The Marche's clinical network for diabetes

MARCHE REGION (ITALY)

Regional Health Agency – Marche Region

Outline

1. The context: Marche region and the healthcare system
2. The diabetes network (design)
3. The core features of the network
4. The diabetes network implementation: opportunities & obstacles
5. Results achieved
6. Success factors and lessons learned

REGIONE MARCHE

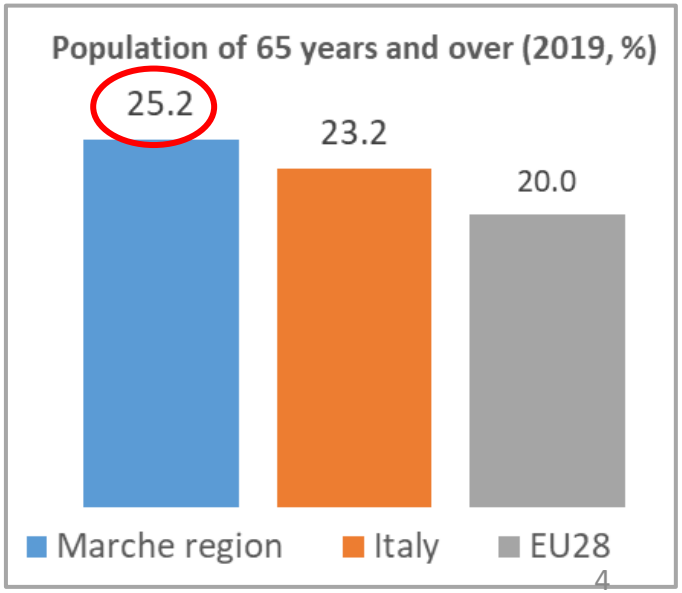
AGENZIA REGIONALE SANITARIA

1. The context: Marche region and the healthcare system

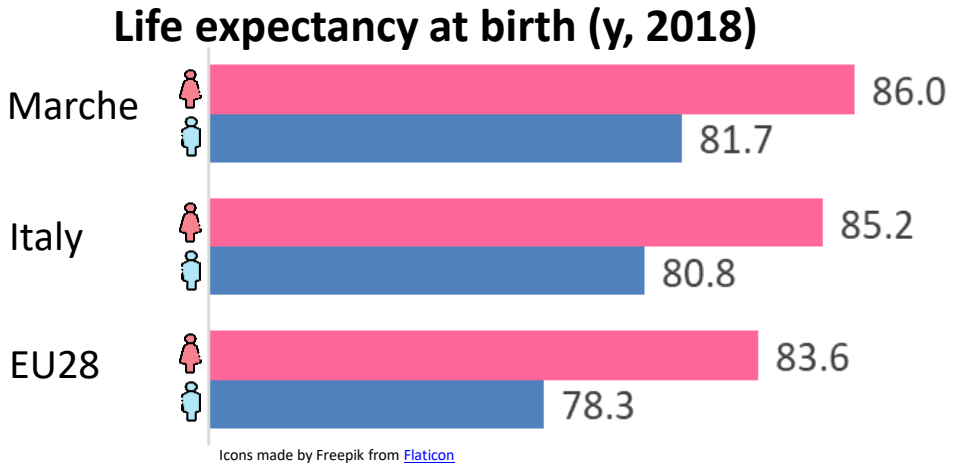
Marche region (1)

Total population (2019): 1,525,271

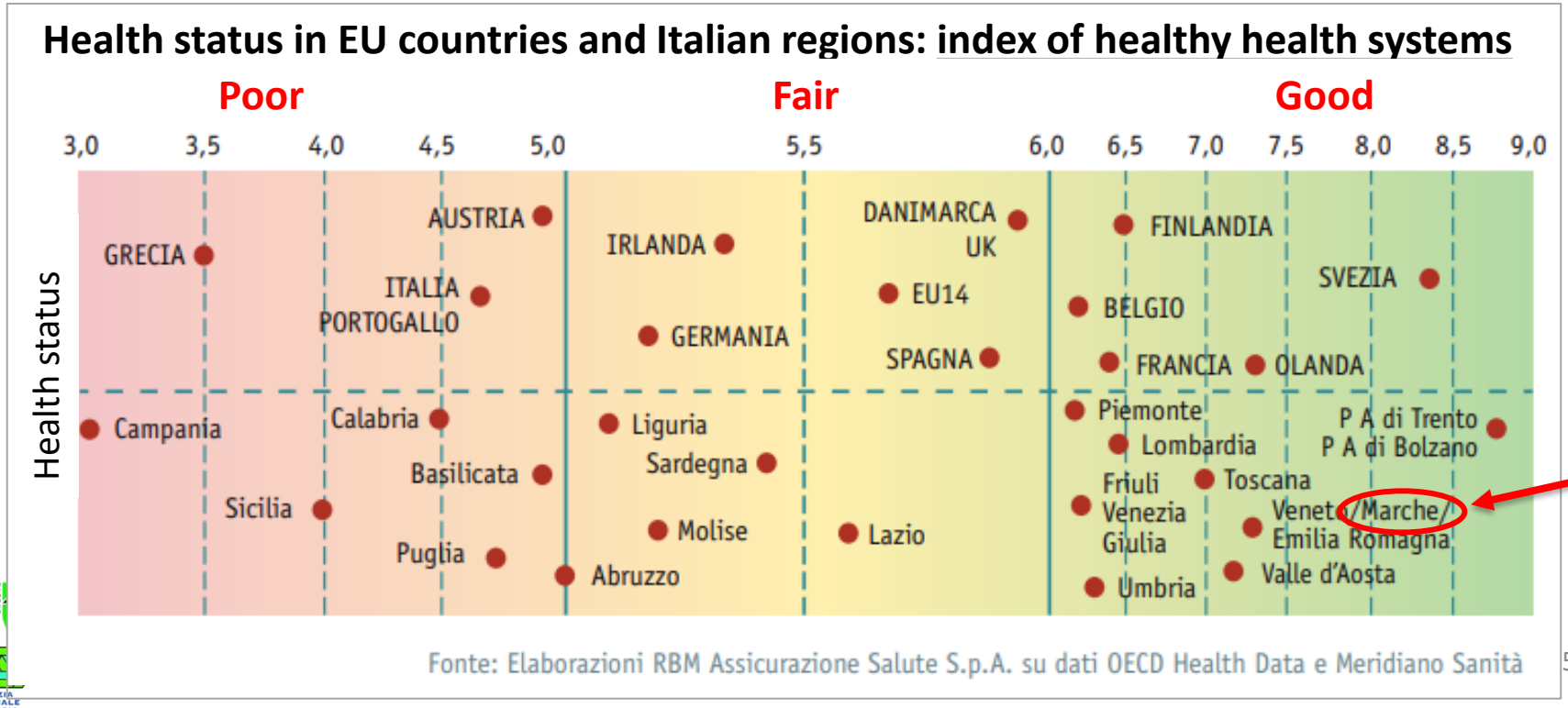
- Majority of the population living in the **coastal area**
- **Disadvantaged rural and mountain internal areas**:
  - Elderly population, low density, depopulation
  - Impact of the 2016 earthquake: reorganization of services, telemedicine tools and unified information systems for the management/sharing of information.



Marche region (2)

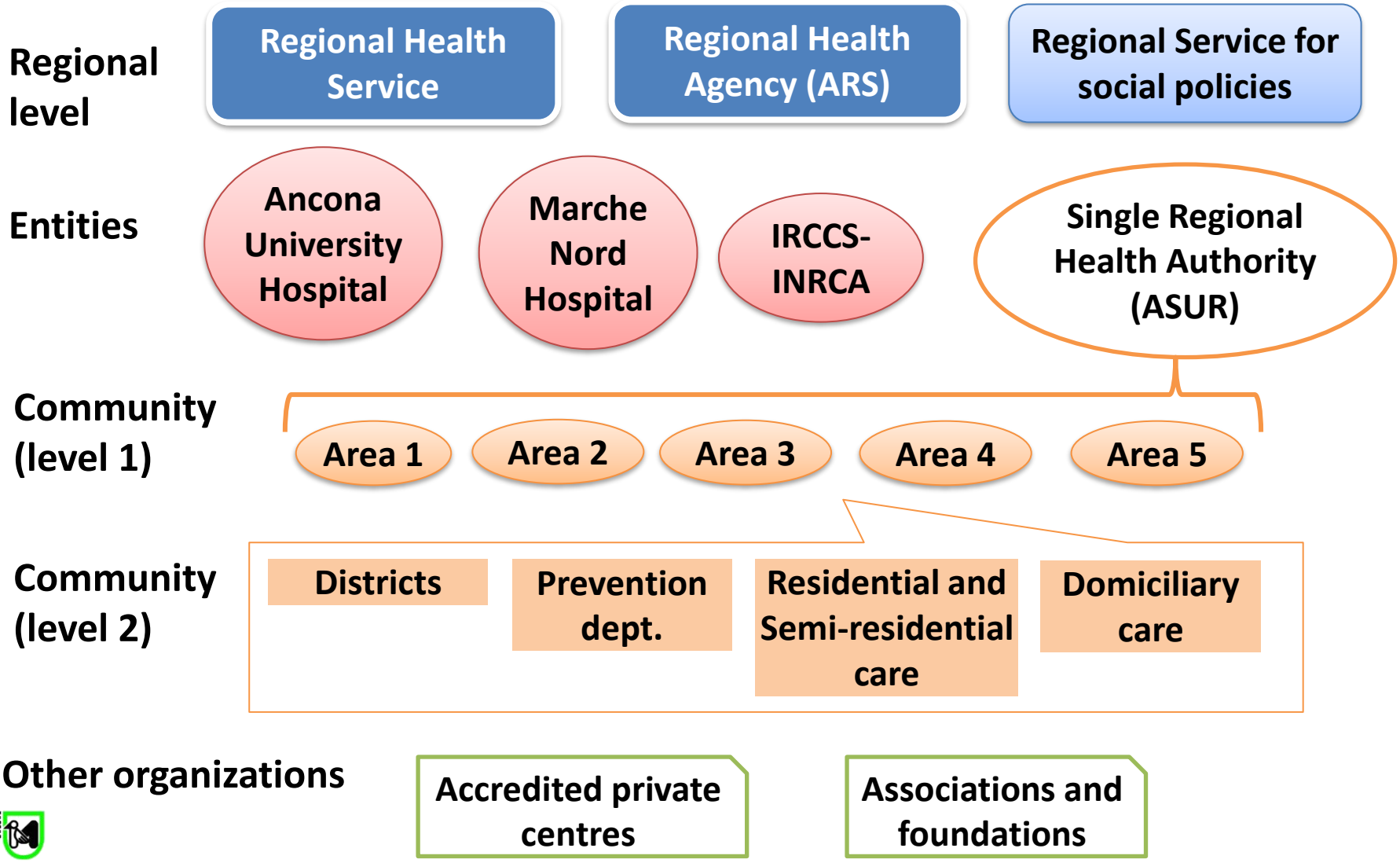


Healthy life expectancy at birth (y, 2018)	
Marche	60.1
Italy	58.5

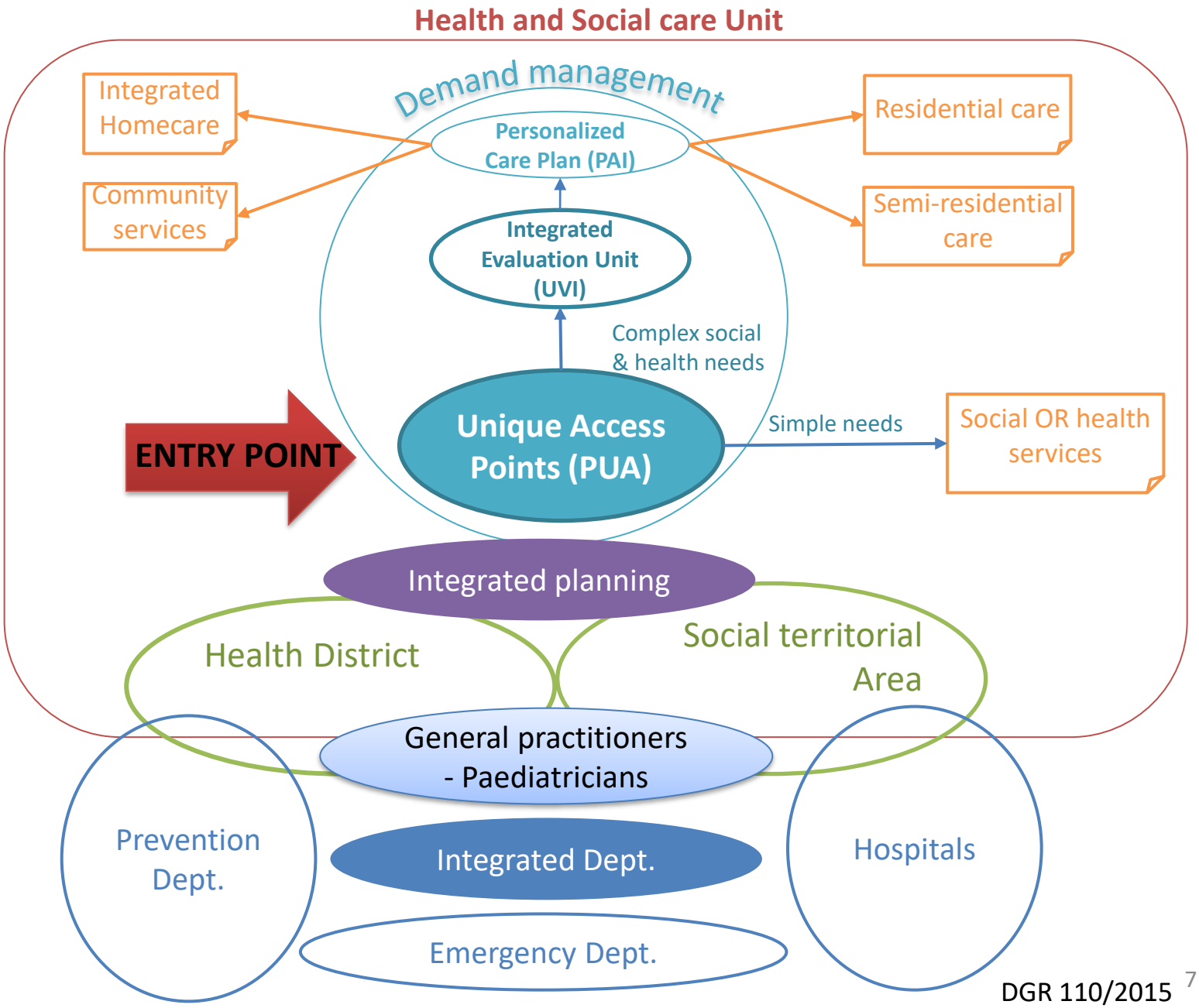


Marche Regional healthcare system (1)

Italy: health right assured by the National Health Service (NHS) and implemented by each Italian region.

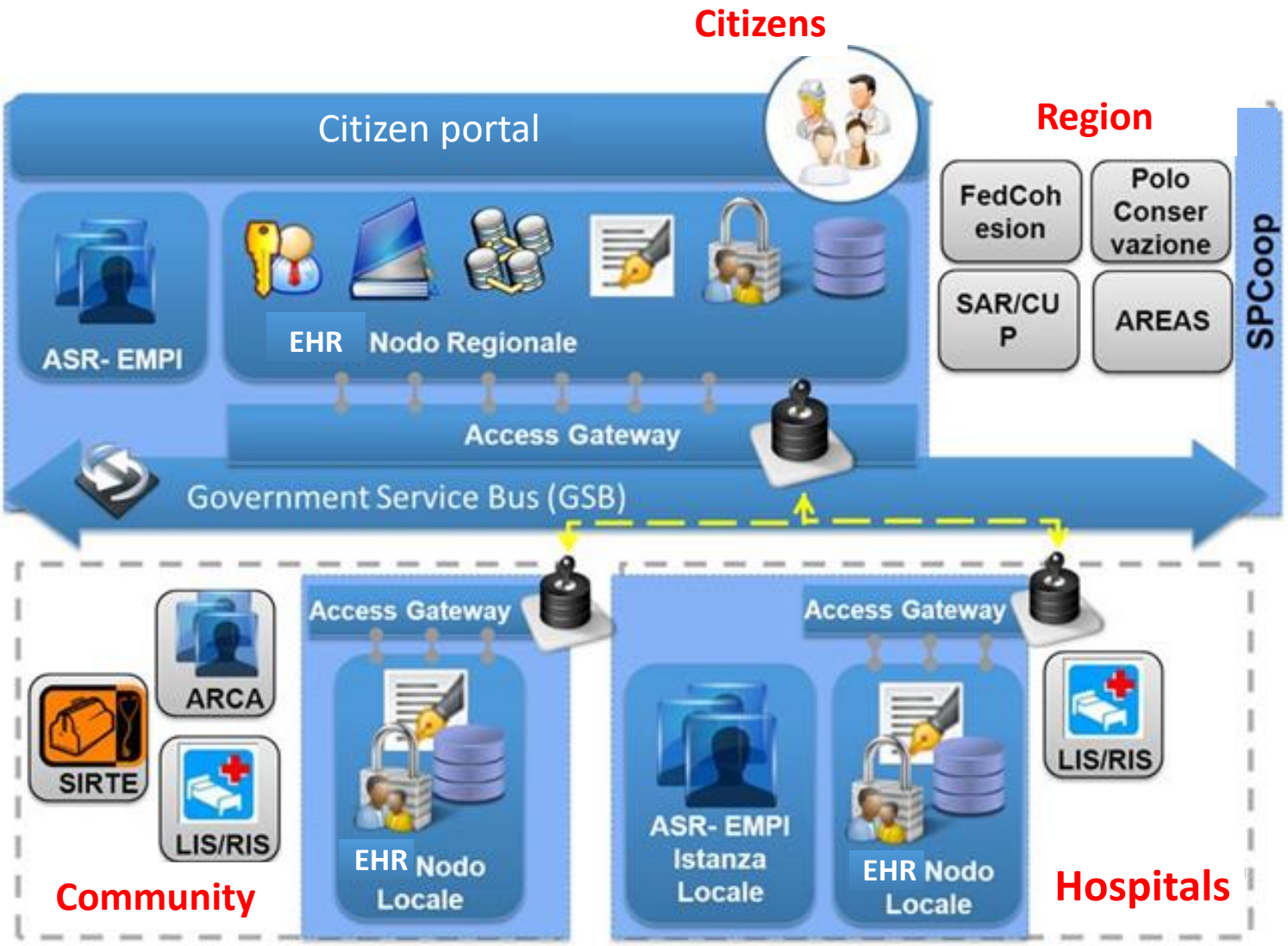


Primary and integrated care



DGR 110/2015

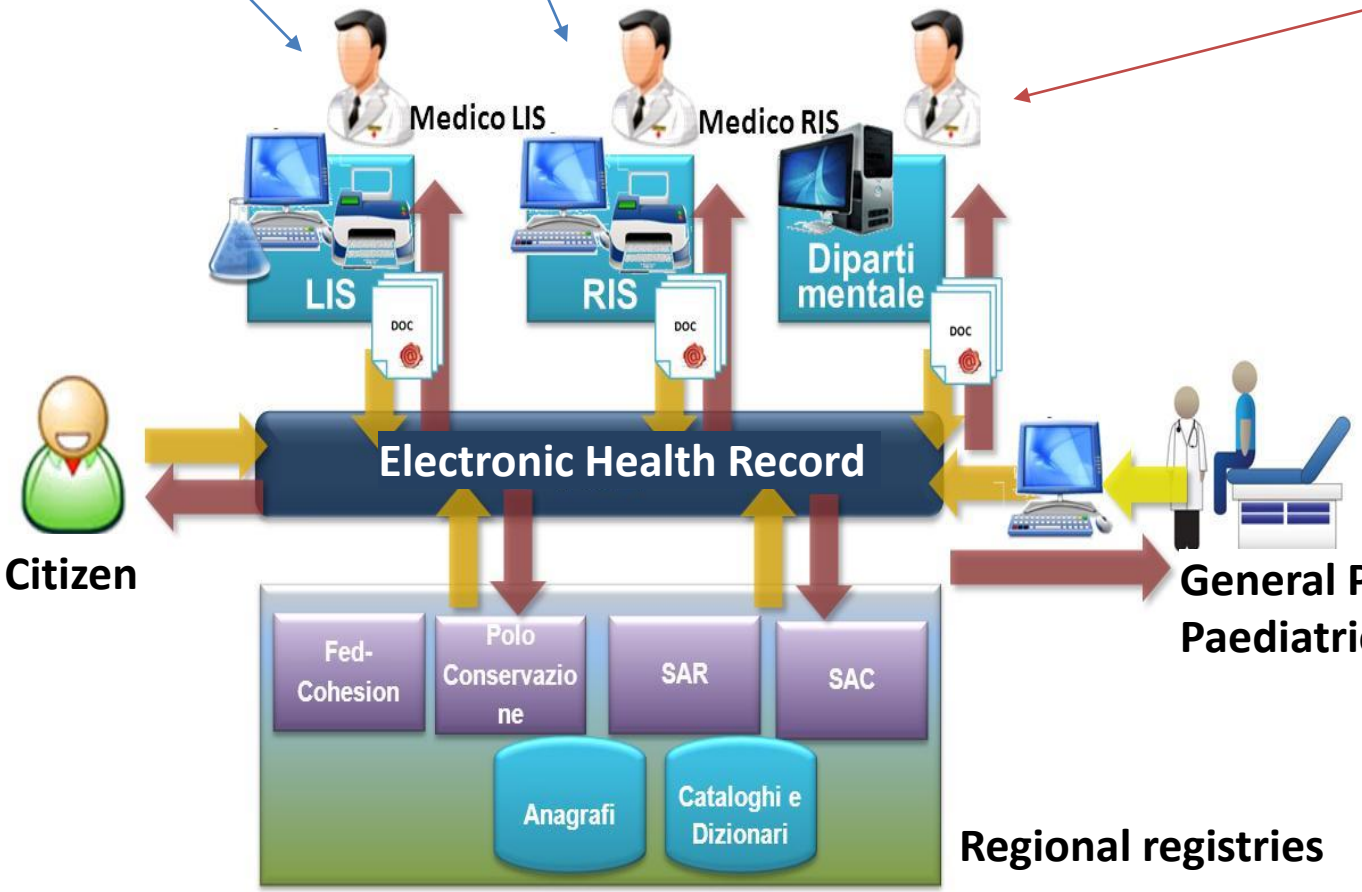
The Health Information System (1)



The Health Information System (2)

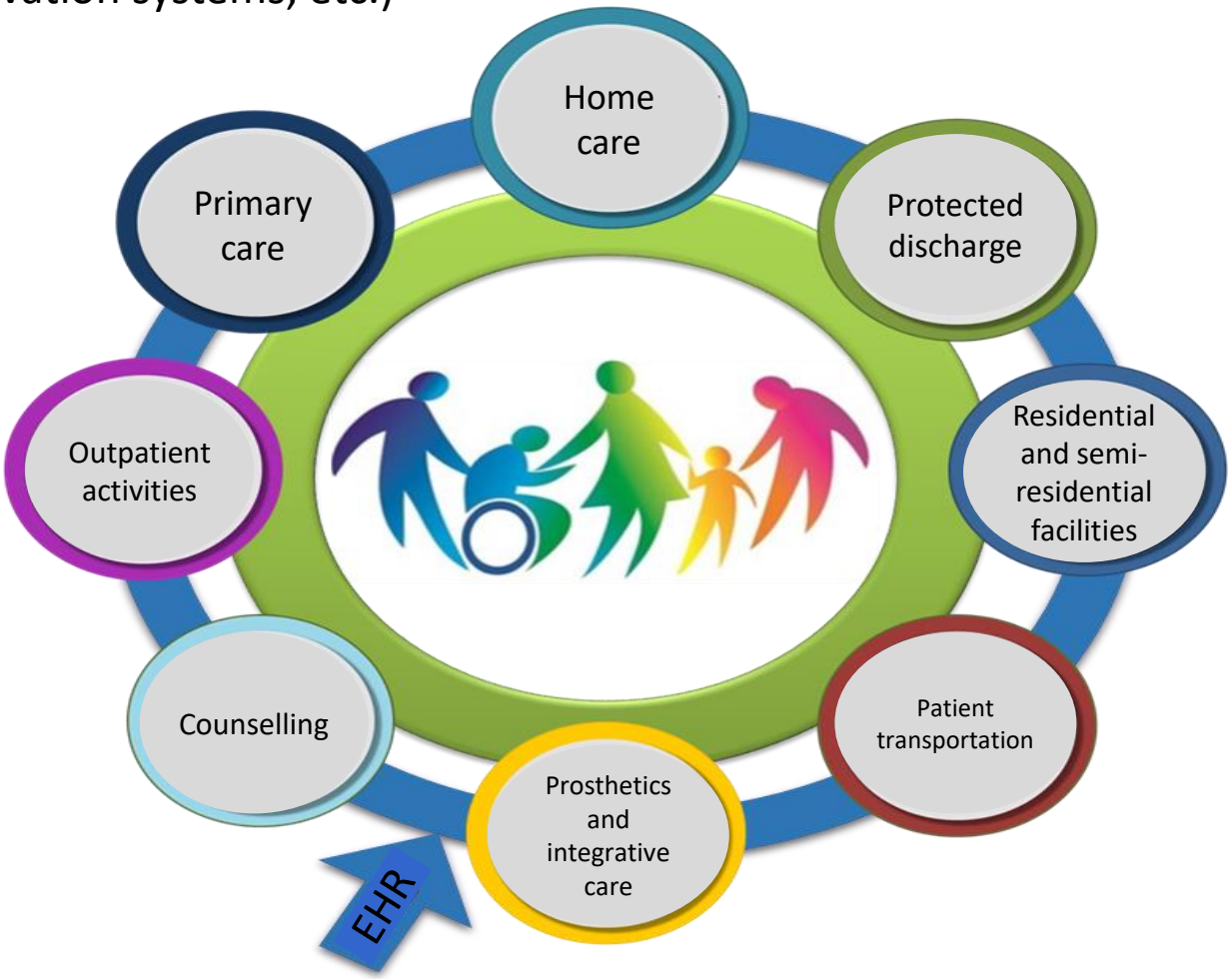
RIS (unique Radiology Information System) and **LIS (Laboratory information system)**, regional standardized networks connecting related departments of all hospitals located in Marche region

Specialists, Telemedicine in Emergency System, SIAT (Unique Trauma Area Information System), Telemedicine in cardiology, Regional Network for the management of diabetes and the **Electronic Regional Patient Health Record**



The Health Information System (3)

SIRTE (Territorial Information System), a unified regional network that is gradually connecting all the public territorial health system's services, interconnected with the regional data systems (GPs IT system, Electronic Health Record, population registries, exams reservation systems, etc.)



Priorities and strategies

- **Strategic Health and Social care Plan - priorities**: integrated person-centred care, digital transformation of healthcare, prevention of management of chronic diseases; development of effective care models; patient empowerment; training of the workforce.

European Innovation Partnership on Active and Healthy Ageing
REFERENCE SITE

- In 2019, awarded as a "3 Stars" **Reference Site** of the **European Innovation Partnership of Active and Healthy Ageing (EIP-AHA)**

Strategia Aree Interne

- **Strategy for the internal areas**: telemedicine; chronicity management; Single Access Point for Health and Welfare platform; a network of residential and semi-residential structures.

- Implementation of the **Community and Family Nurse** (in progress)
- Development of specific **care pathways for chronic diseases** (e.g. COPD, Parkinson, chronic inflammatory bowel disease)

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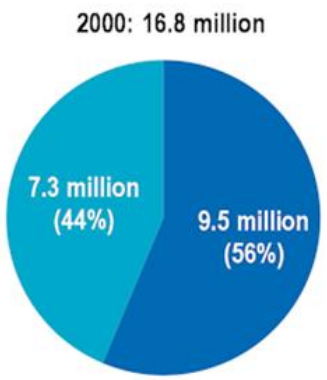
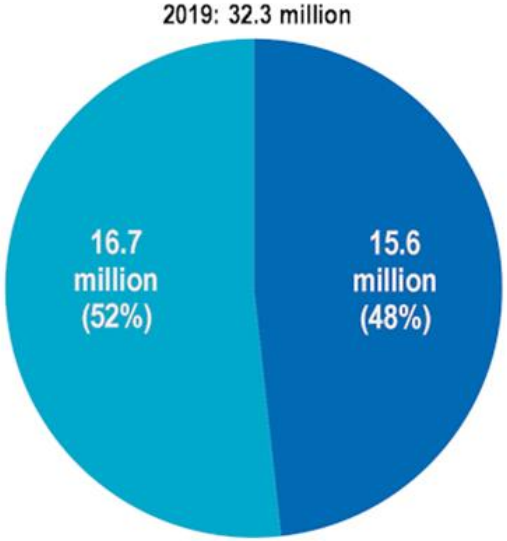
2. The diabetes network design

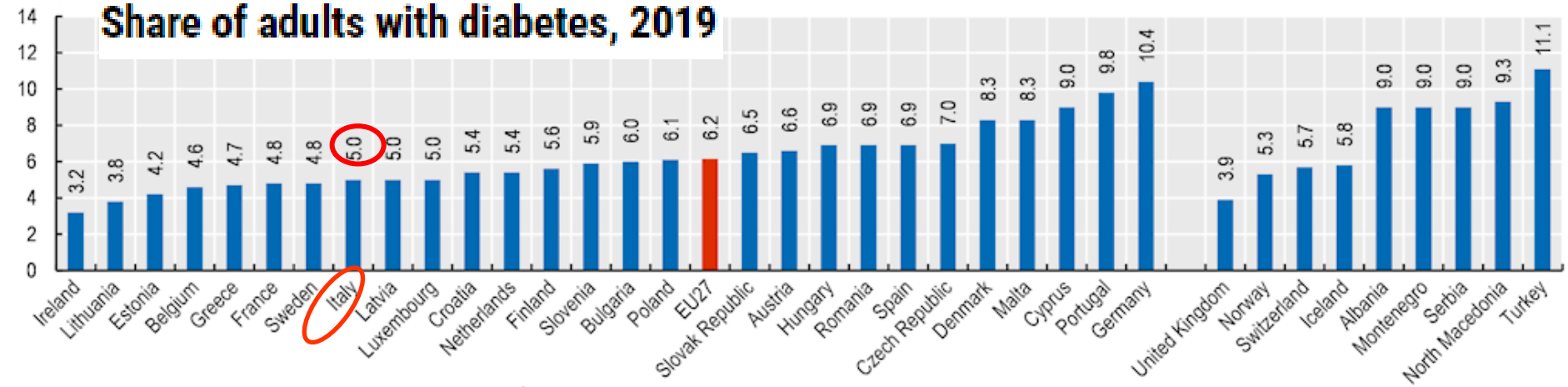
Prevalence of diabetes (1)

Number of people with diabetes in EU27, 2000 and 2019





Marche region:
4.4% of population (67,925 people)



Note: Age-standardised prevalence of population aged 20-79 with Type 1 or Type 2 diabetes. The EU average is unweighted.

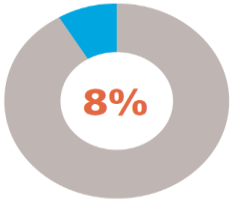
Source: OECD, 2020 (link)

The problem

ACUTE COMPLICATIONS

Hypoglycaemia is the most common complication. 9 episodes/year (up to 15 in the elderly) for every 100 people with type 2 diabetes.

ECONOMIC IMPACT OF DIABETES



8% of the total health budget in Italy dedicated to diabetes. The average annual cost for a person with diabetes in Italy is € 2800.

LONG-TERM COMPLICATIONS

1 point reduction in HbA_{1c} leads to reduction of: 14% risk of heart attack, 37% microvascular complications, and 21% diabetes-related deaths.

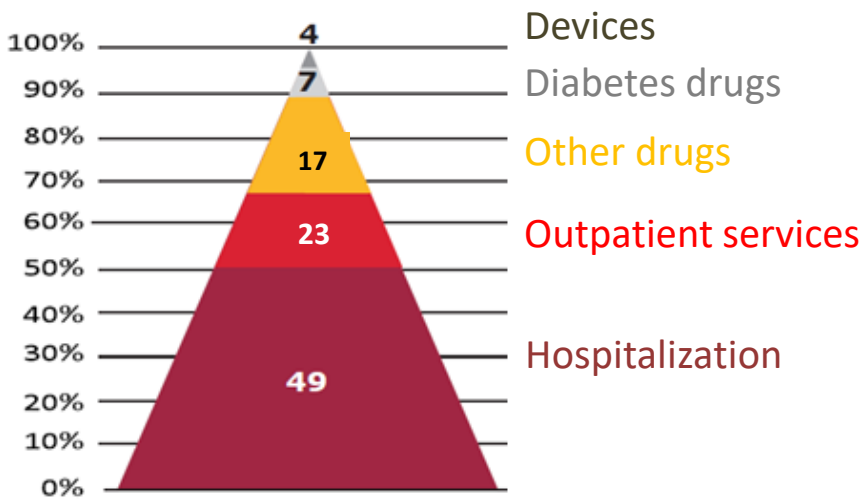
15% suffer from coronary heart disease;

22% suffer from retinopathy, which can cause blindness;

38% have kidney dysfunction that can lead to dialysis;

3% have problems with their lower limbs, which can lead to amputation.

DIRECT HEALTHCARE COSTS OF DIABETES

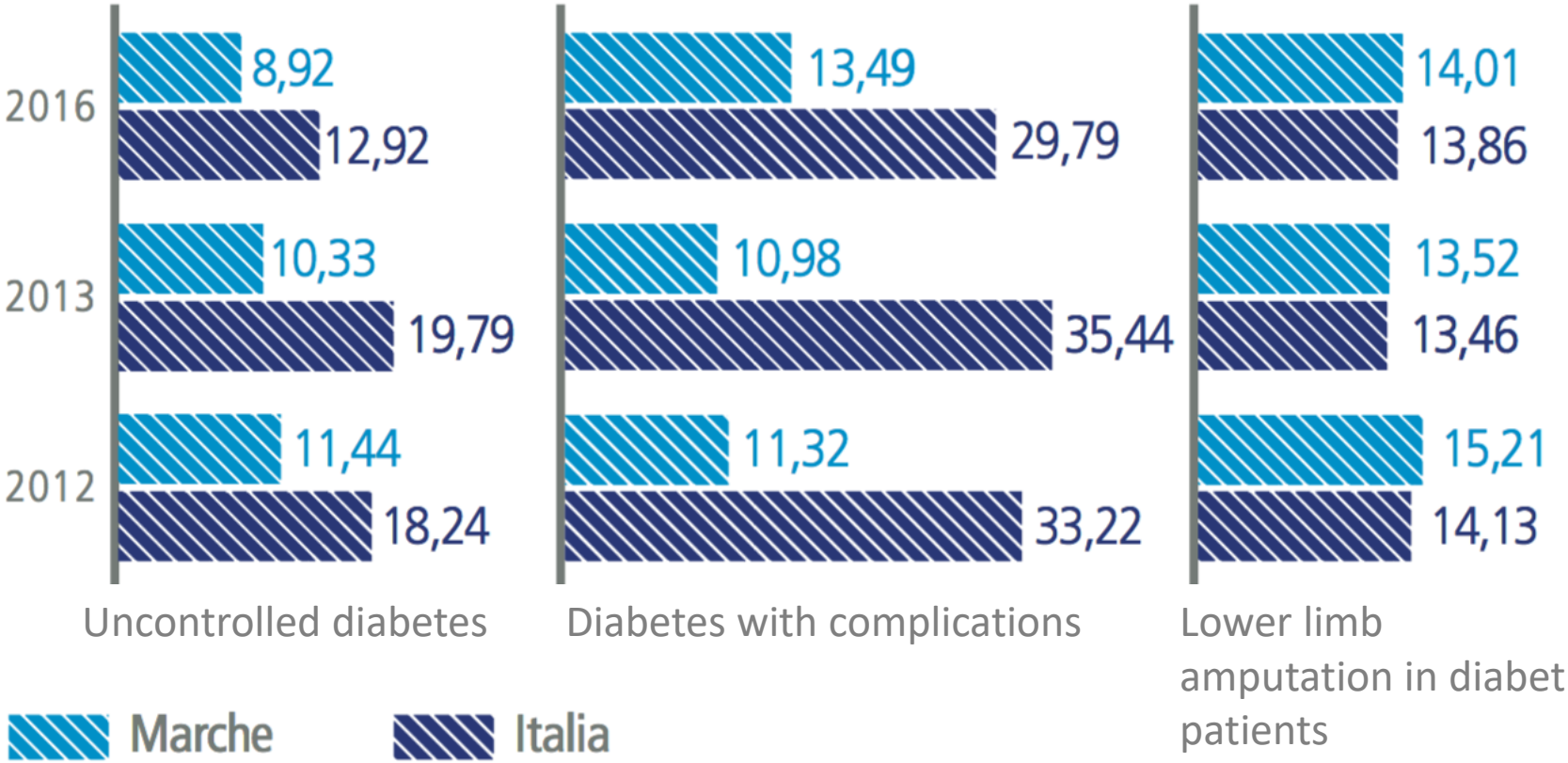


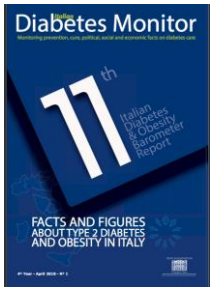
20-25% of people with diabetes are hospitalised at least once a year.

The duration of hospitalisation increases by 20% in the presence of diabetes.

Prevalence of diabetes (2)

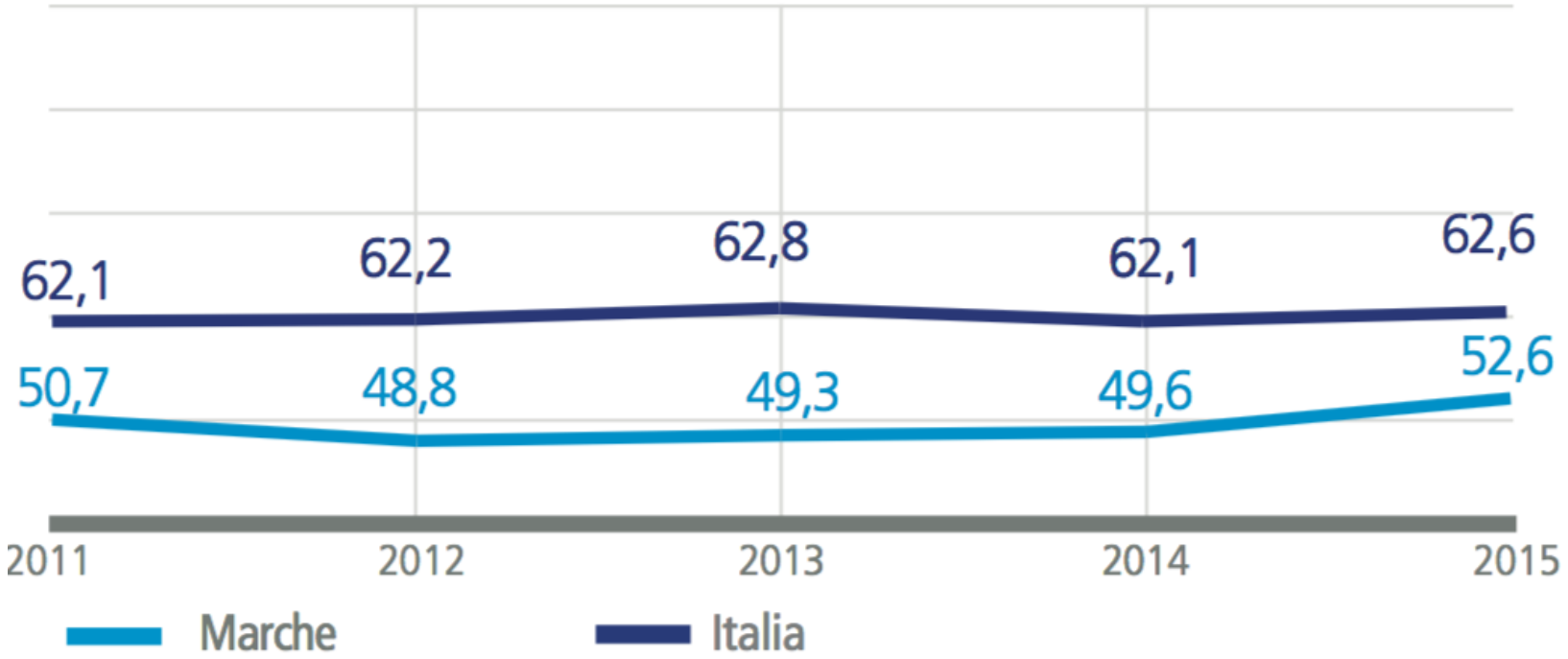
Hospitalization rates per 100,000 inhabitants

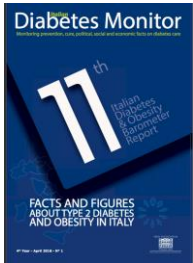




Prevalence of diabetes (3)

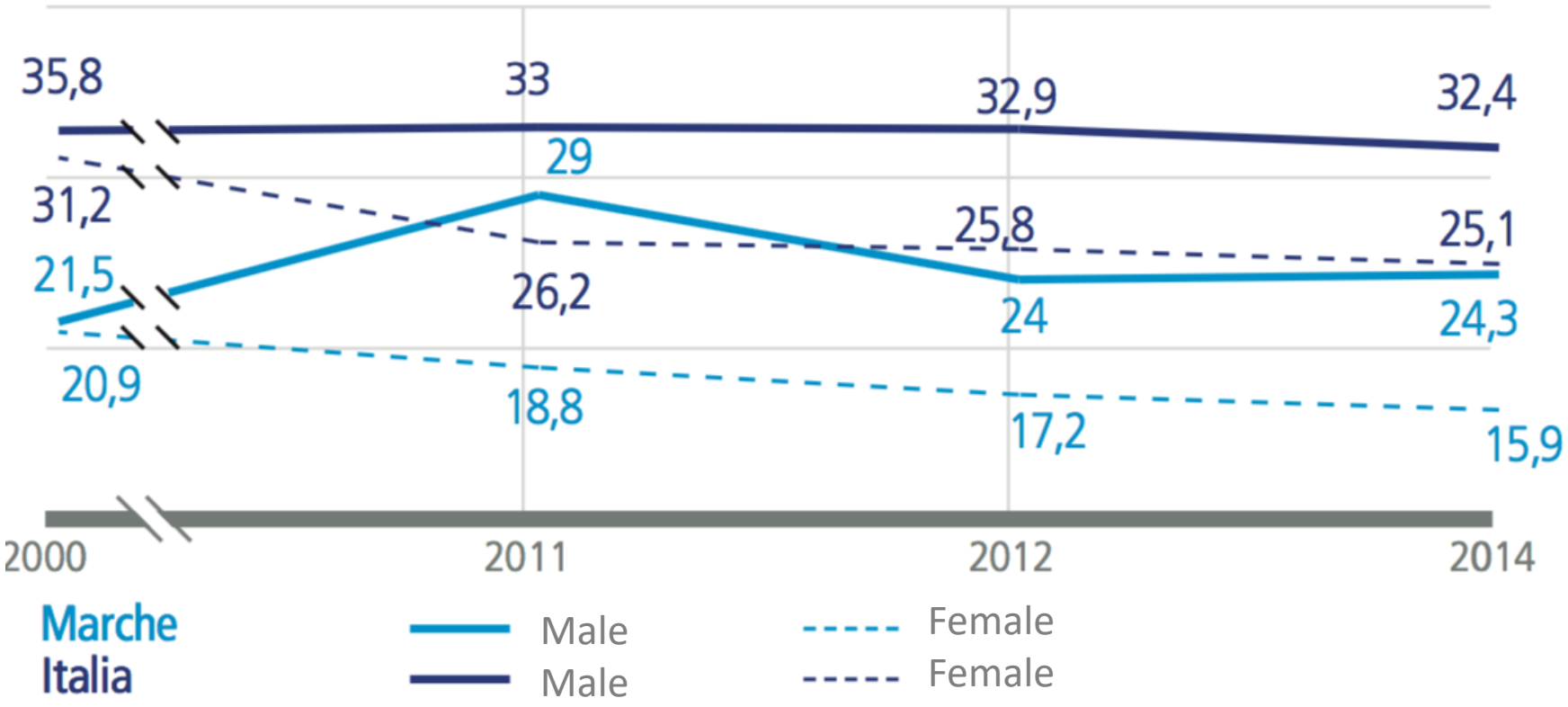
Consumption of antidiabetic drugs (DDD/1000 population/die weighted)

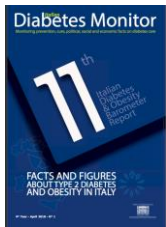




Prevalence of diabetes (4)

Standardised mortality rates for diabetes (males and females per 100,000 inhabitants)





The diabetes network design (1)

1987: Establishment of 14 Regional Diabetes Centres (Regional Law n. 38)

National plan for diabetes (2012)

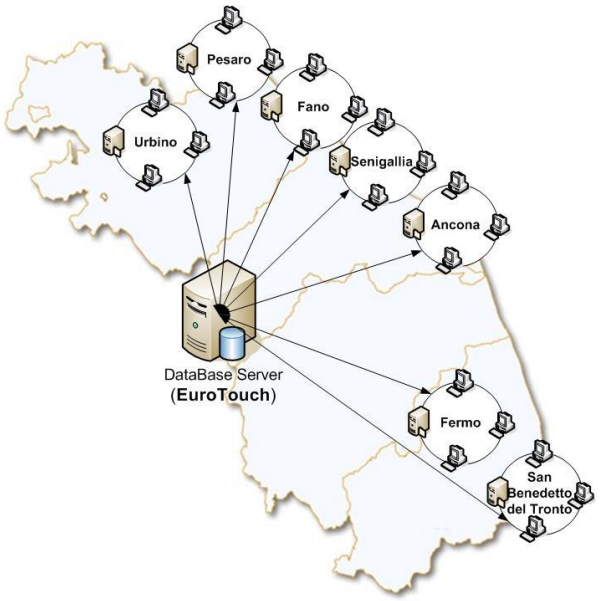
Regional laws, deliberations and decrees (2012-2015)

Network of centres, integrated management, technologies, data dashboard, medicines, multidisciplinary team

End of '90: need to put medical records in computerised form and include all patient data

image: Flaticon.com

The diabetes network design (2)



Phase n. 1 - 2002

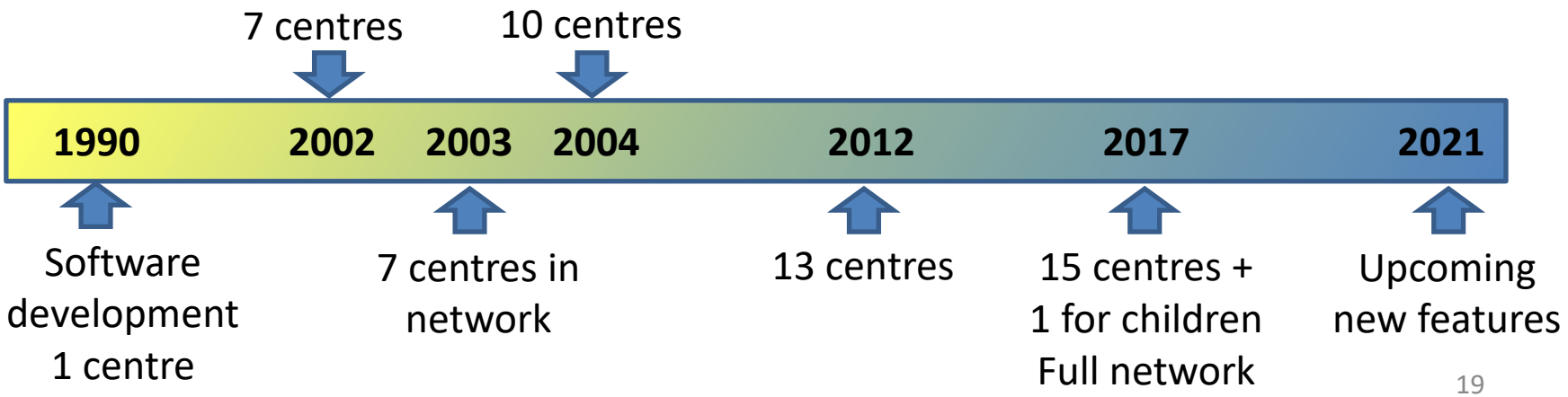
- Delivery and set-up of the regional software
- Data transfer to the regional software
- Specific training of the operators

Phase n. 2 - 2003

- Centres connected to the Regional Private Network
- Regional Clinical Database on protected server

Phase n. 3 - 2004

- Involvement of other diabetes outpatient centres in Marche region



Stakeholders involvement

Healthcare professionals: Diabetologists, nurses, dieticians, podologists, psychologists, IT specialists

University: Università Politecnica delle Marche

Scientific societies

SID Società Italiana di Diabetologia

AMD Associazione Medici Diabetologi 1974

Private organizations

Bayer, Lifescan, MyStar, Roche

Patients associations

ATDM – Federazione Regionale delle Associazioni di Tutela dei Diritti dei Diabetici Marchigiani

- Community role, as defined in the Chronic Care Model
- Advocacy
- Direct participation through the Regional Diabetes Committee
- Support for caregivers
- Information
- School camps for children and adults

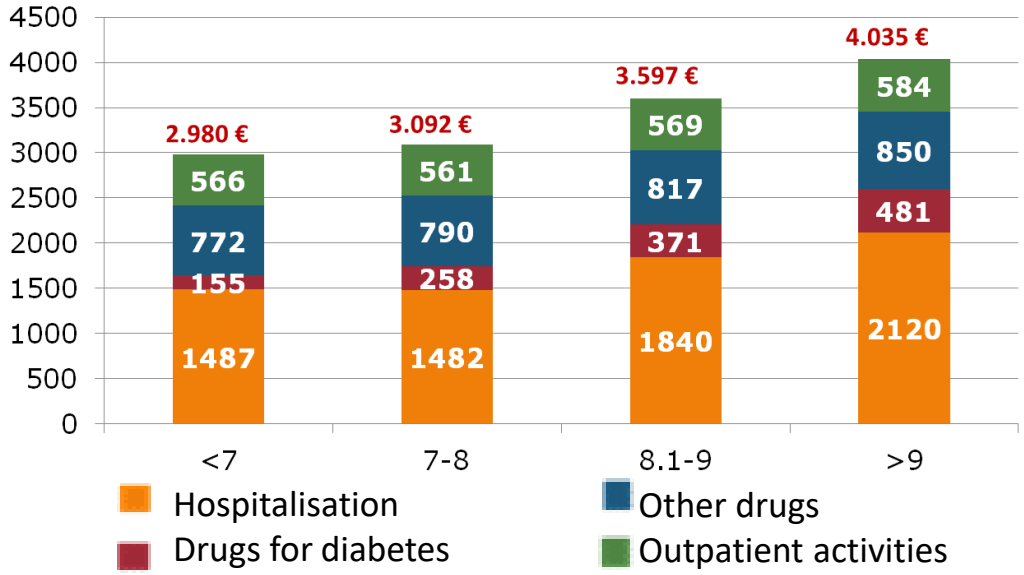
image: Freepik.com

Ethical aspects and equity

- **Services dealing with both prevention and chronicity management**
- Services for the whole population
- Services distributed throughout the region
- Costs covered by the National Health System, also through an exemption code
- Services covering the whole life span
- Support and guidance of the patient in the care pathway
- Activities in schools make it possible to reach all children (and their families), without discrimination of gender, ethnicity and socio-economic situation.

Evaluation study: clinical and costs outcomes

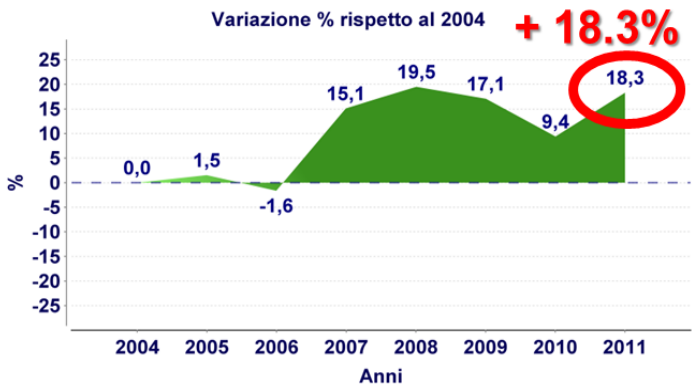
Data from 45,284 patients (clinical & administrative data, 2007-2012)



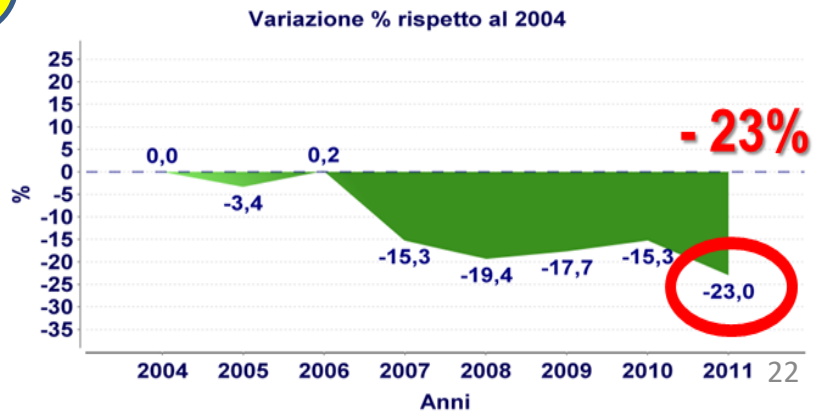
Average annual cost per patient for hospitalization and drug treatment according to % HbA1c levels

HbA1c: intermediate outcome indicators (% variation 2004-2011)

Subjects with HbA1c <=7.0%

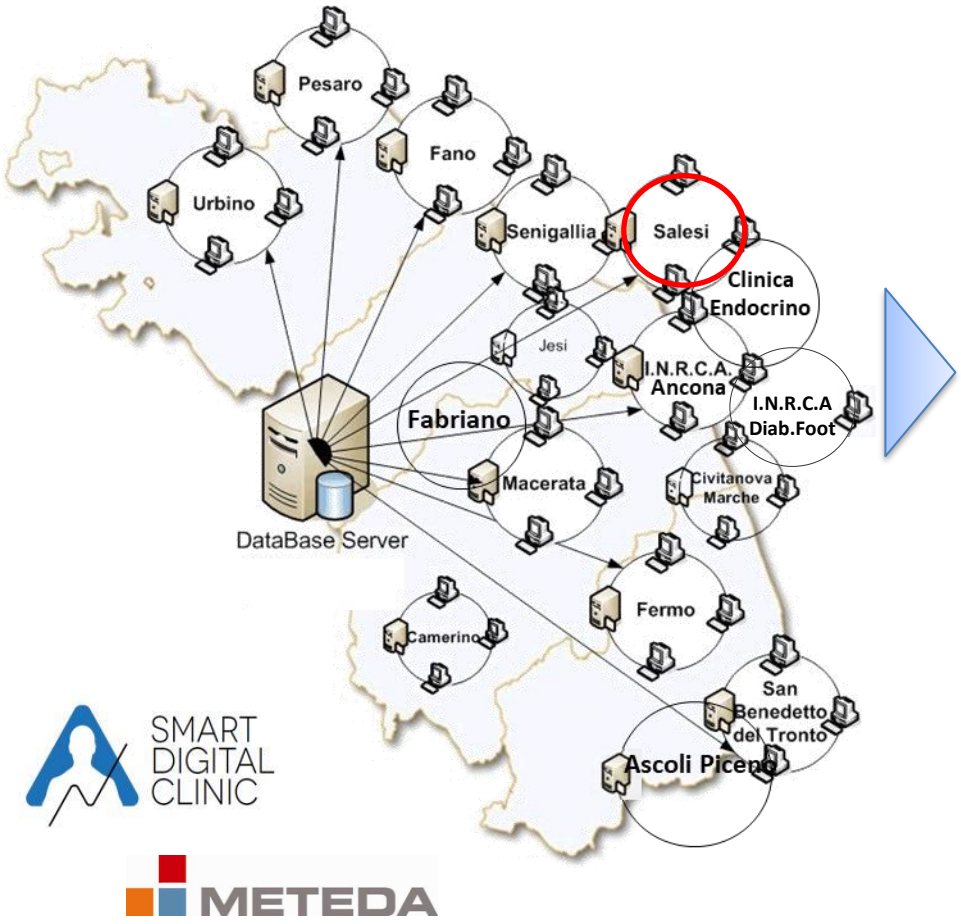


Subjects with HbA1c >8.0%



3. The core features of the network

The network



- 15 centres for adults + 1 for children, evenly distributed throughout the region and easily accessible; most with a 5 or 6 days/week coverage.
- All centres use the same shared electronic patient record (SMART DIGITAL CLINIC by METEDA®), with data flowing into a single regional database
- The patient's documentation is accessible from all centres, allowing mobility throughout the region while guaranteeing data security and privacy (e.g. COVID-19 vaccination).
- Each centre is organized with a multidisciplinary team
- Person-centred care, considering patients and their family's needs, culture/religion, abilities and compliance to different therapies.

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Staff & activities

- Primary care and follow-up;
- Chronic care;
- Health promotion (e.g. courses for a correct diet and physical activity, correct use of diabetes devices, etc.);
- Disease prevention for diabetes and related complications (e.g. cardiovascular diseases, foot ulcer, retinopathy, neuropathy);
- Support to patient's associations activities.

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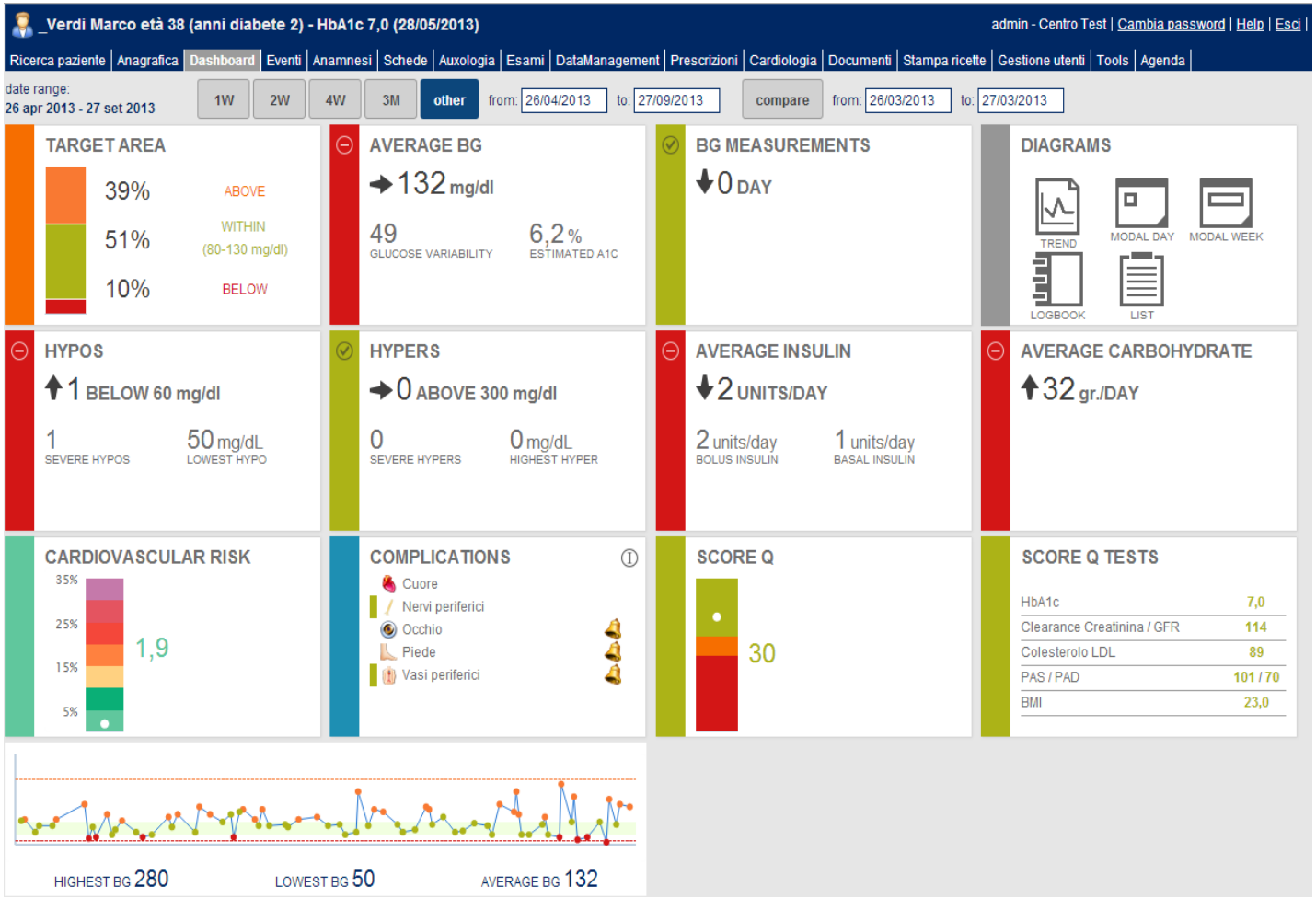
The care pathways

Gestational diabetes

The doctor's dashboard



- Summary of data
- Alerts
- Monitoring of glucometer data
- Drug prescriptions

- Booking of other specialist services (e.g. cardiologist, ophthalmologist, neurologist, sonographer, etc.)

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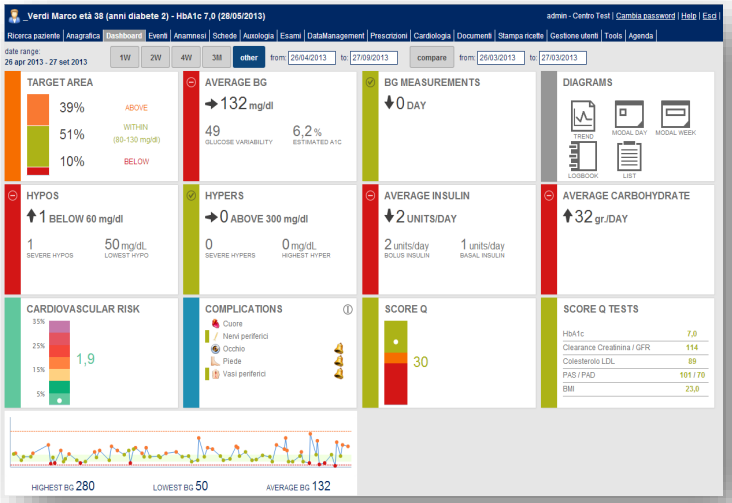
The patient's dashboard

On PC or smartphone



- Summary of data
- Alerts
- Monitoring of glucometer data

- Diet
- Physical activity
- Educational material
- Communication tools

Other activities carried out by the centres

- **Activities in schools:** courses for teachers and school staff, training activities with pupils
- **Patient education:** school camps for children and adults; **diabetic volunteer guide** (trained to work with GPs and diabetes services to disseminate correct information on lifestyles, daily diabetes management, self-monitoring and self-management of diabetes)
- **Training of operators**: courses on use of devices and software
- **Provision of devices**: in progress computerization and dematerialization of device prescriptions

Activities during COVID-19

- **Teleconsultation service** carried out by all centers, avoiding cancellation or postponement of consultations (13,646 carried out from 9 March to 3 June 2020)
- Identification of patients for the **COVID-19 vaccination**

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4. The diabetes network implementation: opportunities & obstacles

Obstacles…	…and how they have been overcome
Resistance to digitalisation in some centres	Awareness activities + turnover
Low digital skills	Training courses and evidence of time-saving and improved outpatient performance
System interoperability	Progress of the connections and the uniformity of operating systems
Sustainability Annual cost = €30,000 (use and routine maintenance) + €10,000 (extraordinary updates).	Included in the regional health budget and minimally supported by sponsors (companies in the field).

Transferable elements

1. The **software** - a complete and organized folder divided in schedules that analyse and involve every single aspect of diabetes and its complications.
2. The **model** - model of care, governance, and evaluation tools.
3. The **network** – how to connect the centres in a local/regional/national network.

The practice has already been transferred to Umbria region (Italy) and by 2021 it should also be operative in the Sicily region (Italy).

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Requirements to transfer the practice…

- A number of diabetes centres (not necessarily networked)
- An experienced diabetologist with basic digital skills
- Support from the governance bodies (also important for the sustainability)
- A system to ensure data protection and privacy

5. Results achieved

Indicators

- A set of 77 indicators collected at National level by all centres having an electronic health folder: *process indicators, intermediate outcome indicators, care intensity and appropriateness indicators, outcome indicators*

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Score Q: quality of care

original figure from the first article published in 2008, all data are updated following the guidelines (e.g. LDL <100 mg/dl or <70 mg/dl if CVD)

Table 1 Quality of care scoring system

Quality of care indicator	Scoring
HbA_{1c} measurement < 1/year	5
$HbA_{1c} \geq 8.0\%$	0
$HbA_{1c} < 8.0\%$	10
Blood pressure measurement < 1/year	5
Blood pressure values ≥ 140/90 mmHg, irrespective of treatment	0
Blood pressure values < 140/90 mmHg	10
Lipid profile measurement < 1/year	5
LDL cholesterol ≥3.37 mmol/L (130 mg/dL) irrespective of treatment	0
LDL cholesterol < 3.37 mmol/L (130 mg/dL)	10
MA measurement < 1/year	5
Not treated with ACE-inhibitors despite the presence of MA	0
Treated with ACE-inhibitors in the presence of MA or MA absent	10
Score range	0–40

Hb, hemoglobin; LDL, low-density lipoprotein; MA, microalbuminuria; ACE, angiotensin-converting enzyme.

Nutrition, Metabolism & Cardiovascular Diseases (2008) 18, 57–65

Quality of diabetes care predicts the development of cardiovascular events: Results of the QuED study

De Berardis G. et al.

DIABETES CARE, VOLUME 31, NUMBER 11, NOVEMBER 2008

Baseline Quality-of-Care Data From a Quality-Improvement Program Implemented by a Network of Diabetes Outpatient Clinics

Rossi M.C.E. et al.

Comparative Study › Diabet Med. 2014 May;31(5):615-23. doi: 10.1111/dme.12366. Epub 2013 Dec 24.

Improving quality of care in people with Type 2 diabetes through the Associazione Medici Diabetologi-annals initiative: a long-term cost-effectiveness analysis

C B Giorda [1], A Nicolucci, F Pellegrini, C K Kristiansen, B Hunt, W J Valentine, G Vespasiani

› Diabetes Care. 2011 Feb;34(2):347-52. doi: 10.2337/dc10-1709.

Quality of diabetes care predicts the development of cardiovascular events: results of the AMD-QUASAR study

Maria C E Rossi [1], Giuseppe Lucisano, Marco Comaschi, Carlo Coscelli, Domenico Cucinotta, Patrizia Di Blasi, Giovanni Bader, Fabio Pellegrini, Umberto Valentini, Giacomo Vespasiani, Antonio Nicolucci, AMD-QUASAR Study Group

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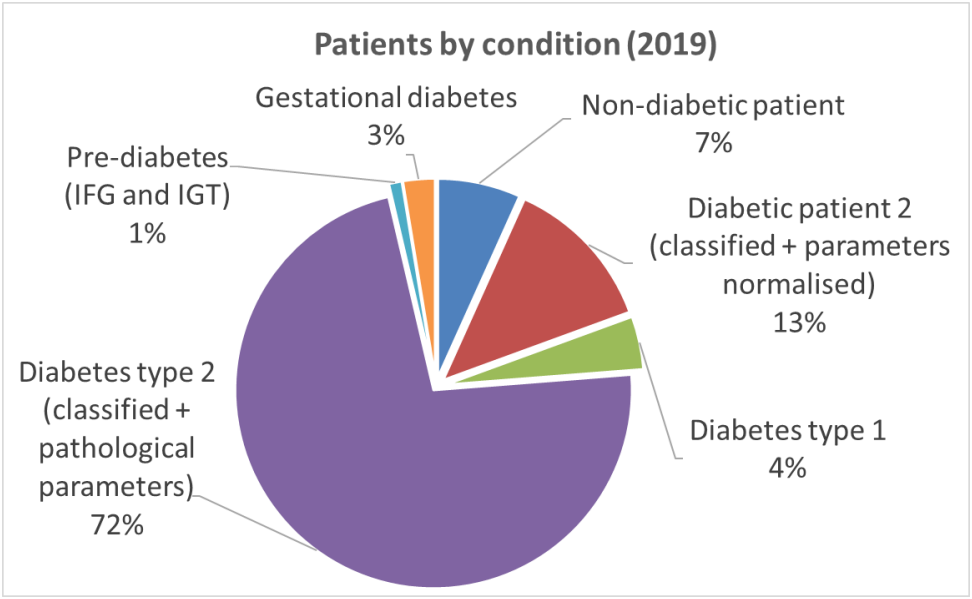
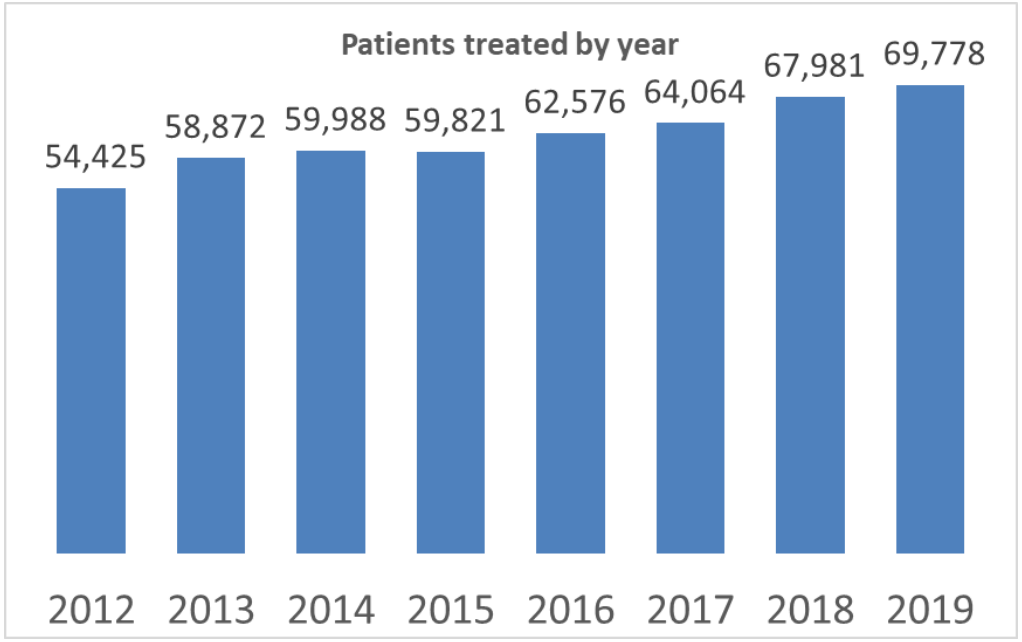
Icons made by srip from Flaticon

Patients and activities



Activities (2019)

MEDICAL EXAMINATIONS	138,512
EDUCATIONAL THERAPY	62,368
BLOOD TESTS	141,802
OTHER ACTIVITIES	36,811
TOTAL	379,493



Results (1)

- 28% reduction of hospital admissions
- improvement in quality of life (according to questionnaires filled in by patients)
- 100% of people supported in community/outpatients settings
- 100% of people able to look after their health and well-being
- Waiting times for non-urgent consultations: within 24 hours by e-mail or for pregnant women; 2 weeks for face to face.
- Patients satisfaction in terms of: quality of care; timing of visits; numbers of additional examinations (e.g. ECG, Fundus Oculi, etc.)
- Patient outcomes indicators: if compared to others Italian Regions we recorded improvement of HbA1c, reduction of cardiovascular risk; improvement of Blood Pressure control; reduction of foot ulcers complications; reduction of mortality.

Results (2)

Direct costs of diabetes (Marche)

67,936 persons with diabetes in Marche region (Source: ISTAT 2016)
Average cost per patient : **2,919 Euro** (ARNO Diabetes 2017)

Devices (4.5%): 8,923,733 €

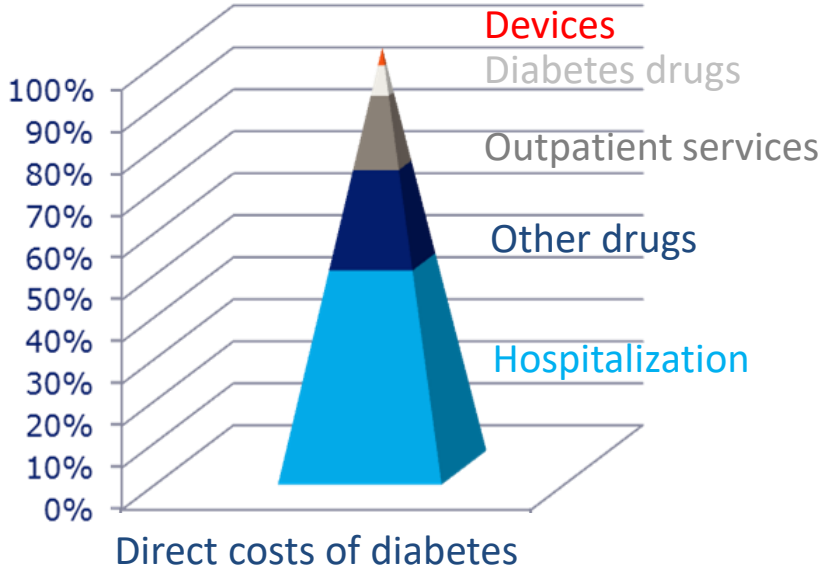
Drugs for diabetes (7.2%): 14,277,973 €

Outpatient activities (16.6%): 32,918,660 €

Other drugs (22.7%): 45,015,276 €

Hospitalization (49%): 97,169,540€

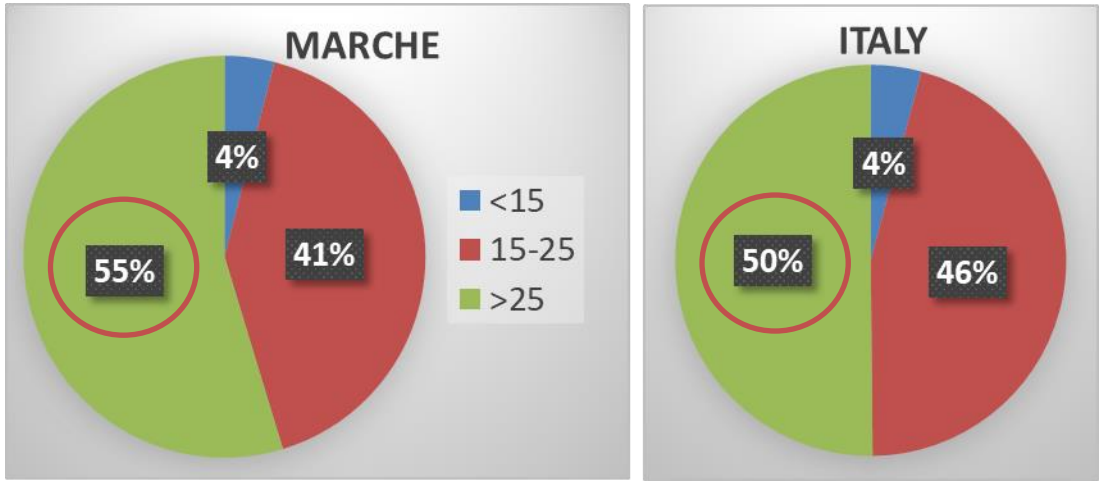
TOTAL 198.305.184 €



- ✔ Healthcare expenditure of the Marche Region 2016: 2.79 billion (Source: MEF - monitoring of healthcare expenditure 2017)
- ✔ Spending on diabetes: 7.1% of regional health expenditure

Results (3)

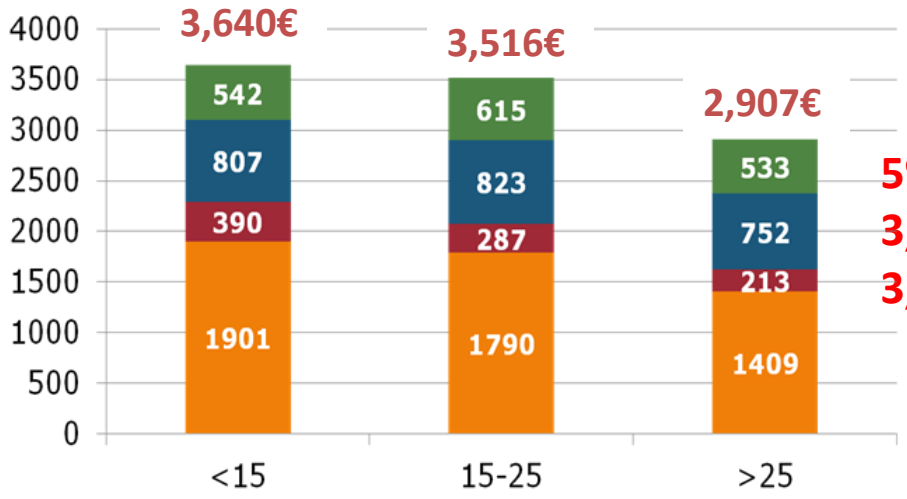
Score Q: MARCHE vs ITALY



Score Q MARCHE

	2011 (%)	2016 (%)	Delta 2016-2011 (%)
Score Q <15	3,9	4	**0,1**
Score Q >25	49,1	54,7	**5,6**

Average annual cost per patient based on Q score



5% of 67,981= 3,399 patients

3,516-2,907 = 609 € (savings per patient)

3,399*609= 2,069,991 € (total annual savings)

6. Success factors and lessons learned

Success factors

- Software created by an experienced diabetologist based on the **needs of the diabetes clinic and patients**
- Software **continuously revised** according to the feedback and experience of all diabetologist and the evolution of clinical guidelines
- A group of diabetologist and stakeholders willing to **cooperate**
- Involvement and support of **all stakeholders**
- Presence of a **regional officer** who supported the development of the network
- **Limited** costs
- Having a **single database**, it's easiest to calculate improvements or critical points in the diabetes treatment

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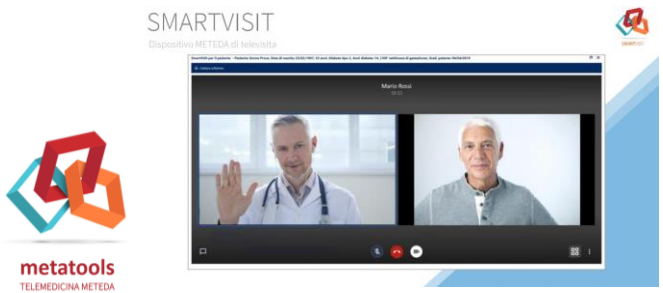
Lessons learned…

- Stipulate a contract with the software house which includes also **assistance and upgrades**.
- The importance of **the interoperability of the different systems** to avoid difficulties in integrating with important stakeholders such as the GPs (currently under development, thanks to the implementation of the EHR and the push for digitalisation caused by COVID-19).
- The importance of a **digitalised healthcare workforce**, services and systems.

Next steps

- Integration with the ‘Single Booking Centre’ system
- Integration with the EHR
- Testing of self-monitoring data transmission kits
- Testing of video consulting
- Testing of artificial intelligence models for predicting the risk of complications



VRAI vision robotics artificial intelligence

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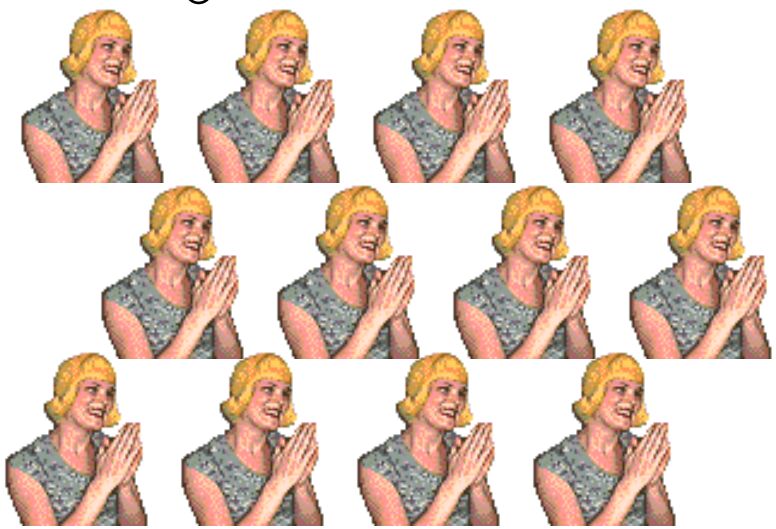
At last,
he finished!!



Thank you for your kind attention!