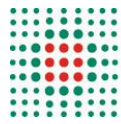


SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA



A Regional Model to Predict Identify and Manage Multimorbidity and Frailty

Regione Emilia-Romagna



Identifying (and taking charge of) patients at high risk of hospitalization and frailty

- Regional predictive model to classify patients by '**risk profile**' (risk of hospitalization for problems that are potentially avoidable, or whose progression may have been avoided or delayed)
- Provision of information on high-risk patients to the general practitioners (GPs) and nurses in the Case della Salute (Community Health Centers-CHC).

BMJ Open Predicting risk of hospitalisation or death: a retrospective population-based analysis

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► Population history and additional material is available. To view please visit the journal (<http://dx.doi.org/10.1136/bmjopen-2014-005225>).

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ABSTRACT
Objectives: Develop predictive models using an administrative healthcare database that provide information for Patient-Centred Medical Homes to proactively identify patients at risk of hospitalisation for conditions that may be improved through improved patient care.

Design: Retrospective healthcare utilisation analysis with multivariable logistic regression models.
Setting: A population-based longitudinal database of residents served by the Emilia-Romagna, Italy, health services in the years 2004–2012 including demographic information and utilisation of health services by 3 758 380 people aged ≥15 years.

Outcome measures: Models designed to predict risk of hospitalisation or death in 2012 for problems that are potentially avoidable were developed and evaluated using the area under the receiver operating curve (AUC), in terms of their sensitivity, specificity and positive predictive value, and for calibration to assess performance across levels of predicted risk.

Results: Among the 3 758 380 adult residents of Emilia-Romagna at the end of 2011, 448 163 (12.1%) were hospitalised in 2012, 4.2% were hospitalised for the selected conditions or died in 2012 (3.6% hospitalised, 1.2% died). The C-statistic for predicting 2012 outcomes was 0.858. The model was well-calibrated across categories of predicted risk. For those patients in the highest predicted risk (high group), the average predicted risk was 23.9% and the actual prevalence of hospitalisation or death was 26.2%.

Conclusions: We have developed a population-based model using a longitudinal administrative database that identifies the risk of hospitalisation for residents of the Emilia-Romagna region with a level of performance as high as, or higher than, similar models. The results of this model, along with profiles of patients identified as high risk, are being provided to the physicians and other healthcare professionals associated with the Patient-Centred Medical Homes to aid in planning for care management and interventions that may reduce their patients' likelihood of a preventable, high-cost hospitalisation.

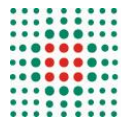
Strengths and limitations of this study

- This study included the entire adult population of the Emilia-Romagna Region, of 8.5, over 3.7 million people.
- The study used an existing longitudinal administrative healthcare database with both the advantage of much lower cost than new data collection and the disadvantage of potential errors in administrative data.
- The results of the study are being used to assist in the development of ready-to-use Patient-Centred Medical Homes.

patients' problems, is shifting to a more proactive model designed to take the initiative in providing care for an increasingly older population that has a greater prevalence of chronic conditions, often with multiple medical and social needs. These changes are driving the reorganisation of the primary care system, emphasising coordination and cooperation among healthcare professionals.^{1–3} Among the approaches to addressing this need has been the establishment of Patient-Centred Medical Homes, organisations in which teams of healthcare providers are engaged in delivering comprehensive, coordinated, patient-centred care to patient-defined populations.

Primary care has a central role in the Italian National Health Service (NHS). Twenty-one regional governments are responsible for ensuring the delivery of a health benefits package through a network of geographically defined, population-based Local Health Authorities. Primary care physicians work for these authorities as independent contractors and act as 'gatekeepers' for specialty and other referral services for their patients.⁴ With the belief that a strong primary care

- ✓ **adult population**
- ✓ **use of regional health/administrative data**
- ✓ **calculate the Risk Score**
- ✓ **high level of statistic accuracy (C= 0.85)**
- ✓ **Louis DZ et al, BMJ Open 2014**

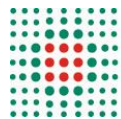


Information Collected

- Chronic Diseases/Multimorbidity
- Pharmaceuticals
- Specialist visits
- Hospitalization
- Emergency care
- Adherence to Guidelines

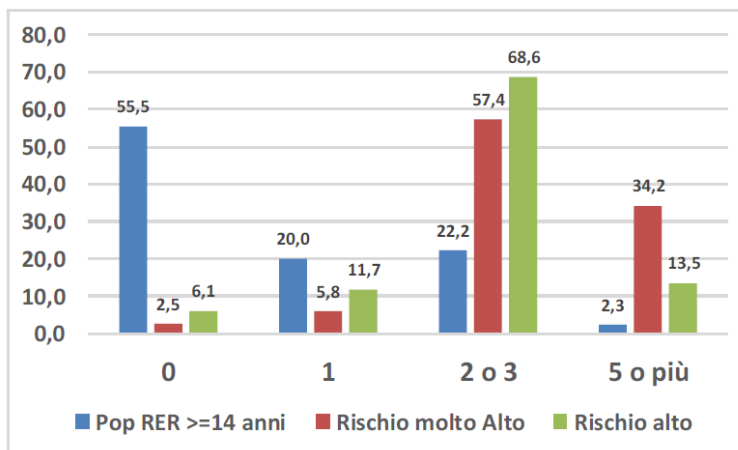
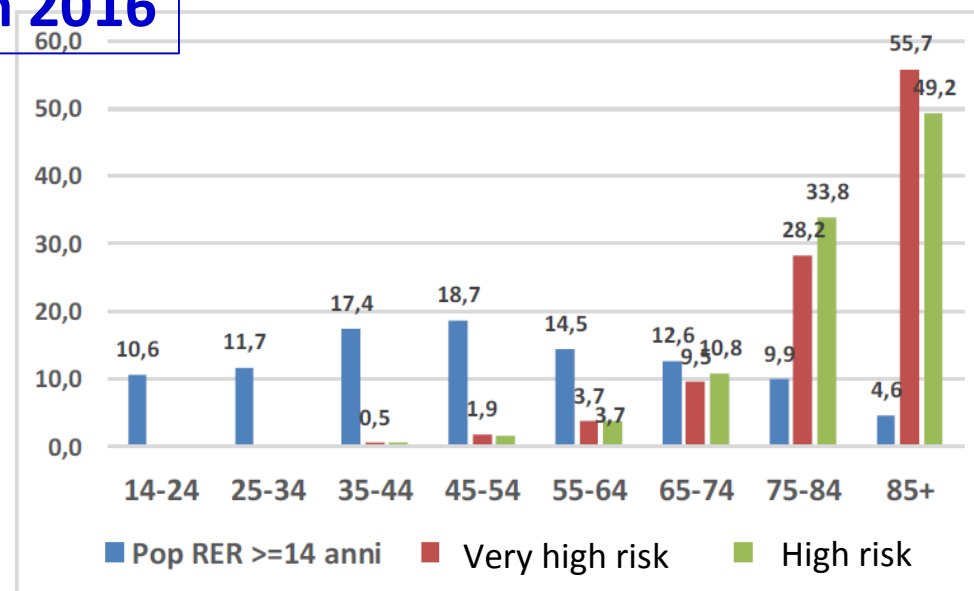
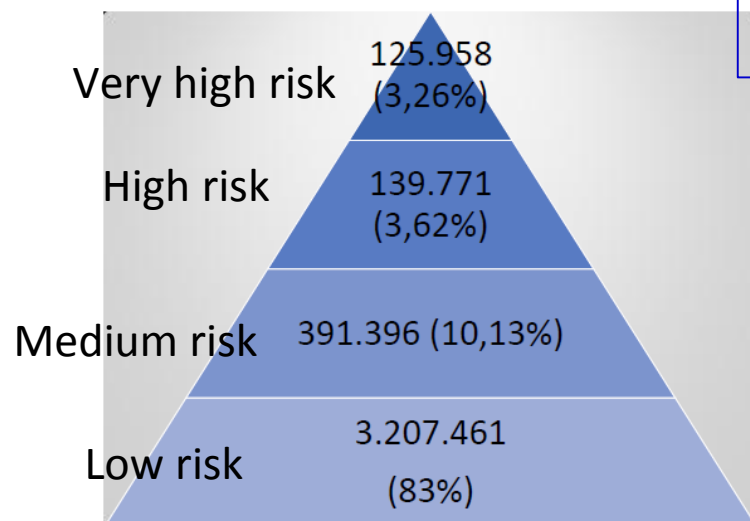


**RISK
SCORE**

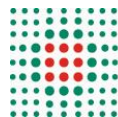


Identifying (and taking charge of) patients at high risk of hospitalization and frailty

Stratification in 2016



By number of chronic conditions



Taking charge of patients at high risk of hospitalization and frailty

Paziente: 1094553 Patient

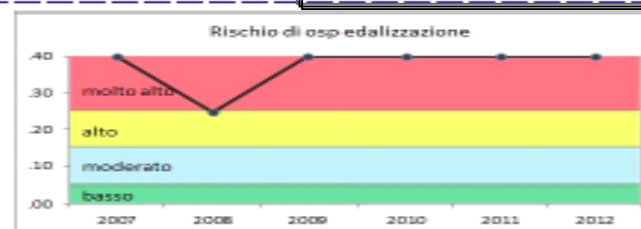
Sesso: F Età: 44

Risk profile

Rischio di ospedalizzazione previsto per il 2013:

Molto alto

Il grafico mostra il cambiamento nel tempo del rischio di ospedalizzazione previsto per il paziente



Questo documento è un sommario delle informazioni di natura amministrativa per un paziente previsto a probabile 'rischio molto alto' di ospedalizzazione nel 2013 in base ai consumi sanitari del 2012.

Patologie croniche (in base al sistema o eziologia)

- | | | |
|---|--|--|
| <input checked="" type="checkbox"/> Cardiovascolari | <input type="checkbox"/> Genitourinarie | <input type="checkbox"/> Oftalmologiche |
| <input type="checkbox"/> Dermatologiche | <input type="checkbox"/> Ginecologiche | <input type="checkbox"/> Otorinolaringoiatriche |
| <input type="checkbox"/> Ematologiche | <input type="checkbox"/> Immunologiche | <input checked="" type="checkbox"/> Psichiatriche |
| <input type="checkbox"/> Endocrine | <input type="checkbox"/> Infettive | <input type="checkbox"/> Respiratorie |
| <input checked="" type="checkbox"/> Epatiche | <input type="checkbox"/> Muscoloscheletriche | <input type="checkbox"/> Sistema Genitale Maschile |
| <input checked="" type="checkbox"/> Gastrointestinali | <input checked="" type="checkbox"/> Neurologiche | <input type="checkbox"/> Tumoriali |

Chronic conditions

Ospedalizzazione 2012 – N. di ricoveri occorsi al paziente: 1

N. 1 Degenza ordinaria presso Ospedali Riuniti-Pr

02/01/12 - 02/02/12 gg_deg: 31 Dimissione: Ordinaria a domicilio

Patologia principale del ricovero: 785.59 Altro Shock Senza Menzione Di Trauma

Comorbidità: 789.5 Ascite

571.2 Cirrosi Epatica Alcolica

570 Necrosi Acuta E Subacuta Del Fegato

307.1 Anoressia Nervosa

070.54 Epatite C Cronica Senza Menzione Di Coma Epatico

Procedura: 42.91 Legatura Di Varici Esofagee

Hospitalization

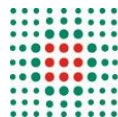
Pronto Soccorso 2012 – N. : 3

Presso Ospedali Riuniti-Pr

13/02/12 - 13/02/12

Altri Sintomi O Disturbi

Emergency room



Risk profile

Visite specialistiche

Dermatologia
Gastroenterologia
Malattie Infettive E Tropicali
Odontoiatria E Stomatol.

Specialistic visits

Farmaci: N. totale di farmaci nel 2012: 11

A02 Farmaci Per Disturbi Correlati All'Acidita'

Lansoprazolo

1	2	3	4
---	---	---	---

A06 Lassativi

Lattitolo

1	2	3	4
---	---	---	---

Lattulosio

1			
---	--	--	--

A07 Antidiarroici, Antinfiammatori Ed Antimicrobici Intestinali

Rifaximina

1	2	3	4
---	---	---	---

B02 Antiemorragici

Fitomenadione

1	2	3	4
---	---	---	---

C03 Diuretici

Torasemide

1	2	3	4
---	---	---	---

Canrenoato Di Potassio

1	2	3	4
---	---	---	---

Furosemide

1			
---	--	--	--

C07 Betabloccanti

Carvedilolo

1	2	3	4
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J01 Antibatterici Per Uso Sistemico

Ciprofloxacina

			4
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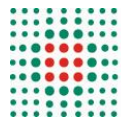
N03 Antiepilettici

Fenobarbital

1	2	3	4
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Drugs

Il paziente è stato esposto a politerapia nel 2012, definita come l'uso simultaneo di 5 o più principi



Taking charge of patients at high risk of hospitalization and frailty

- Risk Profiles provided to GPs
- Activation of Professional Teams
 - ✓ GPs, specialists, nurses, physiotherapists, social workers
 - ✓ a proactive response...
- Interdisciplinary Paths
 - ✓ prevention, clinical appropriateness and adherence, health education...
- Participation of the Community
 - ✓ Patients, Caregivers, Associations

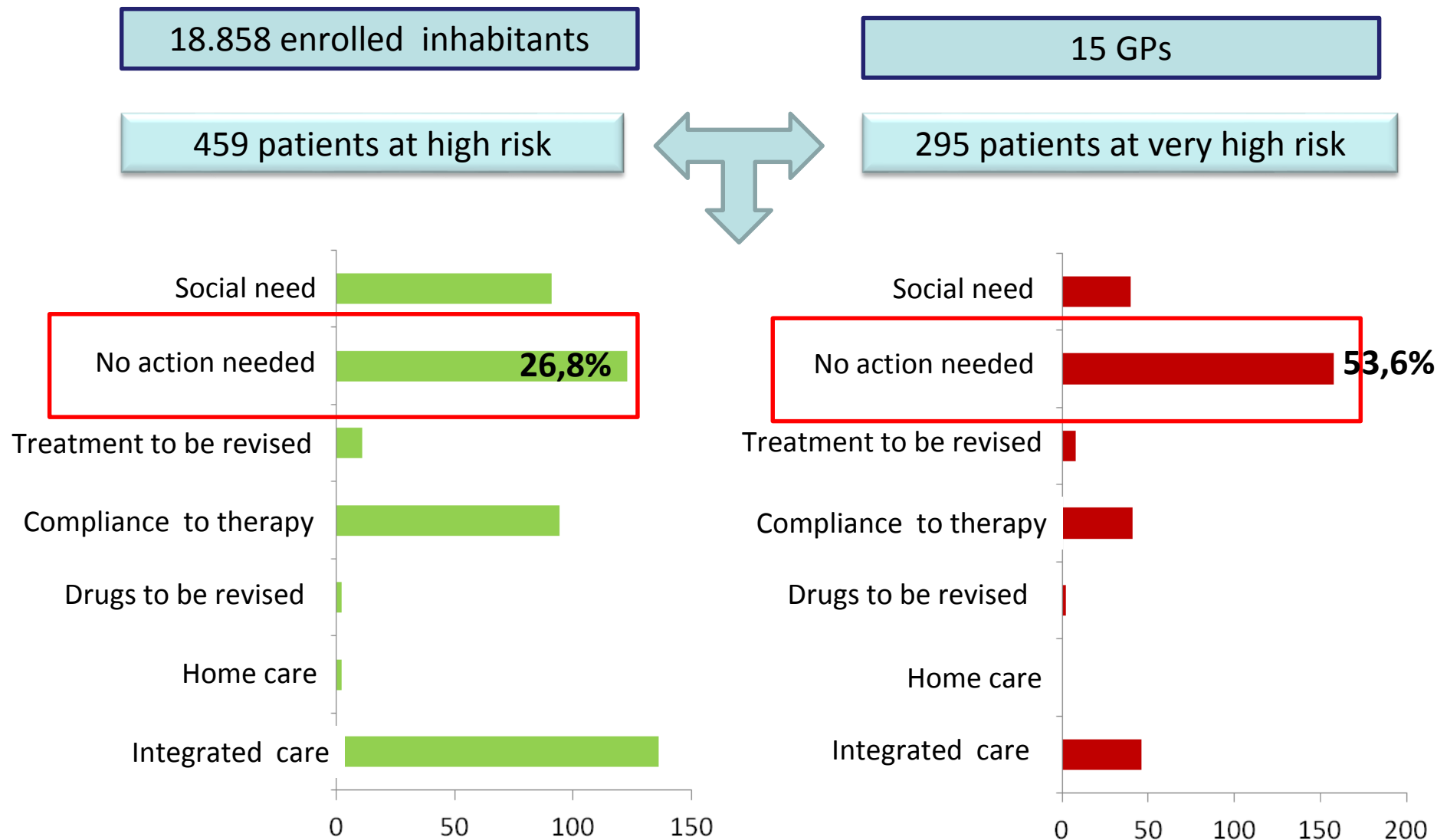


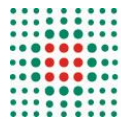
Does it work?

- 11 Community Health Centres involved
- **Patient Assessment Chronic Illness Care-PACIC and Patients point-of-view** in cooperation with patients' associations (CHF, diabetes, COPD, ESRD)
- **Assessment Chronic Illness Care- ACIC and Health care team point-of-view** focus-group: GPs, nurses, social workers, ambulatory specialists, Primary Care Department



Does it work? Experience in one of the 11 Community Health Center





<http://salute.regione.emilia-romagna.it/documentazione/multimedia/video/the-one-stop-home-for-healthcare>

Emilia-Romagna Region

- ✓ General Directorate for Care of the person, Health and Welfare
- ✓ Health and Social Regional Agency

