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THE IMPACT OF INAPPROPRIATE EMERGENCY ADMISSIONS IN THE AUTONOMOUS PROVINCE OF BOLZANO: CHALLENGES AND INSIGHTS

Mirko Bonetti, MSc[1]; Giuseppe D'Orio, MSc[2]; Chiara Seghieri, PhD[2]

[1] Health Department Province of Bolzano (Italy)
[2] Management and Health Lab, Institute of Management, L'EMbeDS Sant'Anna School of Advanced Studies (Italy)

Anziani, attese interminabili al pronto soccorso. Messner: «Non deve accadere»

L'assessore prende in mano la situazione dopo il caso della paziente di 90 anni che il 7 aprile ha atteso tredici ore, dalle 13 alle 2 di notte: «Voglio intervenire. Ho chiesto i dati per sapere quanto attendono over70, pazienti fragili e con quali codici»

IL FATTO L'incubo di una 90enne: «13 ore di attesa»

Valeria Frangipane

Sanità Sanità Alto Adige Salute Pronto Soccorso Bolzano Anziani

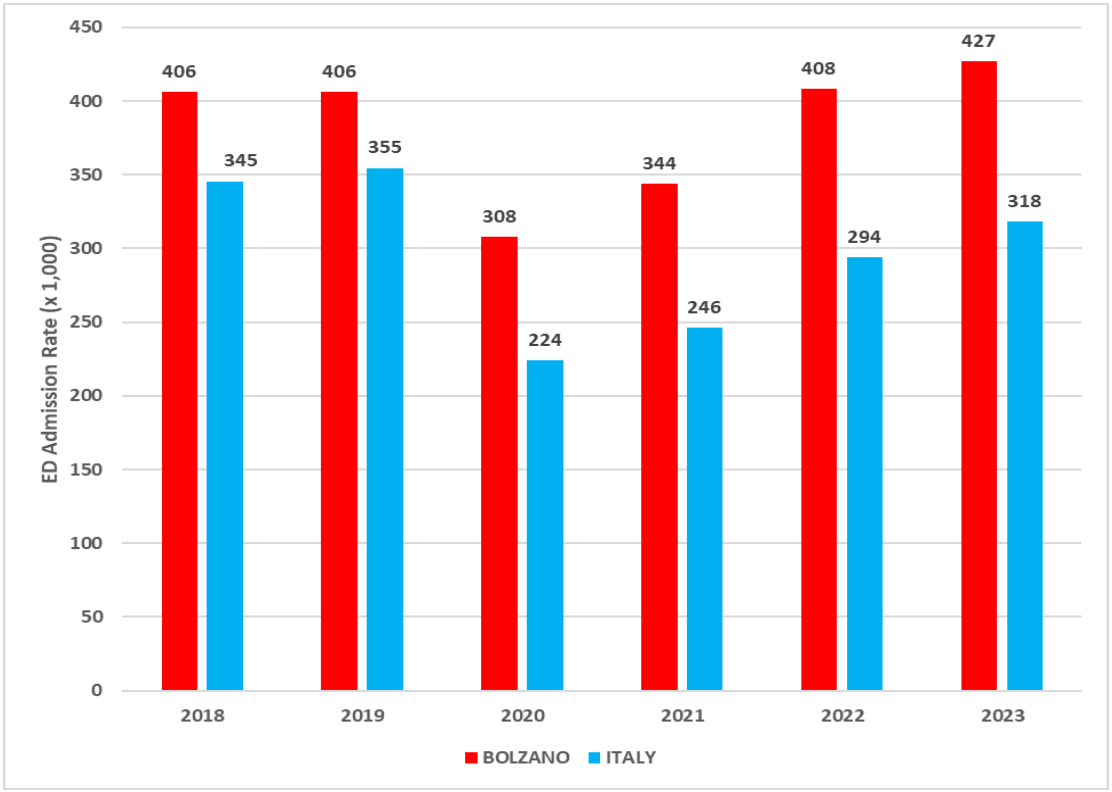
06 maggio 2024

BOLZANO. Domenica 7 aprile **una paziente di 90 anni ha trascorso 13 ore al Pronto soccorso del San Maurizio** prima di essere curata. Era in barella, si lamentava. Entrata alle 13 è stata dimessa alle 2 di notte.

What about the Emergency Departments (EDs) in the Province of Bolzano (Italy)?

- *Admission Rates*
- *Length of Stay (LOS)*

ED Admission Rates (per 1,000 inhabitants)

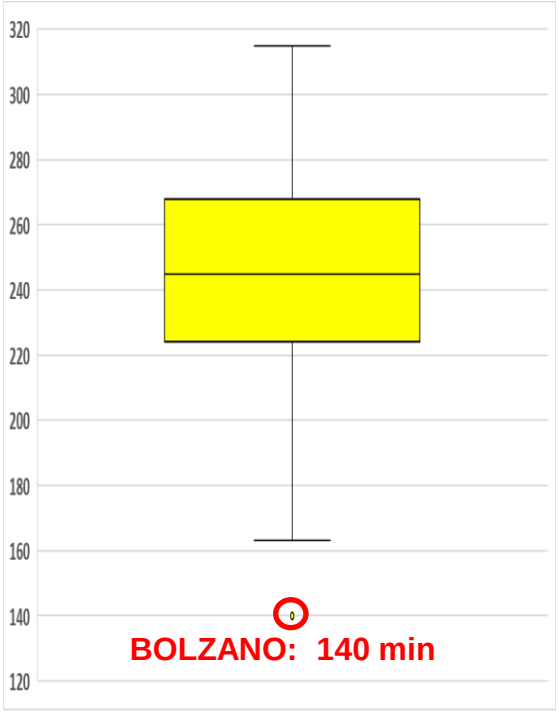


YEAR	BOLZANO	ITALY	RATIO
2018	406	345	1.18
2019	406	355	1.15
2020	308	224	1.38
2021	344	246	1.40
2022	408	294	1.39
2023	427	318	1.34

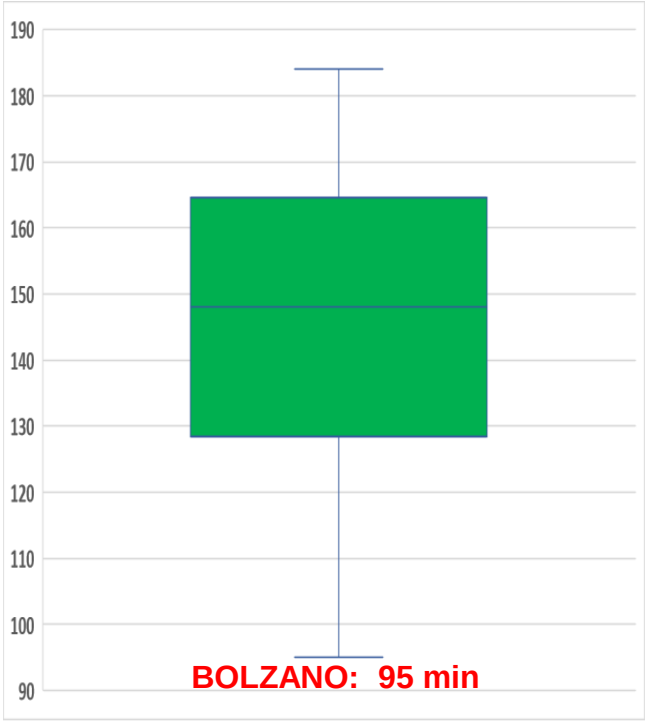
Source:
Mes Lab Institute of Management of Sant'Anna School of Advanced Studies (Pisa, Italy), The Italian Regional Performance Evaluation System (IRPES)
Ministry of Health

ED Admissions: Length of Stay (LOS) - median

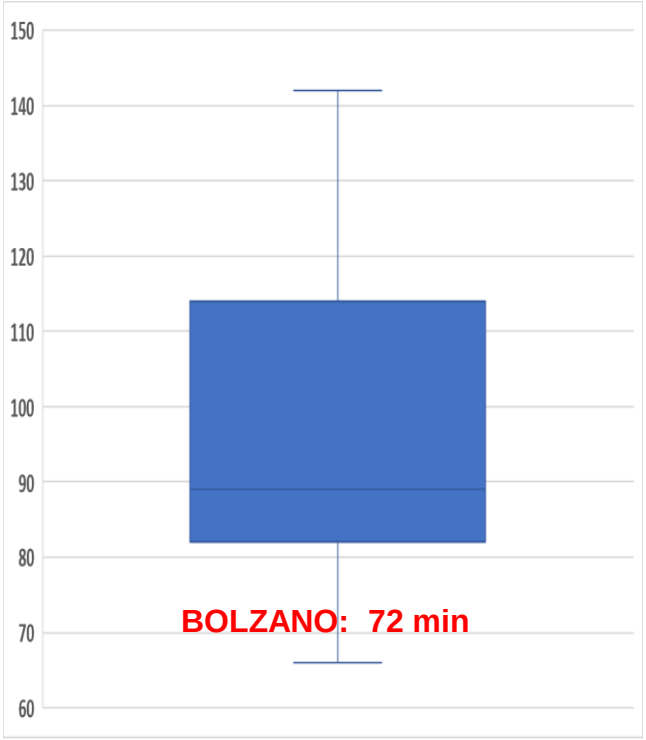
Triage Level 3 (Urgent)



Triage Level 4 (Less Urgent)



Triage Level 5 (Non Urgent)

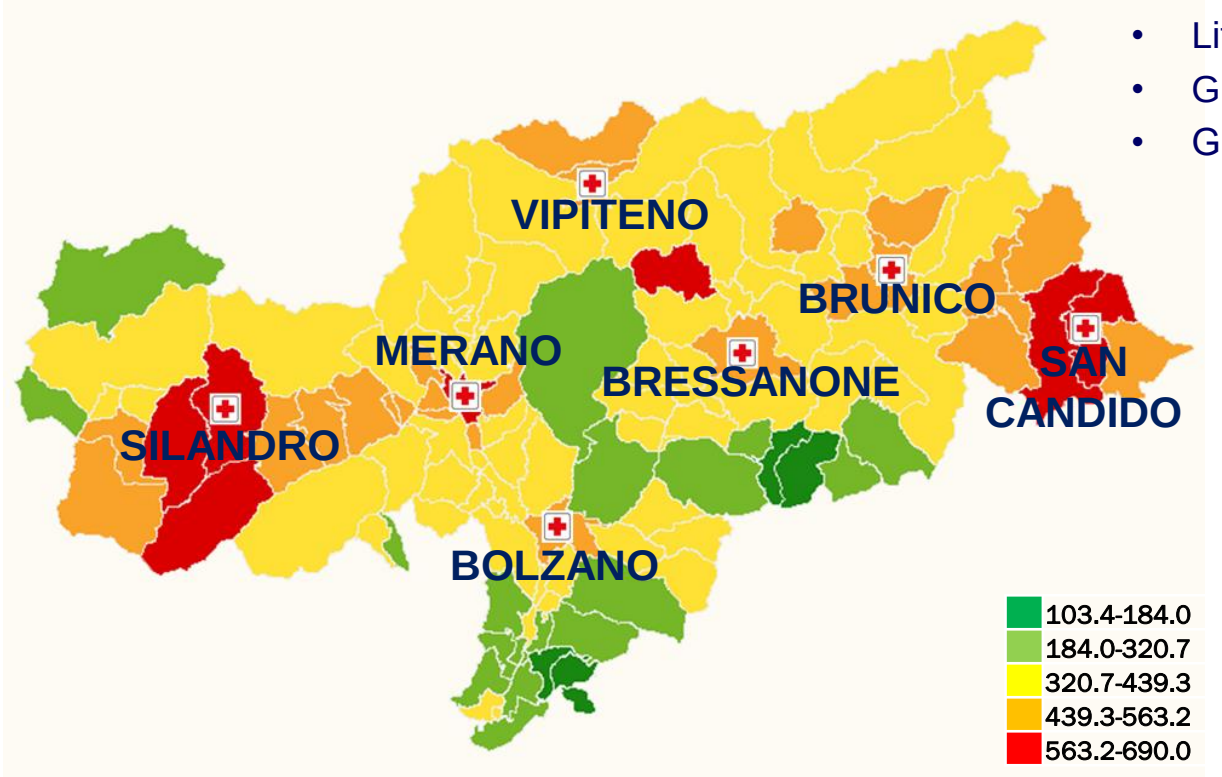


Source: The Italian National Agency for Regional Healthcare Services (AGENAS) – Data 2022

Emergency Departments in figures (2023)

- Population: 534,147
- Area: 7,398 km^2
- Mean age: 43.5 yrs. (vs 46.4 Italy)
- Life expectancy: 84.2 yrs. (vs 83.1 Italy)
- GPs per 1,000: 0.53 (vs 0.69 Italy)
- GDP per capita: 54,507 € (vs 32,984 Italy)

ADMISSION RATES (x 1,000)



	2023
RATE	426.7
MIN	103.4
MAX	690.0
(High/Low)	6.7
SCV	6.9 (high)

ED Admissions …. high rates and high geographic variation!

- ***Overcrowding***

  excessive number of patients waiting to be examined and treated

  vs

  the physical capacity or to the available personnel of the emergency room[1]

- ***ED inappropriate admissions***
  - *delays in treating seriously ill patients*
  - *increase of the costs due to unnecessary investigations*

- ***Health policy***

  To analyze the unwarranted variation

  To reduce ED potentially ***inappropriate admissions***

[1] Maninchedda, M., Proia, A. S., Bianco, L., Aromatario, M., Orsi, G. B., & Napoli, C. (2023). Main Features and Control Strategies to Reduce Overcrowding in Emergency Departments: A Systematic Review of the Literature. Risk Management and Healthcare Policy, 16, 255–266. https://doi.org/10.2147/RMHP.S399045

EDs Inappropriate Admissions: Objectives/Methods/Data

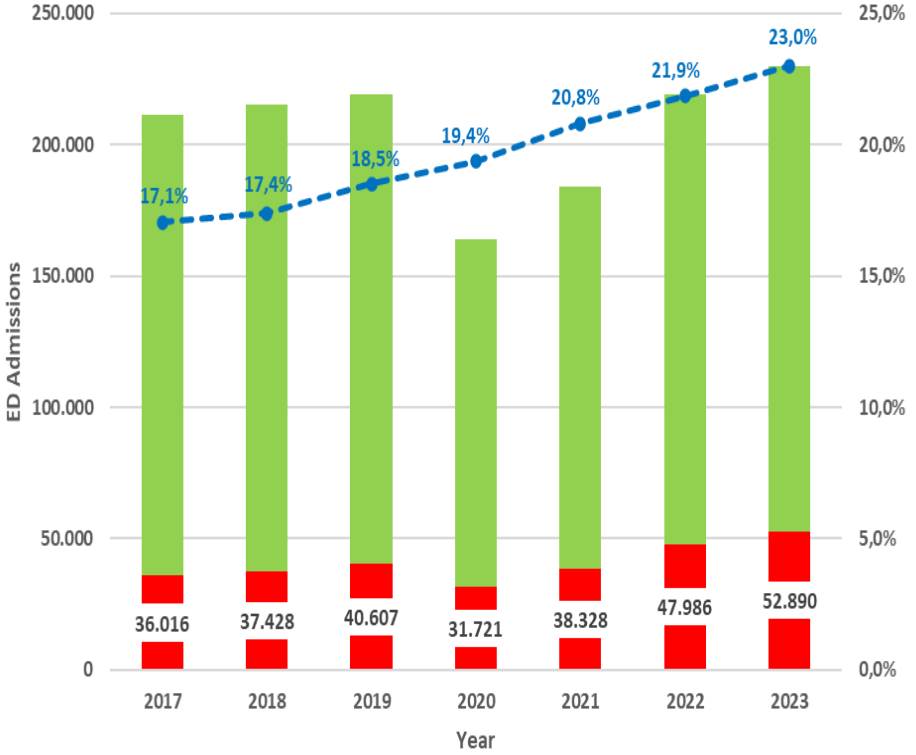
- ✓ To **analyse** and **compare variations** among the 116 municipalities

- ✓ To identify the **determinants of unwarranted variation**
  - geography (distance from the ED)
  - health care resources (GPs, specialists, …)

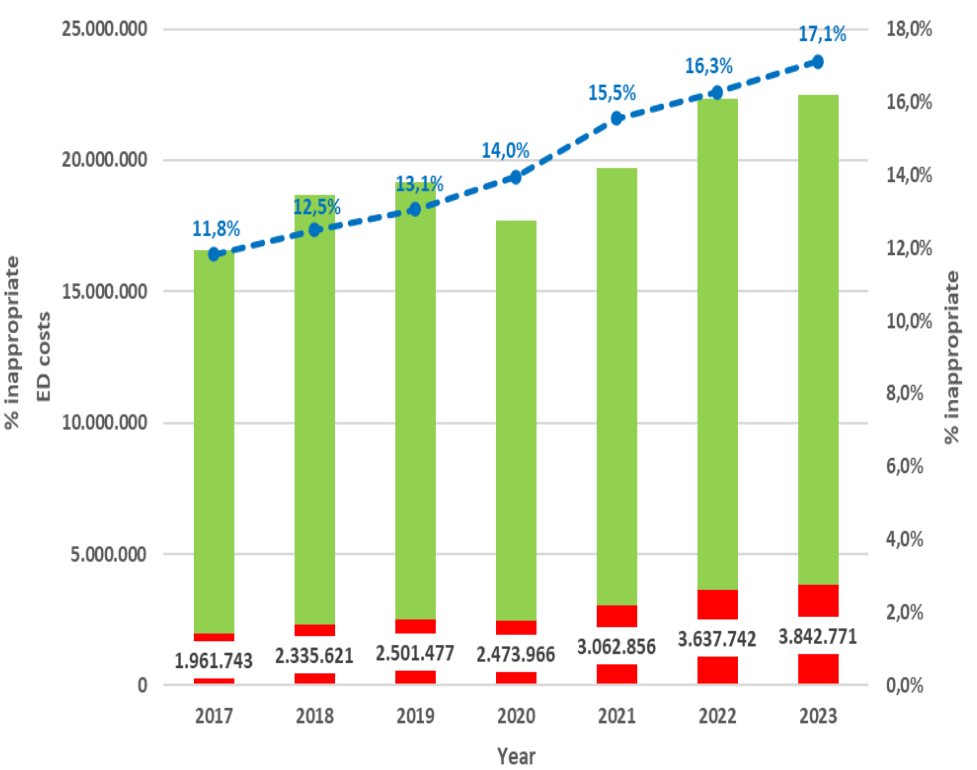
Selection Criteria:

- ✓ ED Admissions (2019-2023) by resident patients
- ✓ **Inappropriate admissions** are defined as
  - Triage: Level 4 (less urgent)/Level 5 (non urgent)
  - No Diagnosis of Trauma
  - Arrival Time from 8 a.m to 8 p.m. (week-end and Public Holidays excluded)
  - by Private Transport
  - Discharge Home

EDs Inappropriate Admissions (%)



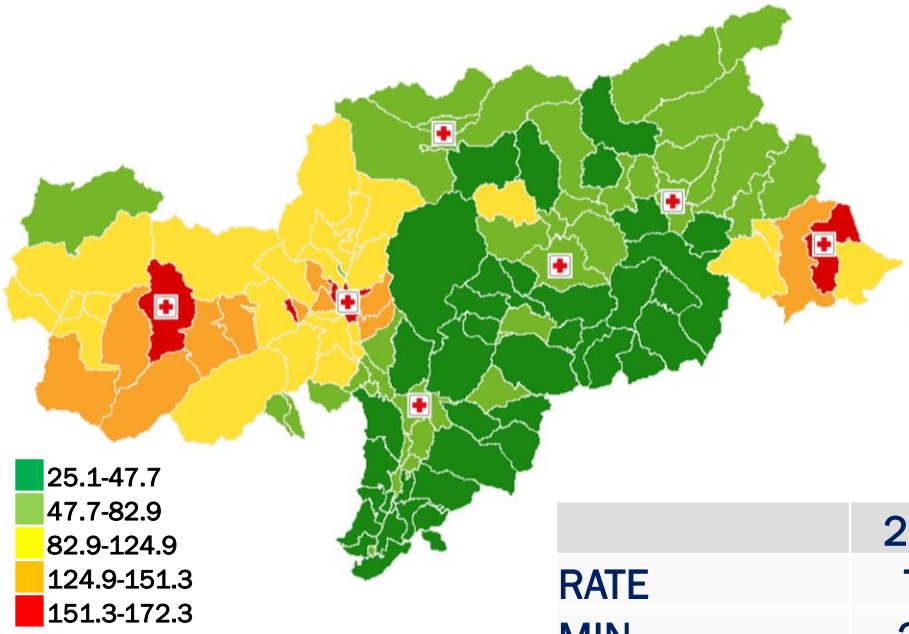
Costs (tariffs) of EDs Inappropriate Visits (%)



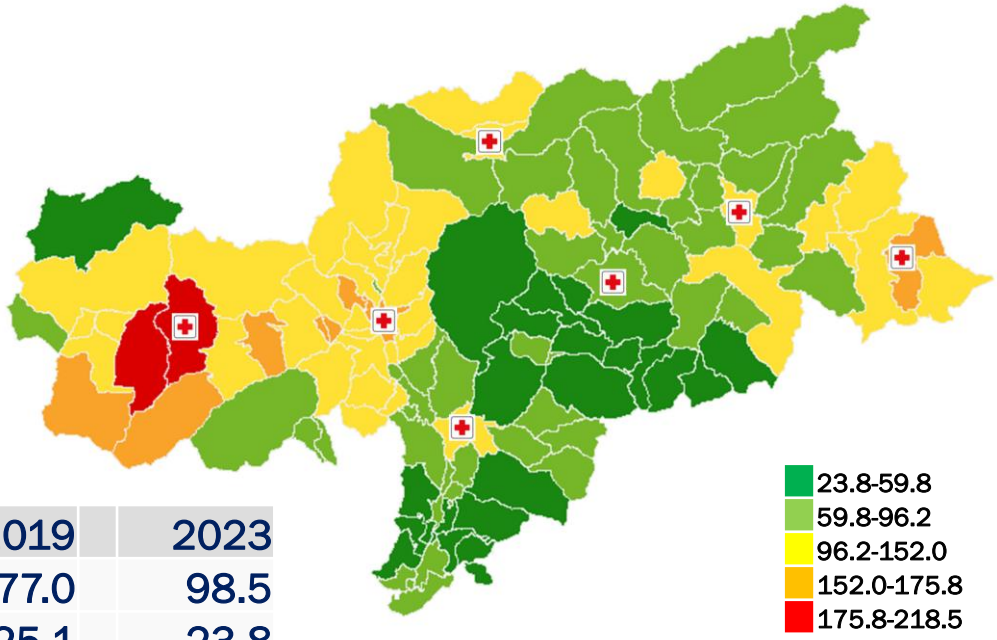
INAPPROPRIATE APPROPRIATE INAPPROPRIATE (%)

ED Inappropriate Admission Rates

2019

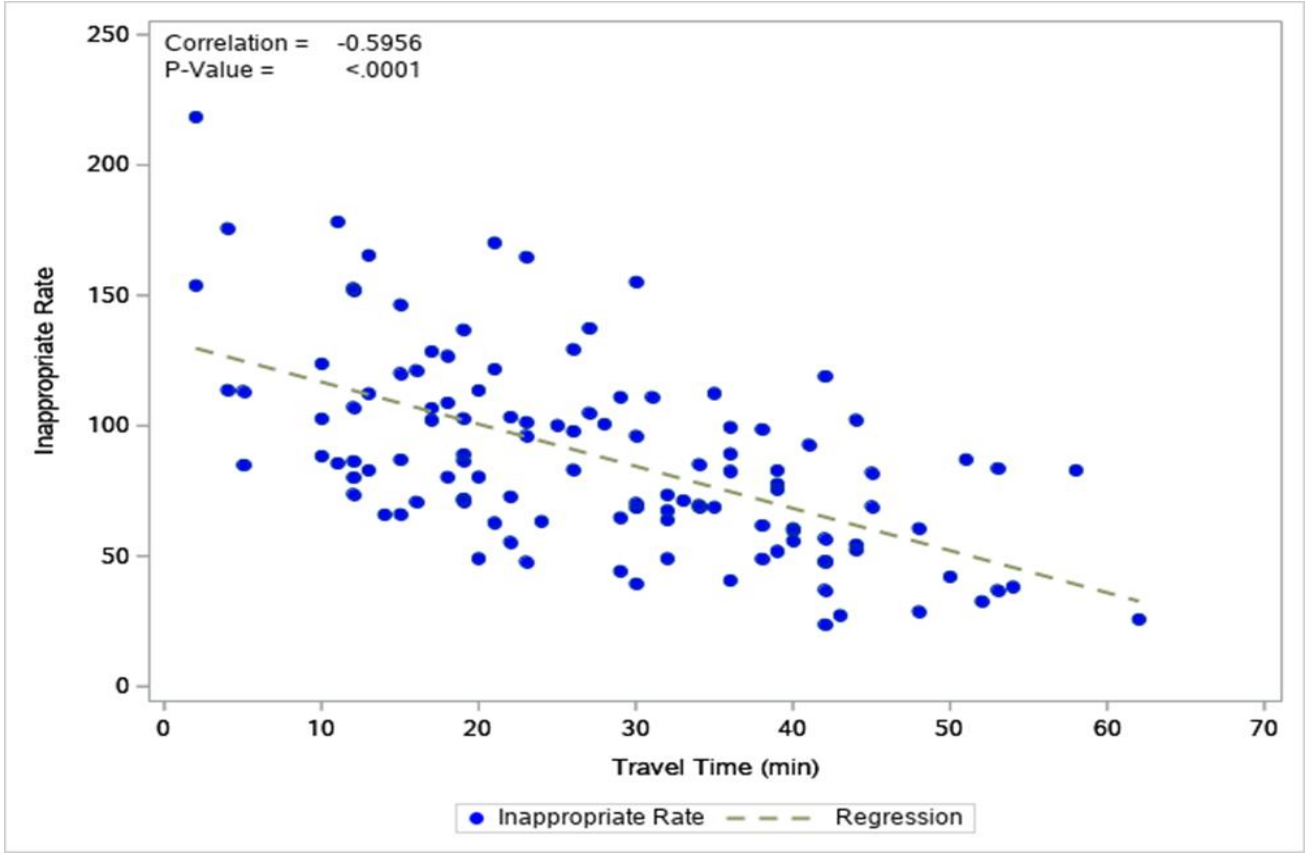


2023

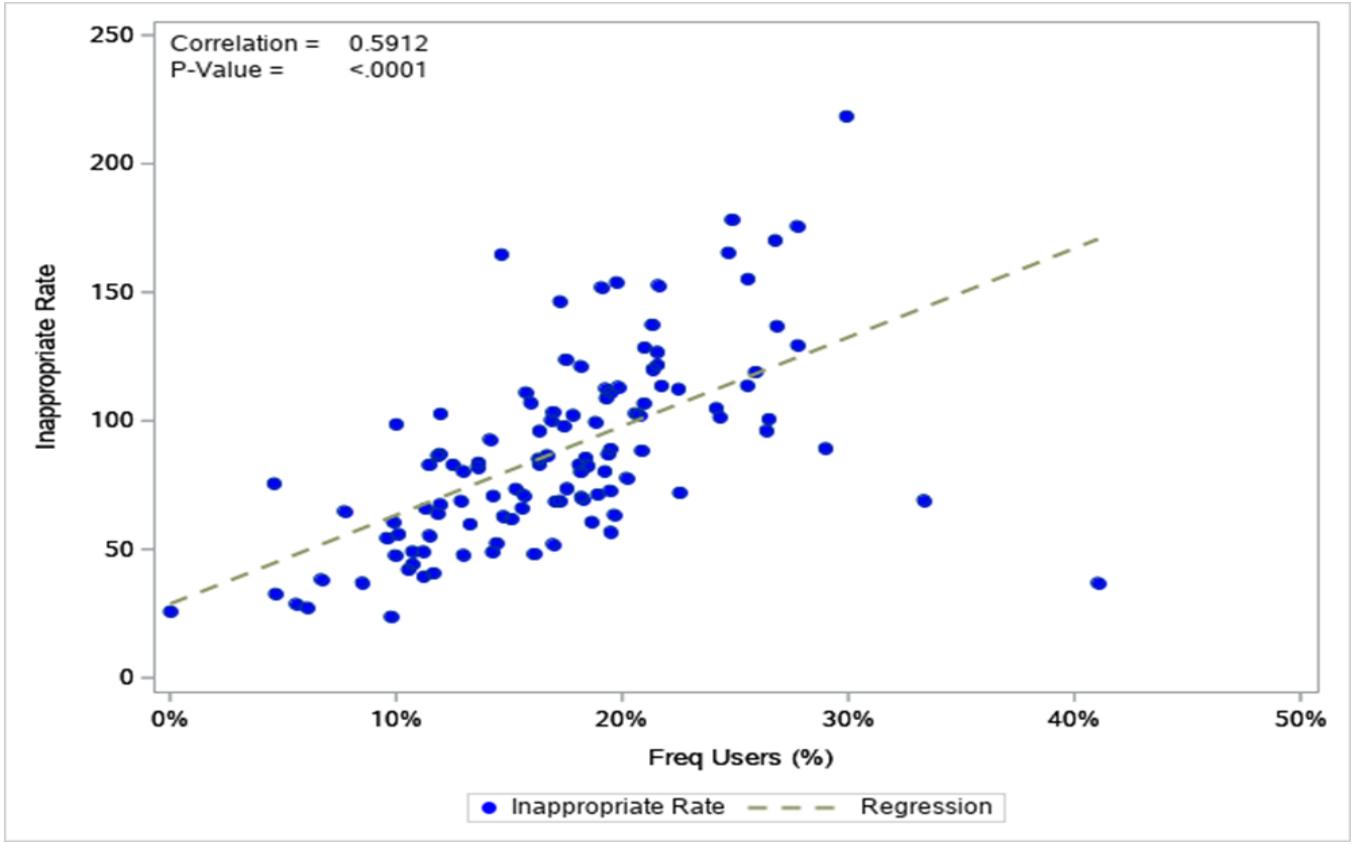


	2019	2023
RATE	77.0	98.5
MIN	25.1	23.8
MAX	172.3	218.5
(High/Low)	6.9	9.2
SCV	> 10	> 10

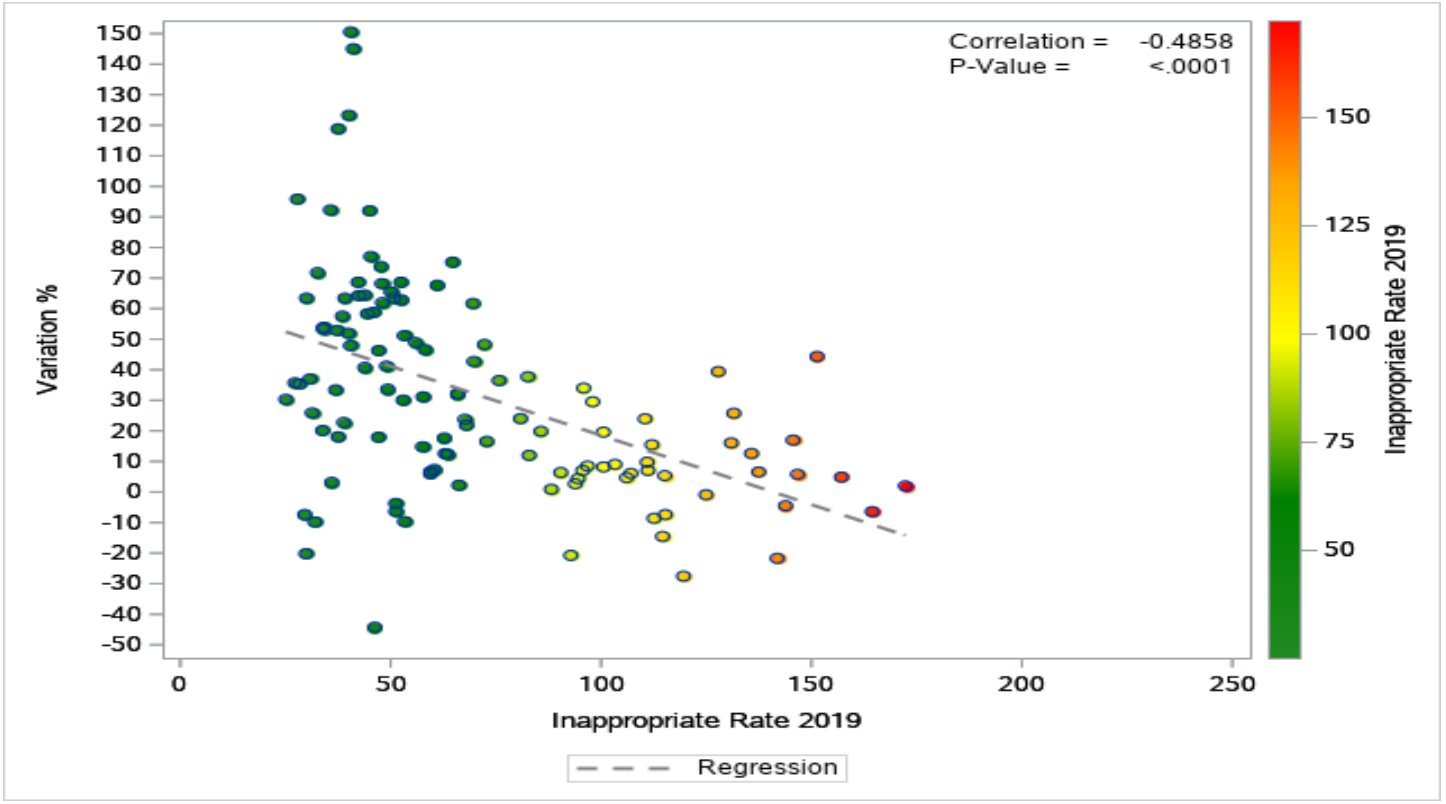
EDs Inappropriate Admissions: Determinants of variation (1)



EDs Inappropriate Admissions: Determinants of variation (2)



EDs Inappropriate Admissions: Overall geographic variation (2023/2019)



- ***Regression model (2023)***
  - ✓ *Given the existence of excess zeros in the distribution of inappropriate admissions we tested the following three different models (Deb, Norton, Annu. Rev. Public Health, 2018):*
    - *Zero Inflated Poisson Model (ZIP)*
    - *Zero Inflated Binomial Model (ZIBN)*
    - *Hurdle count data Model (HM)*
  - ✓ *We also tested for municipalities (n=116) fixed effects (FE) vs random effects (RE).*
  - ✓ *Model performance was compared using the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC)*

- ***Regression model (2023)***

  ✓ *Explanatory variables:*

  - ***Age***
  - ***Gender***
  - ***Travel distance to the hospital (minutes)***
  - ***Frequent User*** *(1 = yes; 0 = no)*

VARIABLES	INAPPROPRIATE ADMISSIONS	APPROPRIATE ADMISSIONS	p
N, %	42,563 (29.9)	99,664 (70.1)	
Age (years) Median (range)	44.0 (0.0 – 102.0)	44.0 (0.0 – 106.0)	a
Females (n, %)	21,998 (51.7)	47,251 (47.4)	c*
Travel distance (min) Mean (sd)	20.4 (16.1)	22.0 (16.1)	b*
Frequent User (n, %)	5,500 (12.9)	3,048 (3.1)	c*

[a] Wilcoxon median test; [b] t-student test; [c] $\chi 2$ test; * statistical significance at the 5% level

- ***Regression model (estimates)***

Hurdle count data Model (HM)
+
Random Effects (RE)
was the best specification

		Coefficients[1]	
VARIABLES	CATEGORY	BINARY	NON ZERO
Age	-	-0.00134* (0.00002)	0.00003 (0.00031)
Sex	F	0.17405* (0.01193)	0.04934* (0.01602)
Travel Distance (min)	-	0.00034 (0.00056)	-0.00068* (0.00062)
Frequent User	Yes	1.50389* (0.02369)	1.33625* (0.01609)

Note:
[1] Shows the coefficients and standard errors
* Statistical significance at the 5% level

Conclusions (1)

- Higher ED admission rates (Overcrowding) → Higher Risk of inappropriate admissions
- ED Inappropriate Admission Rate is increasing along the years, as the geographic variation between the municipalities *(internal variability)*
- Closer the ED, higher the rates
  - Health system could be not able to respond to patients' demand equally
- **Role of Patients' preferences**
  - Availability of GPs or specialists/waiting times for a visits
  - Low ED LOS → due to specific lane (e.g. Fast Track, GPs working in ED)
  - Since 2020 no co-payment for ED admissions (except for a part for non urgent visits)

Conclusions (2)

- **Role of Health Care Managers and Policy makers**
  - Interventions for reducing the LOS in ED (e.g. to increase healthcare workers, Fast Track) might have an adverse effect of increasing ED Inappropriate Admissions
  - Availability and geographic Health Care Resources should be improved

Conclusions (3)

- **Limitations and next steps**
  - Based on health administrative data
  - To include chronic diseases
  - To include severity of diagnosis (e.g. Charlson's Index)
  - To include specific data related to municipalities
    - GPs per inhabitants
    - % of people over 65
    - Waiting times for an outpatient visit

For any questions

mirko.bonetti@provincia.bz.it