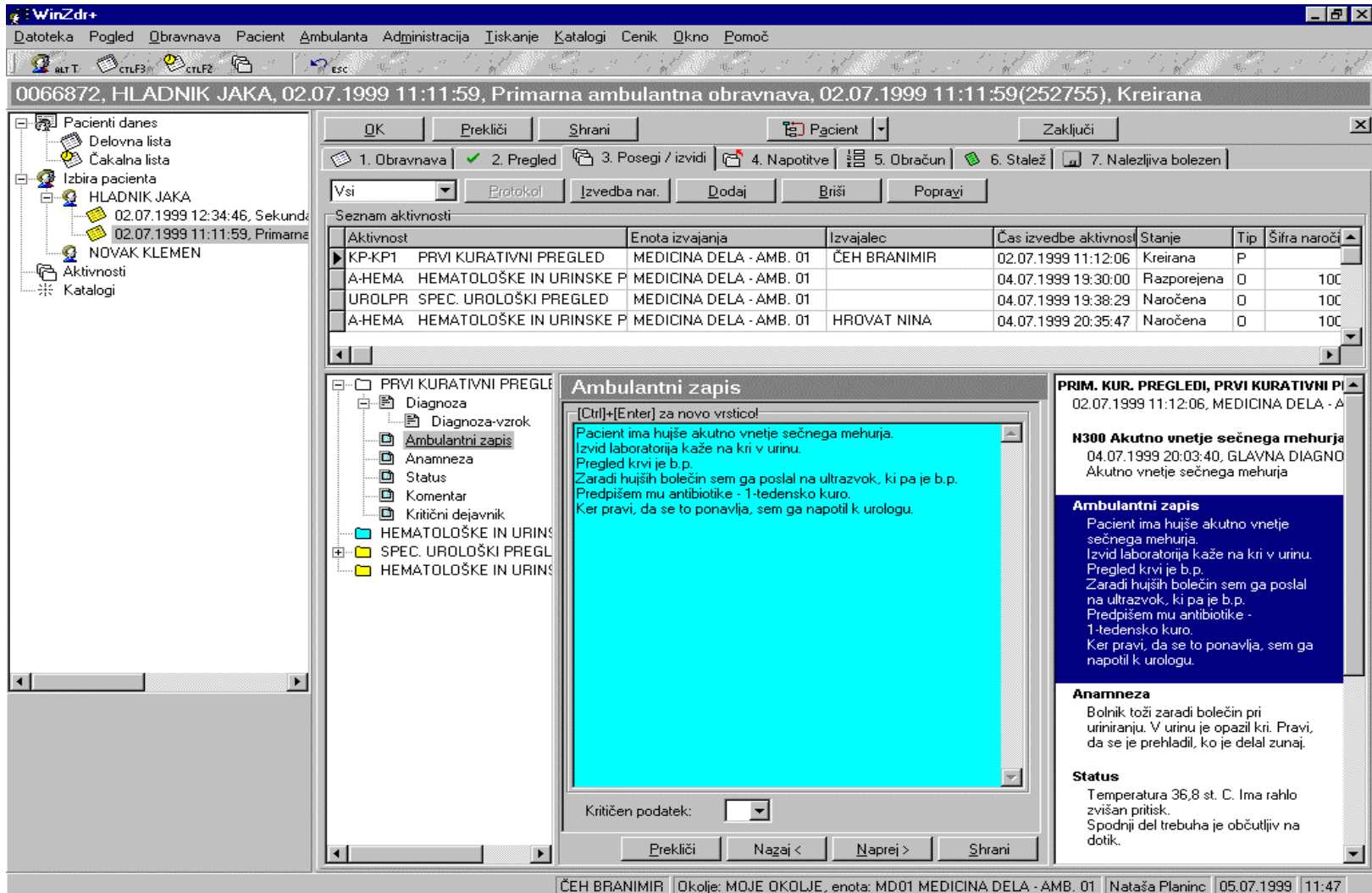
(anamnesis, clinical status, epicrisis)

**but they are used in almost all Slovene hospitals except
Clinical centre.**

What is structured and standardised?

- **main and additional diagnoses: ICD 10 classification from 1998**
 - ICD 10 AM by 1st of January 2004
- **Clinical procedures: local classification from 2000**
 - ICD 10 AM by 1st of January 2004

An example of Clinical file - EHR in our applications



0066872, HLADNIK JAKA, 02.07.1999 11:11:59, Primarna ambulantna obravnava, 02.07.1999 11:11:59(252755), Kreirana

1. Obravnava 2. Pregled 3. Posegi / izvidi 4. Napotitve 5. Obračun 6. Stalež 7. Nalezljiva bolezen

Aktivnost	Enota izvajanja	Izvajalec	Čas izvedbe aktivnosti	Stanje	Tip	Šifra naročij
KP-KP1 PRVI KURATIVNI PREGLED	MEDICINA DELA - AMB. 01	ČEH BRANIMIR	02.07.1999 11:12:06	Kreirana	P	
A-HEMA HEMATOLOŠKE IN URINSKE P	MEDICINA DELA - AMB. 01		04.07.1999 19:30:00	Razporejena	O	10C
UROLPR SPEC. UROLOŠKI PREGLED	MEDICINA DELA - AMB. 01		04.07.1999 19:38:29	Naročena	O	10C
A-HEMA HEMATOLOŠKE IN URINSKE P	MEDICINA DELA - AMB. 01	HROVAT NINA	04.07.1999 20:35:47	Naročena	O	10C

Ambulantni zapis

[Ctrl]+[Enter] za novo vrstico!

Pacient ima hujše akutno vnetje sečnega mehurja. Izvid laboratorija kaže na kri v urinu. Pregled krvi je b.p. Zaradi hujših bolečin sem ga poslal na ultrazvok, ki pa je b.p. Predpišem mu antibiotike - 1-tedensko kuro. Ker pravi, da se to ponavlja, sem ga napotil k urologu.

Kritičen podatek:

PRIM. KUR. PREGLEDI, PRVI KURATIVNI P
02.07.1999 11:12:06, MEDICINA DELA - A

H300 Akutno vnetje sečnega mehurja
04.07.1999 20:03:40, GLAVNA DIAGNO
Akutno vnetje sečnega mehurja

Ambulantni zapis
Pacient ima hujše akutno vnetje sečnega mehurja. Izvid laboratorija kaže na kri v urinu. Pregled krvi je b.p. Zaradi hujših bolečin sem ga poslal na ultrazvok, ki pa je b.p. Predpišem mu antibiotike - 1-tedensko kuro. Ker pravi, da se to ponavlja, sem ga napotil k urologu.

Anamneza
Bolnik toži zaradi bolečin pri uriniranju. V urinu je opazil kri. Pravi, da se je prehladil, ko je delal zunaj.

Status
Temperatura 36,8 st. C. Ima rahlo zvišan pritisk. Spodnji del trebuha je občutljiv na dotik.

ČEH BRANIMIR | Okolje: MOJE OKOLJE, enota: MD01 MEDICINA DELA - AMB. 01 | Nataša Planinc | 05.07.1999 | 11:47

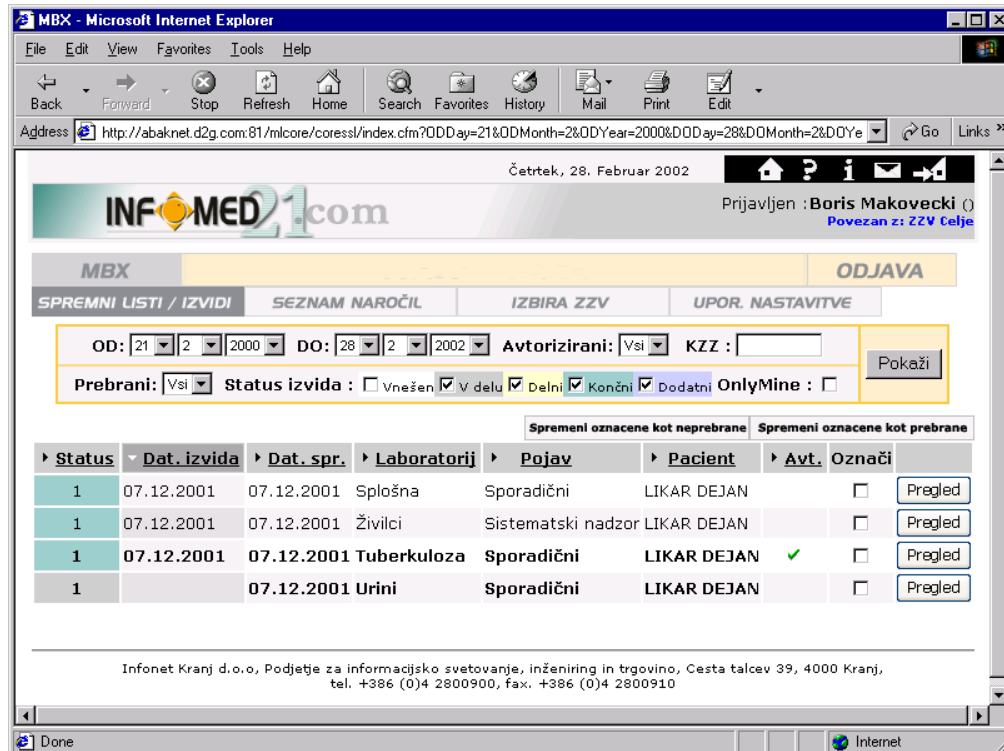
WEB applications

MBX - fast review and examination of microbiology laboratory tests.

Web portal at <http://www.infomed21.com>.

- for all laboratory request (referral)
- senders and results users:
 - hospitals,
 - primary healthcare centres and
 - general practitioners.

It enables a simple insight into the sent requests and laboratory findings over the internet.



MBX - Microsoft Internet Explorer

Address: <http://abaknet.d2g.com:81/mlcore/coress/index.cfm?DDay=21&DDMonth=2&DDYear=2000&DDay=28&DDMonth=2&DDYear=2002>

Četrek, 28. Februar 2002

Prijavljen: **Boris Makovecki**
Povezan z: ZZZV Celje

MBX ODJAVA

SPREMNJI LISTI / IZVIDI SEZNAM NAROČIL IZBIRA ZZV UPOR. NASTAVITVE

OD: 21 / 2 / 2000 DO: 28 / 2 / 2002 Avtorizirani: Vsi KZZ: Pokaži

Prebrani: Vsi Status izvida: Vnešen V delu Delni Končni Dodatni OnlyMine:

Spremeni oznacene kot neprebrane Spremeni oznacene kot prebrane

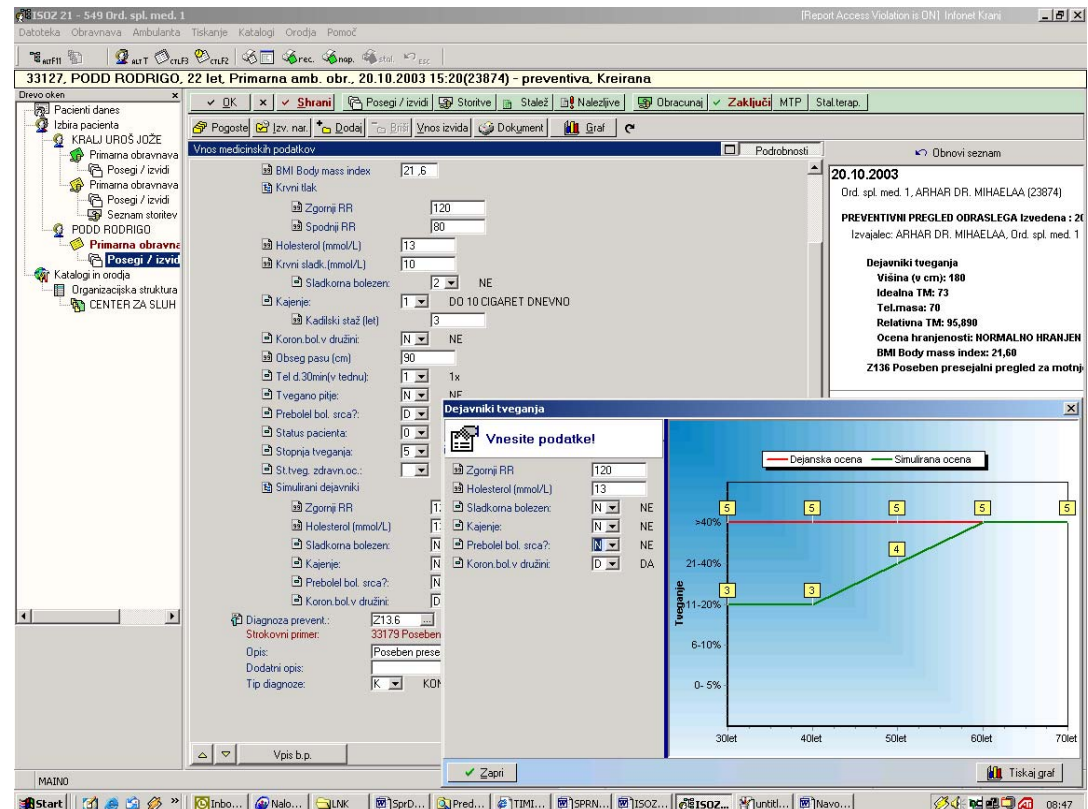
Status	Dat. izvida	Dat. spr.	Laboratorij	Pojav	Pacient	Avt.	Označi	
1	07.12.2001	07.12.2001	Splošna	Sporadični	LIKAR DEJAN		<input type="checkbox"/>	Pregled
1	07.12.2001	07.12.2001	Živilci	Sistematski nadzor	LIKAR DEJAN		<input type="checkbox"/>	Pregled
1	07.12.2001	07.12.2001	Tuberkuloza	Sporadični	LIKAR DEJAN	✓	<input type="checkbox"/>	Pregled
1		07.12.2001	Urini	Sporadični	LIKAR DEJAN		<input type="checkbox"/>	Pregled

Infonet Kranj d.o.o., Podjetje za informacijsko svetovanje, inženiring in trgovino, Cesta talcev 39, 4000 Kranj, tel. +386 (0)4 2800900, fax. +386 (0)4 2800910

Primary health care providers and their EHR

Prevention is very important for each selected doctor. Gathered data is collected at national level.

- Risk factors for heart attack all citizens after 35/45 y are invited to visit their Selected doctors
- Some cytological tests to prevent cancer



The screenshot shows a software interface for entering medical data for a patient named KRALI UROŠ JOŽE. The interface includes a tree view on the left, a central data entry form, and a summary panel on the right. A graph titled 'Dejavniki tveganja' (Risk factors) is displayed, showing the patient's risk level over time from 30 to 70 years of age. The graph compares the actual risk (Dejavska ocena) and the simulated risk (Simulirana ocena) based on the entered data.

Dejavniki tveganja (Risk factors):

- Visina (v cm): 180
- Idealna TM: 73
- Telesna masa: 70
- Relativna TM: 95,899
- Ocena hranjenosti: NORMALNO HRANJEN
- BMI Body mass index: 21,60
- Z136 Poseben presejalni pregled za motnj

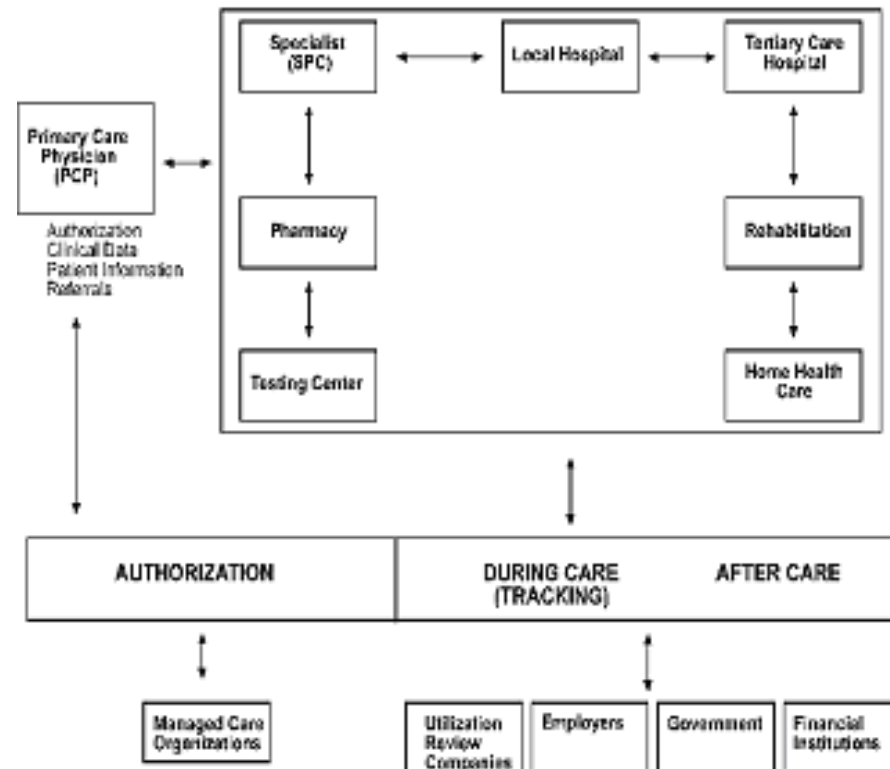
Dejavniki tveganja (Risk factors) Graph Data:

Starost (let)	Dejavska ocena (%)	Simulirana ocena (%)
30	~11%	~11%
40	~11%	~11%
50	~11%	~11%
60	~11%	~11%
70	~11%	~11%

Communication between Hospitals and GPs – Discharge Letters

- **Discharge letters from hospitals to GP**
- **Data sent:** provider data, patient identification and medical data (diagnoses and free text – other data is to be defined by experts)
- **Future use:** For referrals and discharges in the whole Patient Treatment process

Patient Treatment Process



Communication between Hospitals and GPs – Discharge Letters

**Thank
you for your
attention.**

*And thank you to
all our Danish friends
for their hospitality.*