ICU performance over space: geographical differences in GiViTI data

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GiViTI Coordinating Center
IRCCS – Pharmacological Research Institute 'Mario Negri'
Villa Camozzi - Ranica (BG)

Pesaro – October 20, 2016

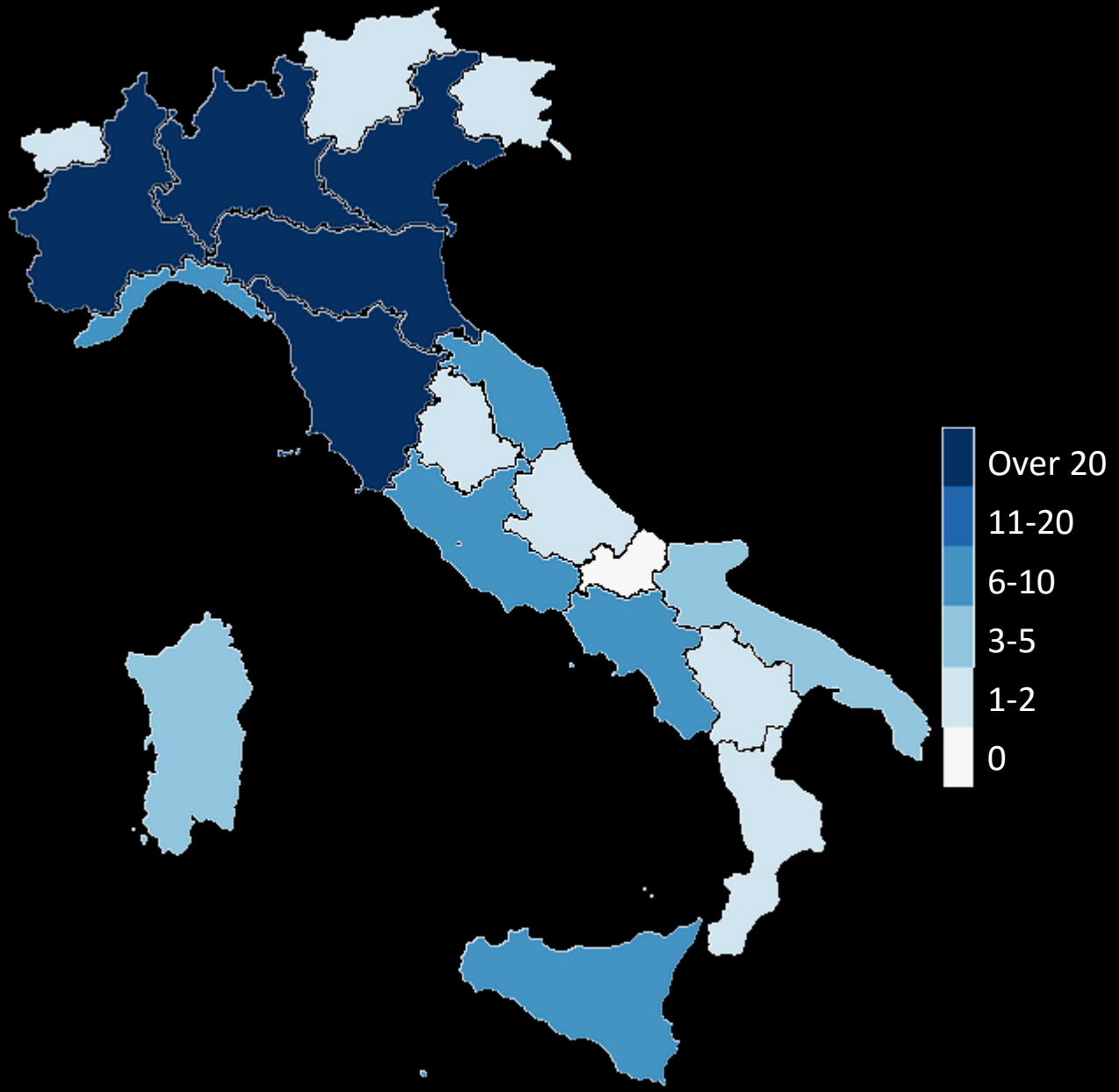
Introduction

NORTHERN ITALY

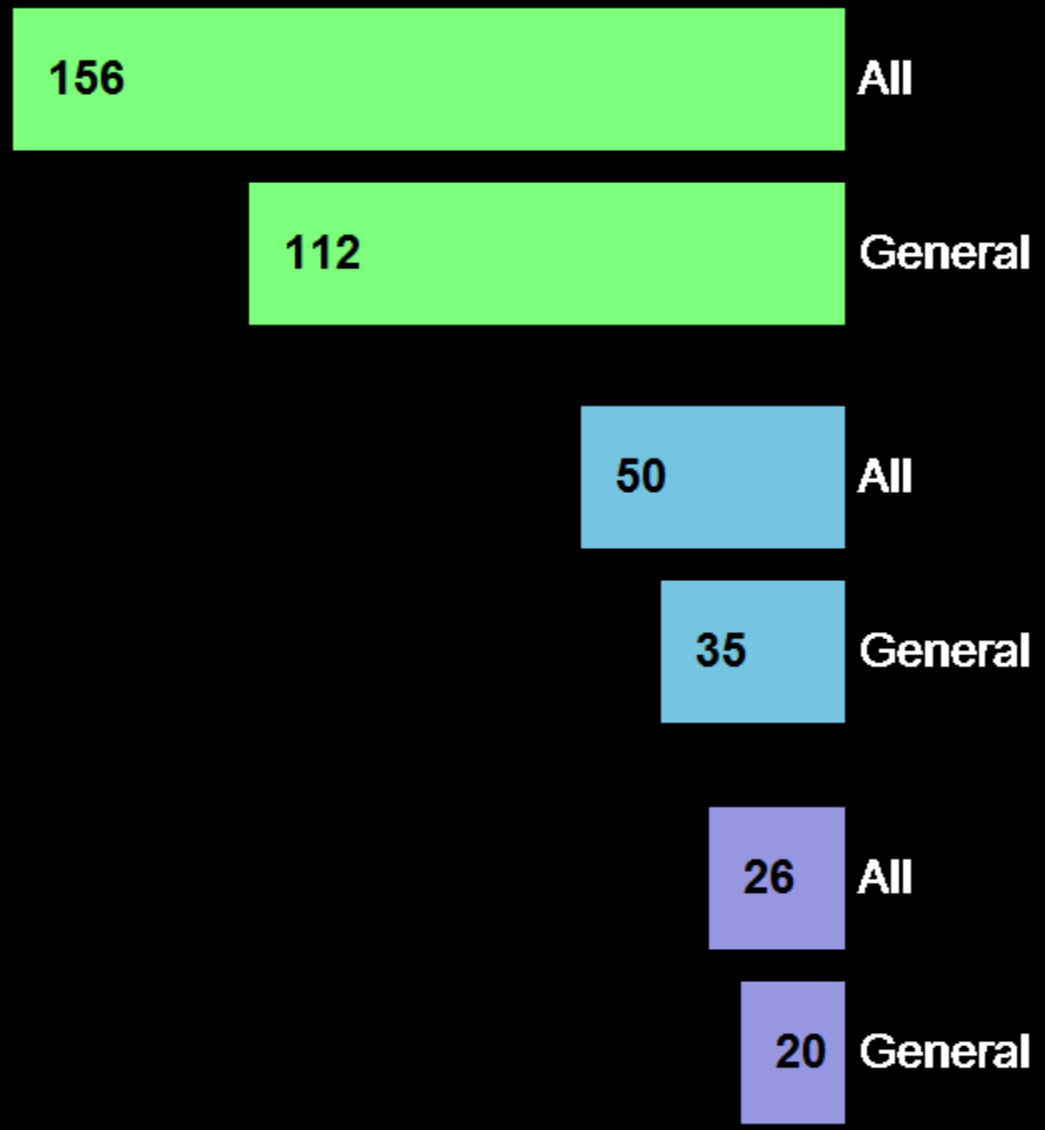
CENTRAL ITALY

SOUTHERN ITALY

Project Participation



Project Participation



Project Participation

37856 pts

112 General

10212 pts

35 General

4515 pts

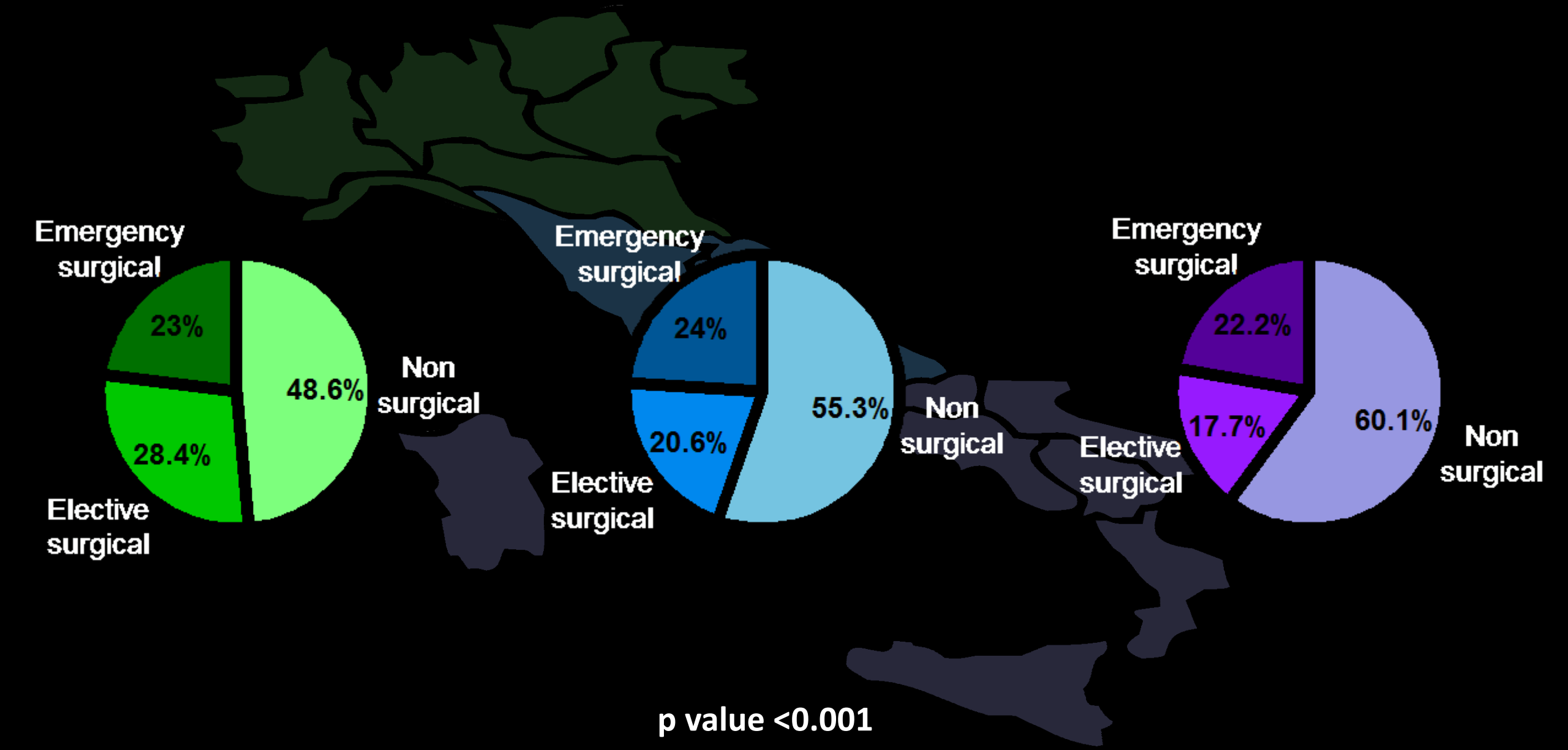
20 General

Case Mix

Mortality

ICU mortality
15.9%
19.7%
34.5%
N
C
S
p value <0.001
H mortality
23.4%
27.1%
41.2%
N
C
S
p value <0.001

Surgical Status



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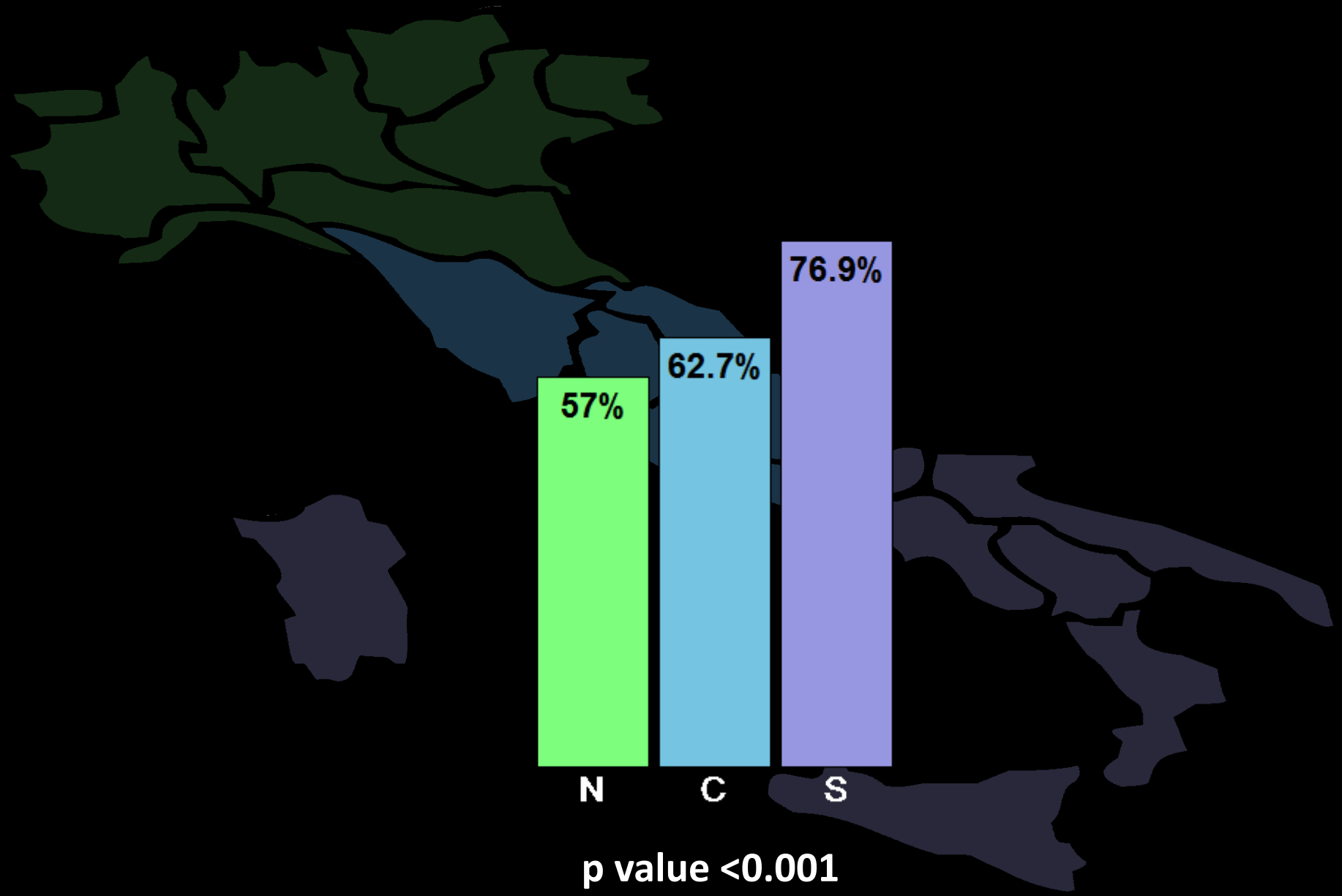
Reason for Admission: Intensive Treatment



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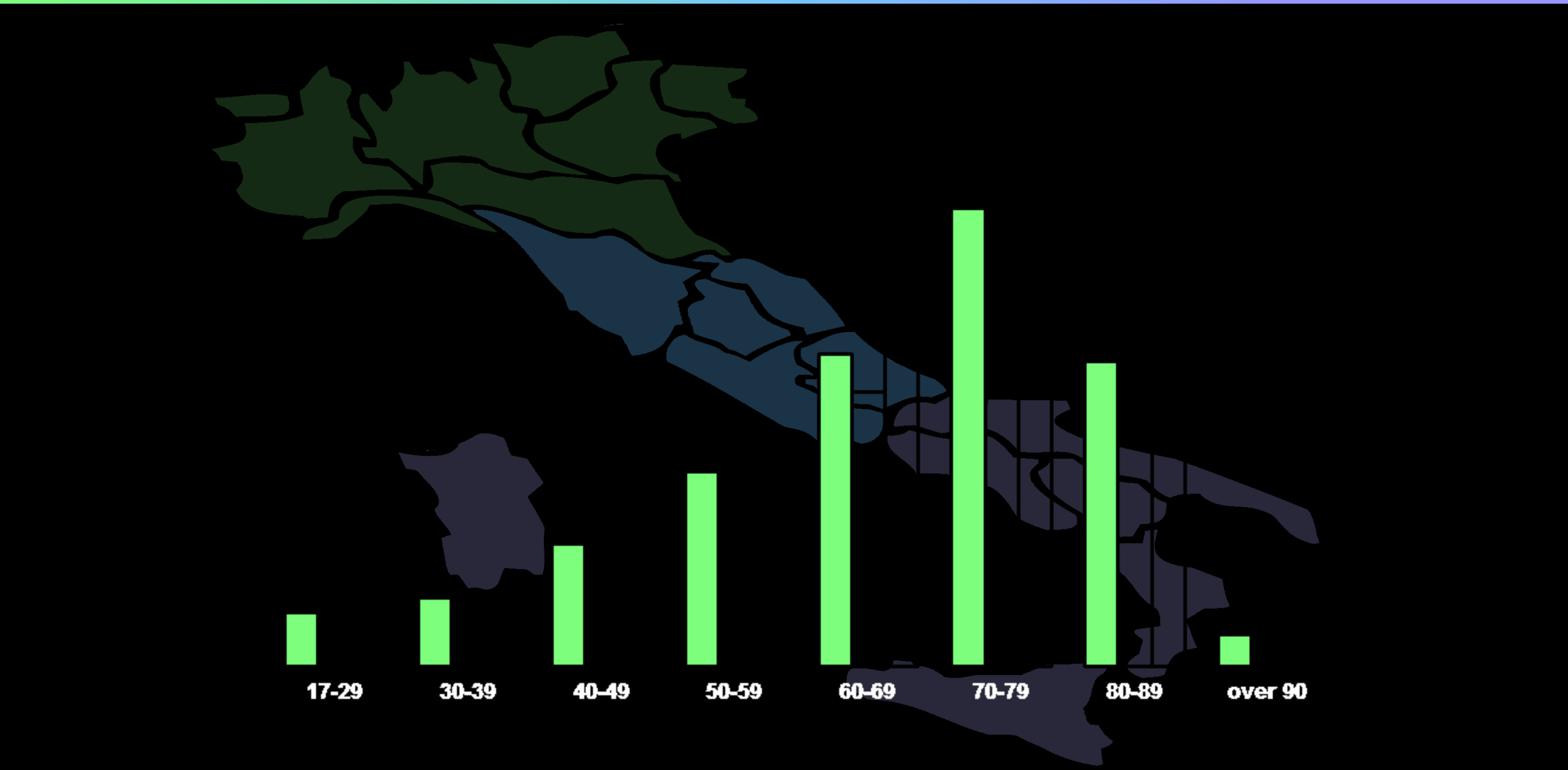

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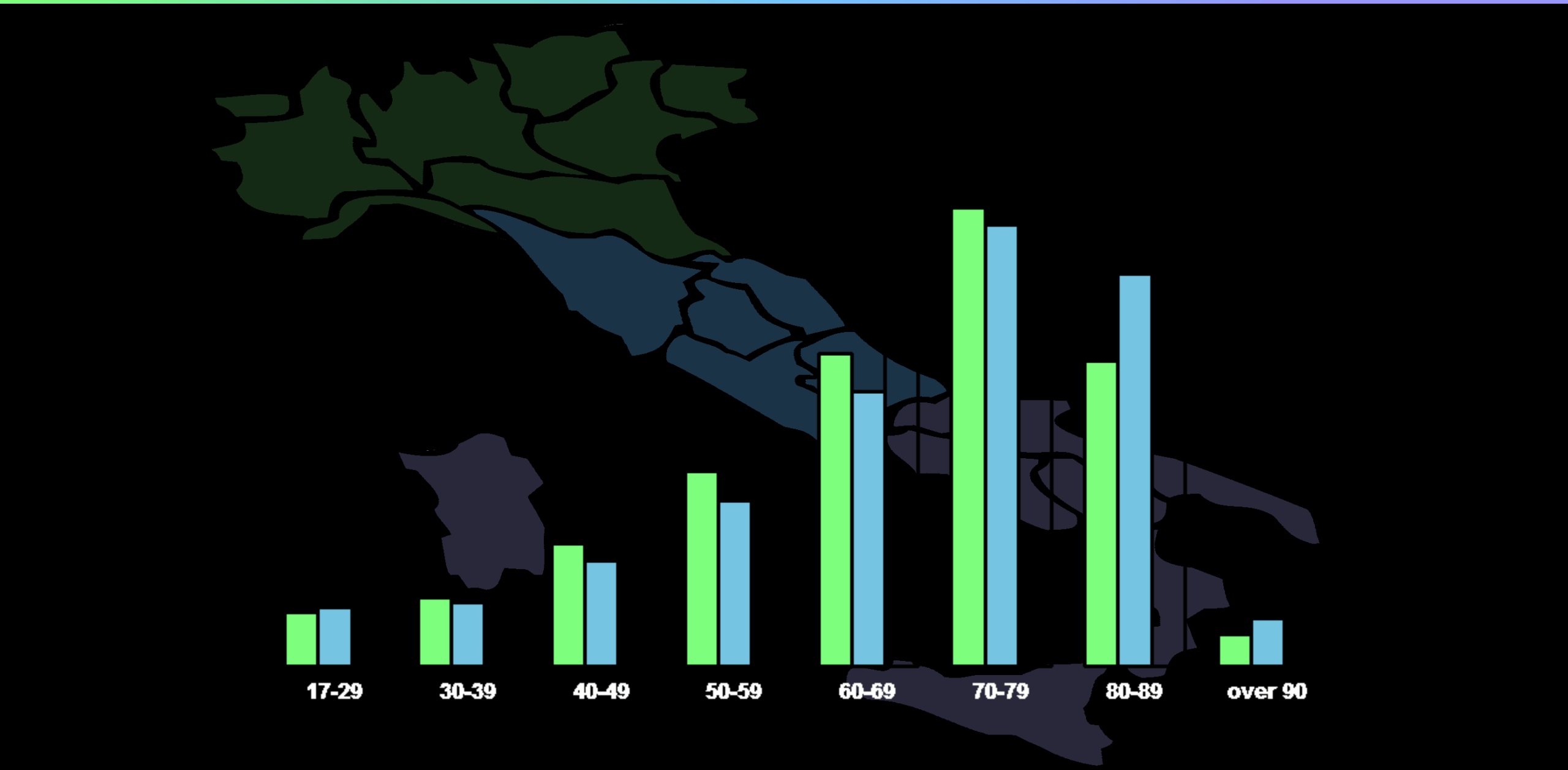

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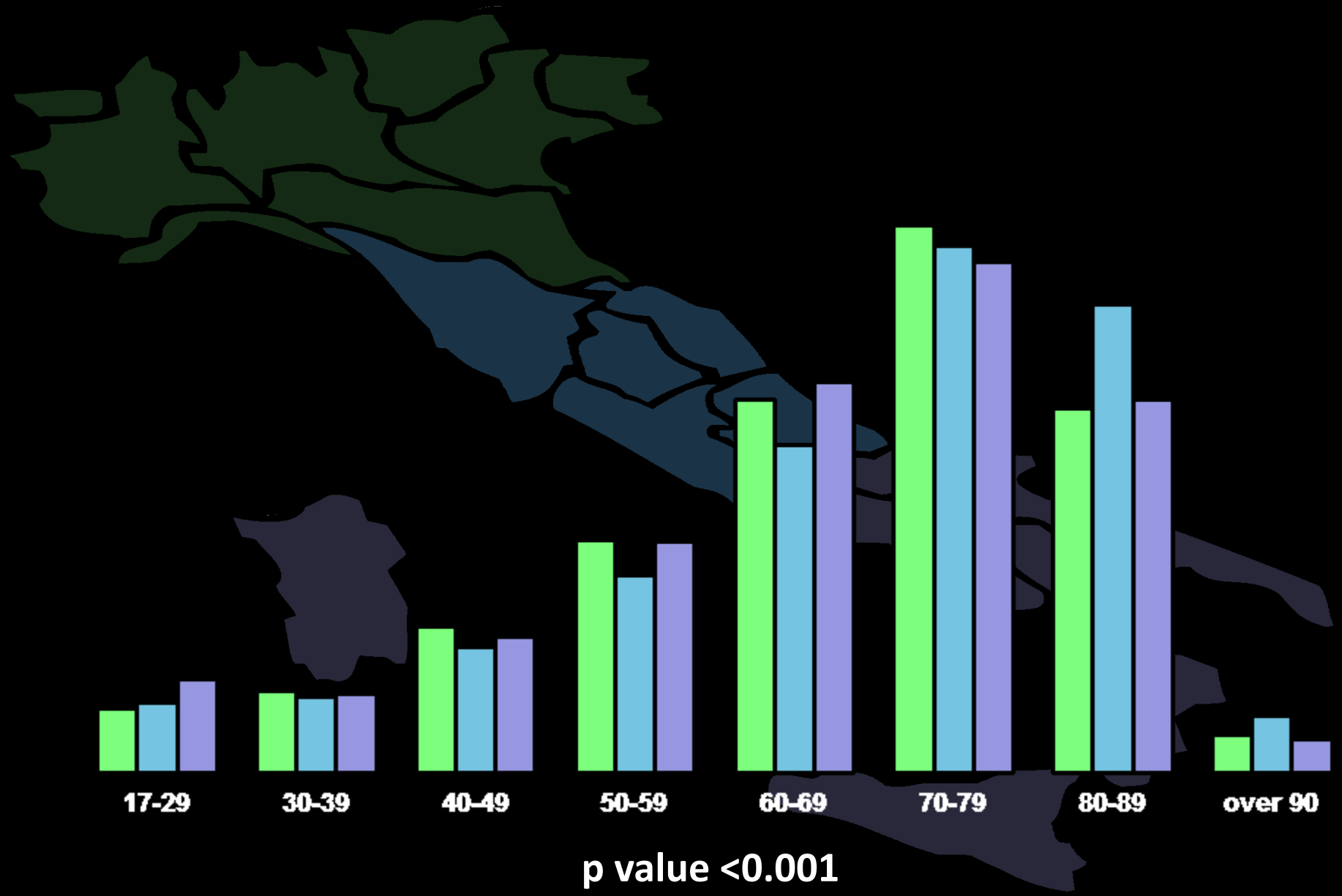

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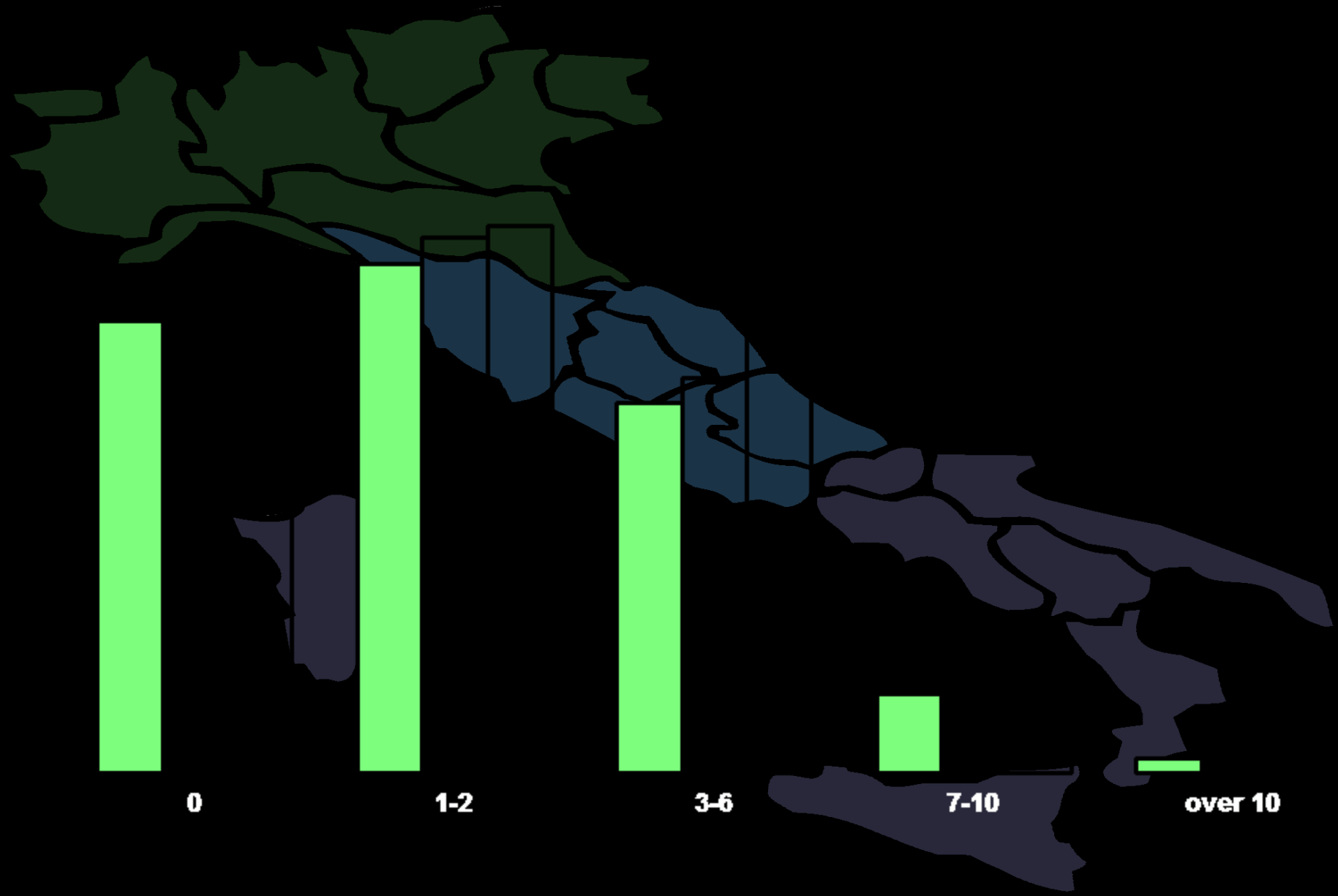
Comorbidities: Charlson Comorbidity Index



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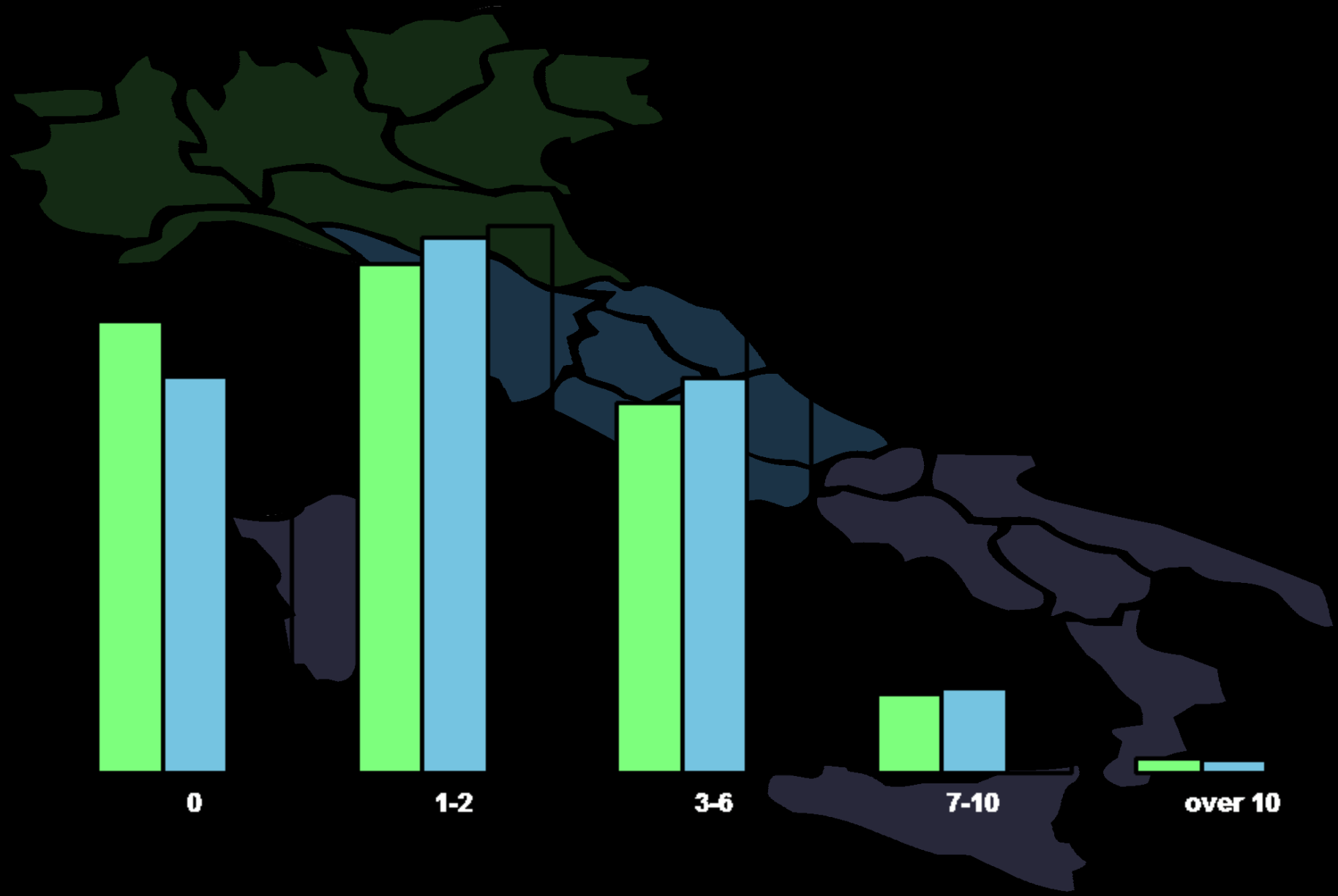

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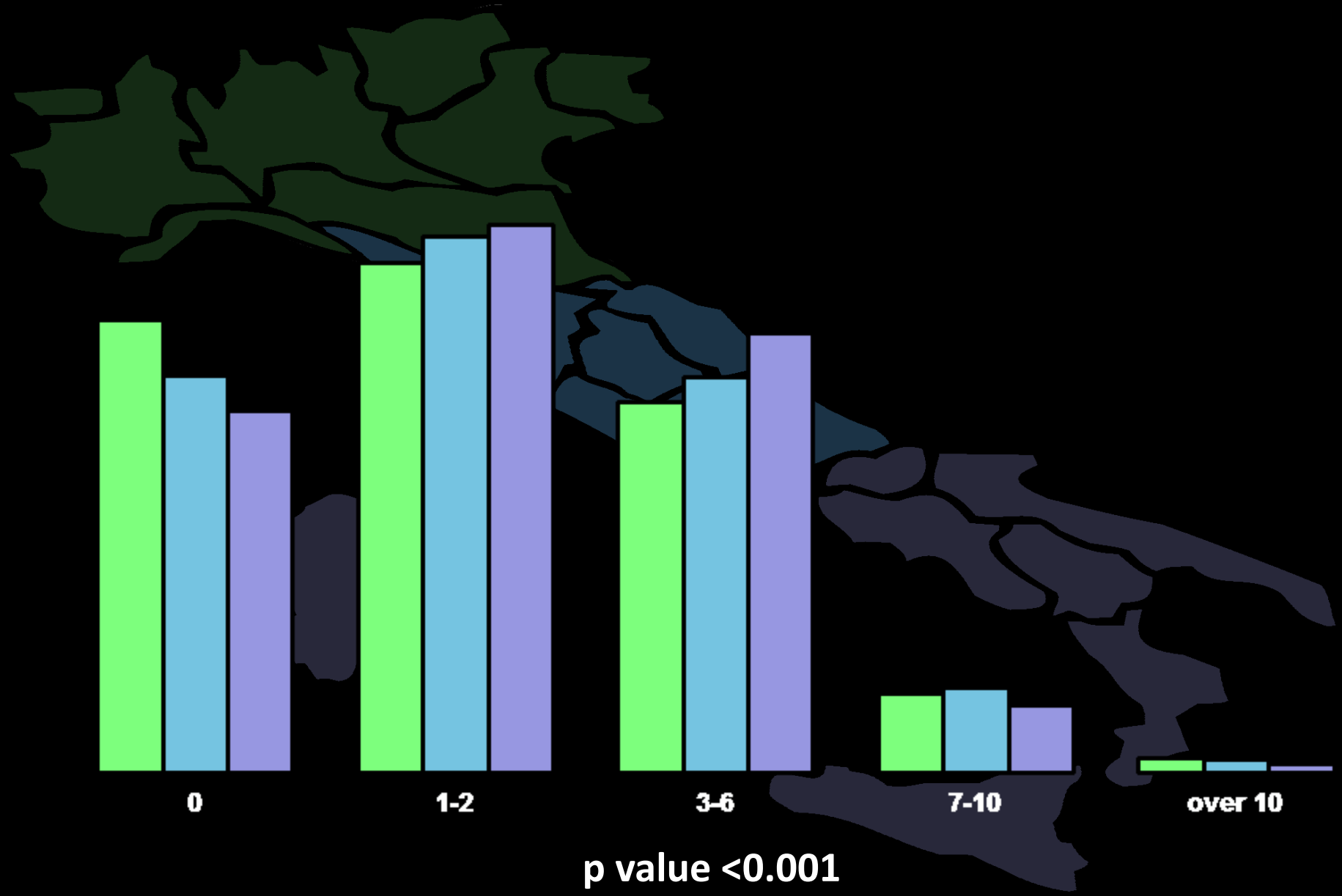

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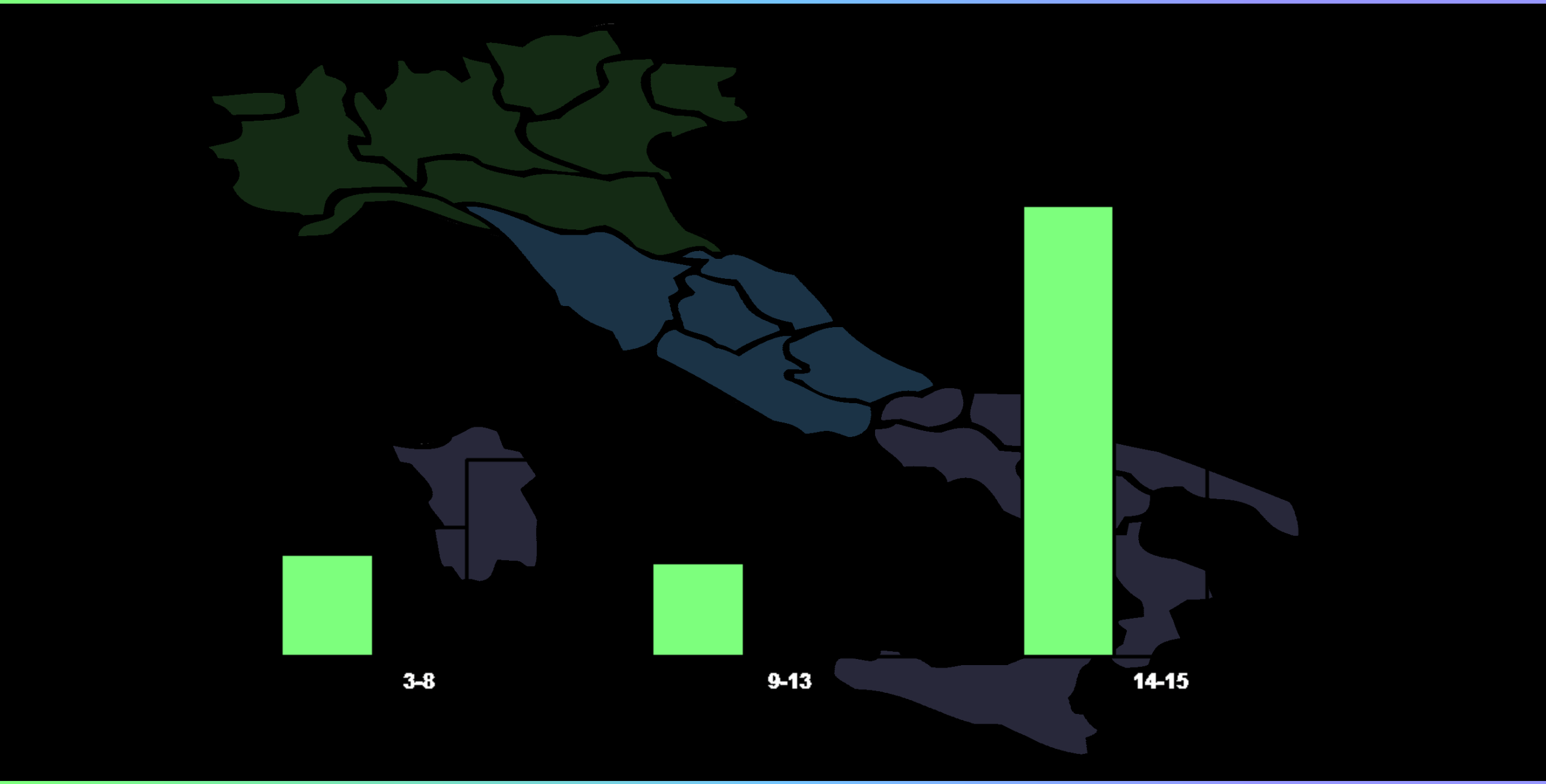
Glasgow Coma Scale



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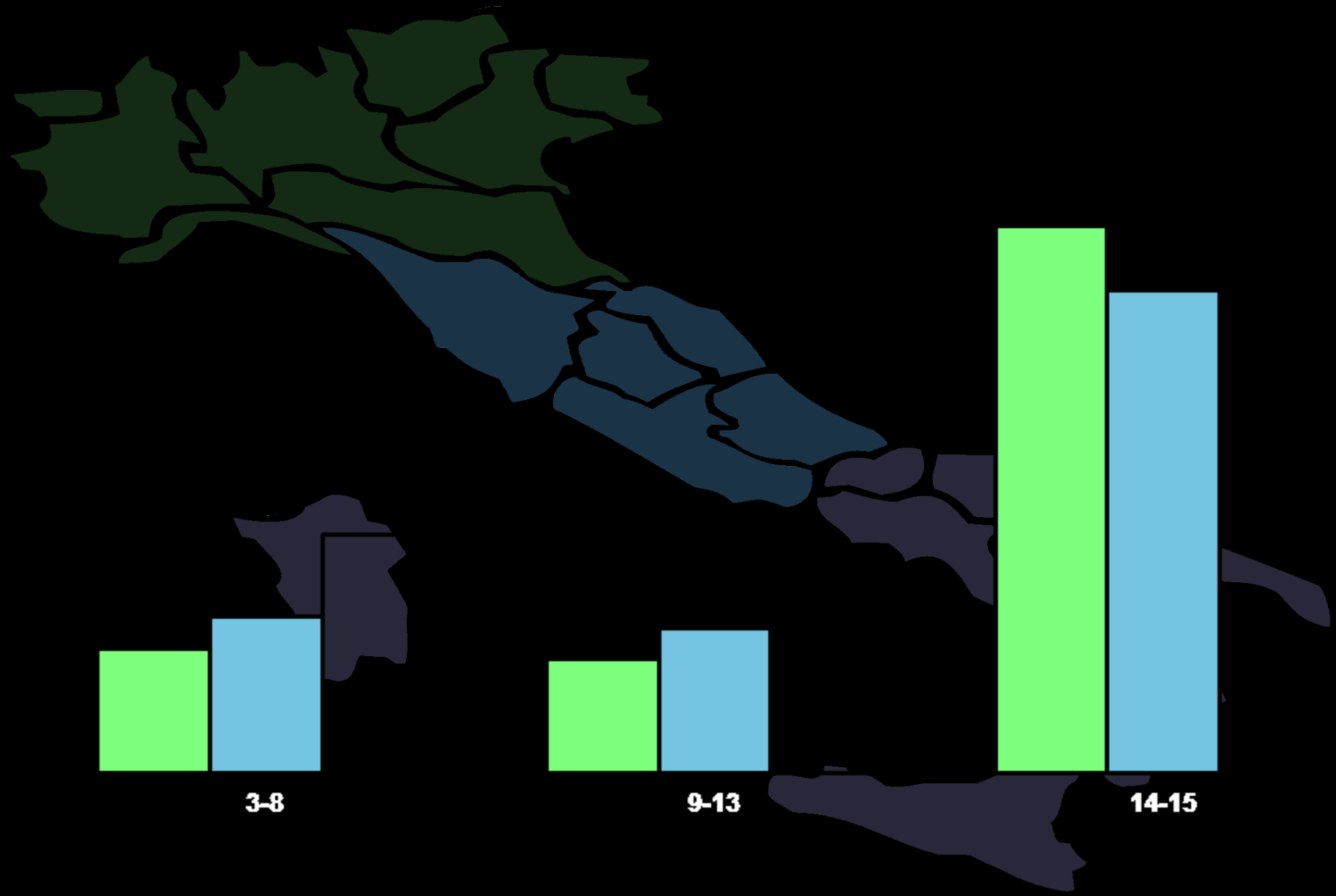

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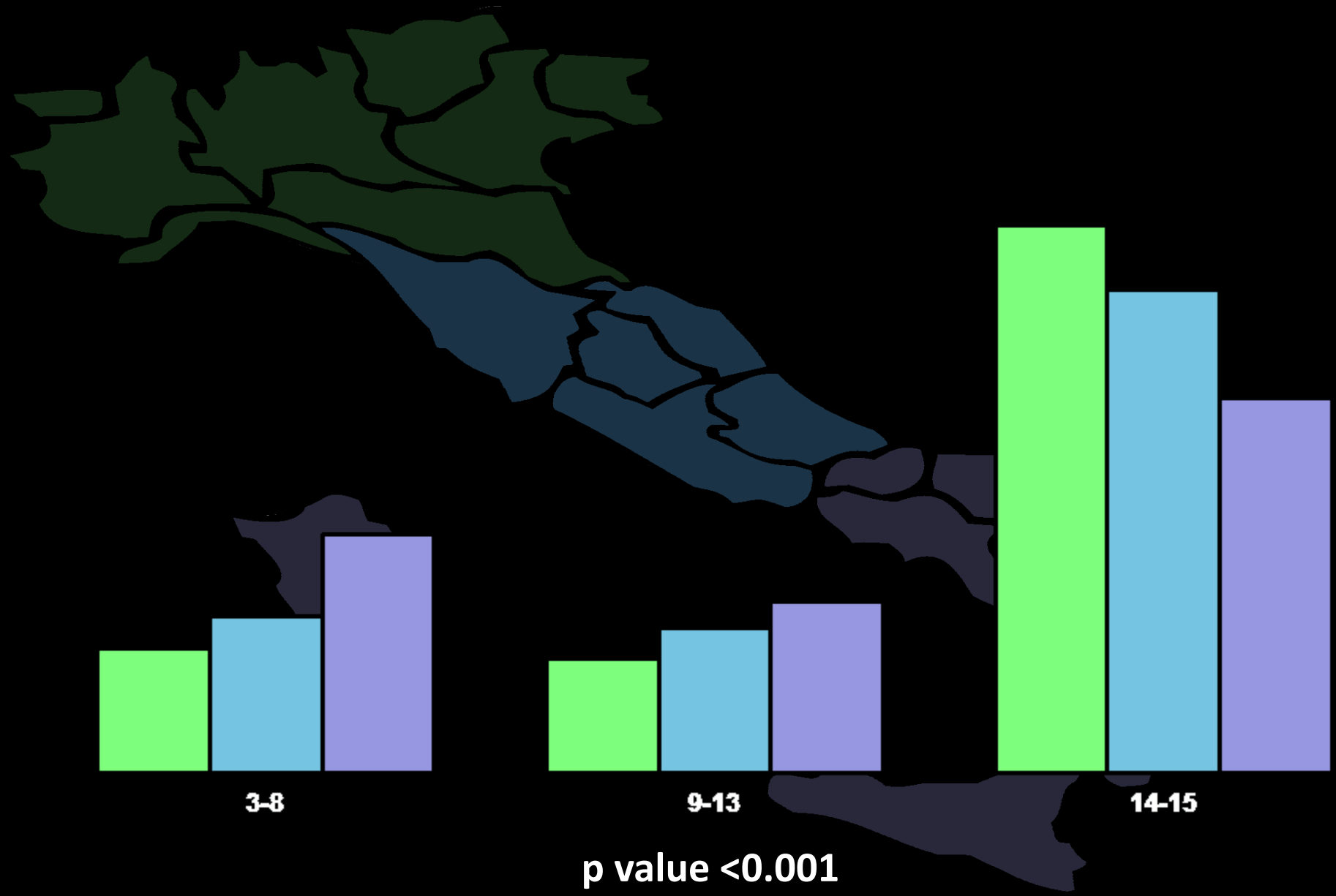

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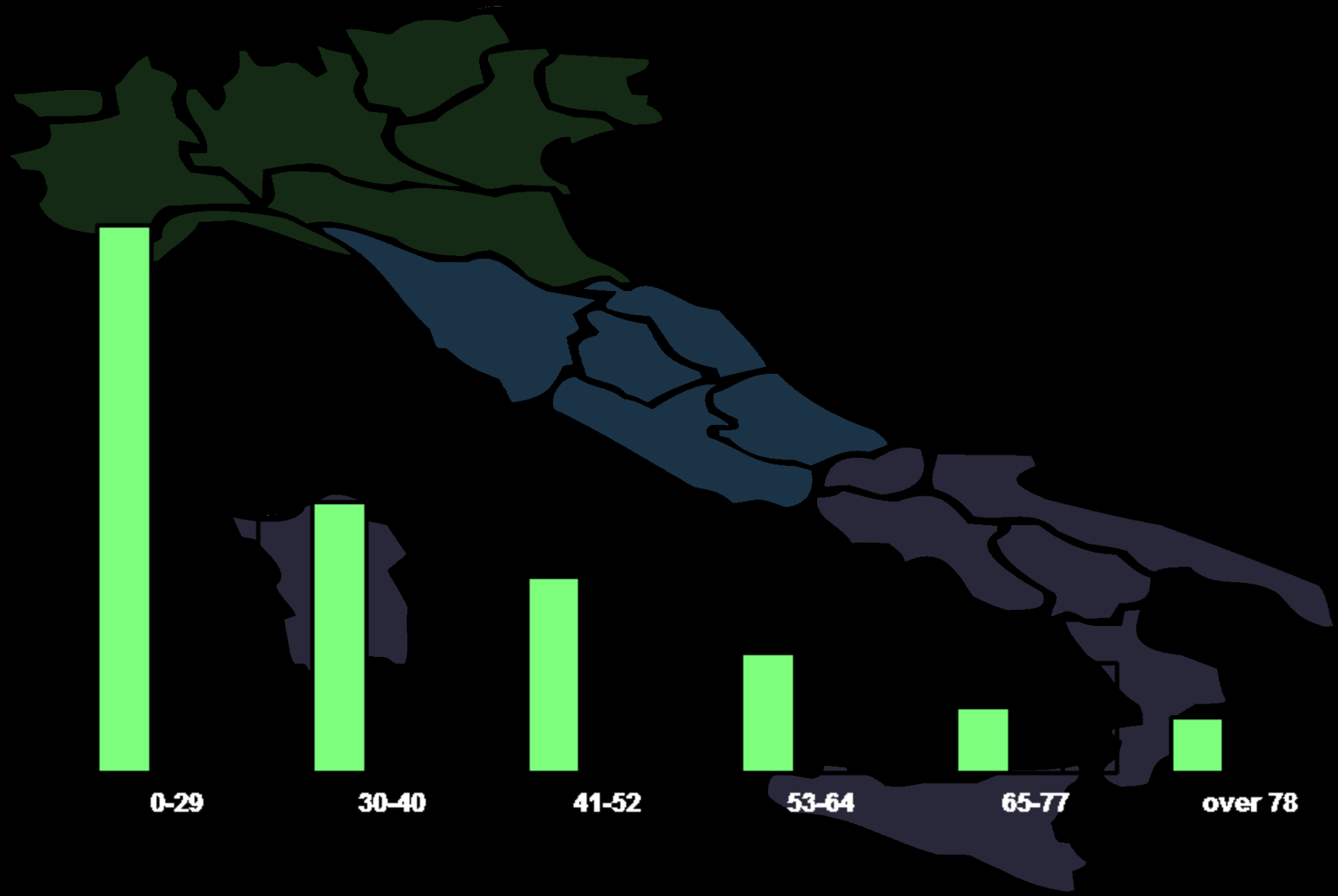

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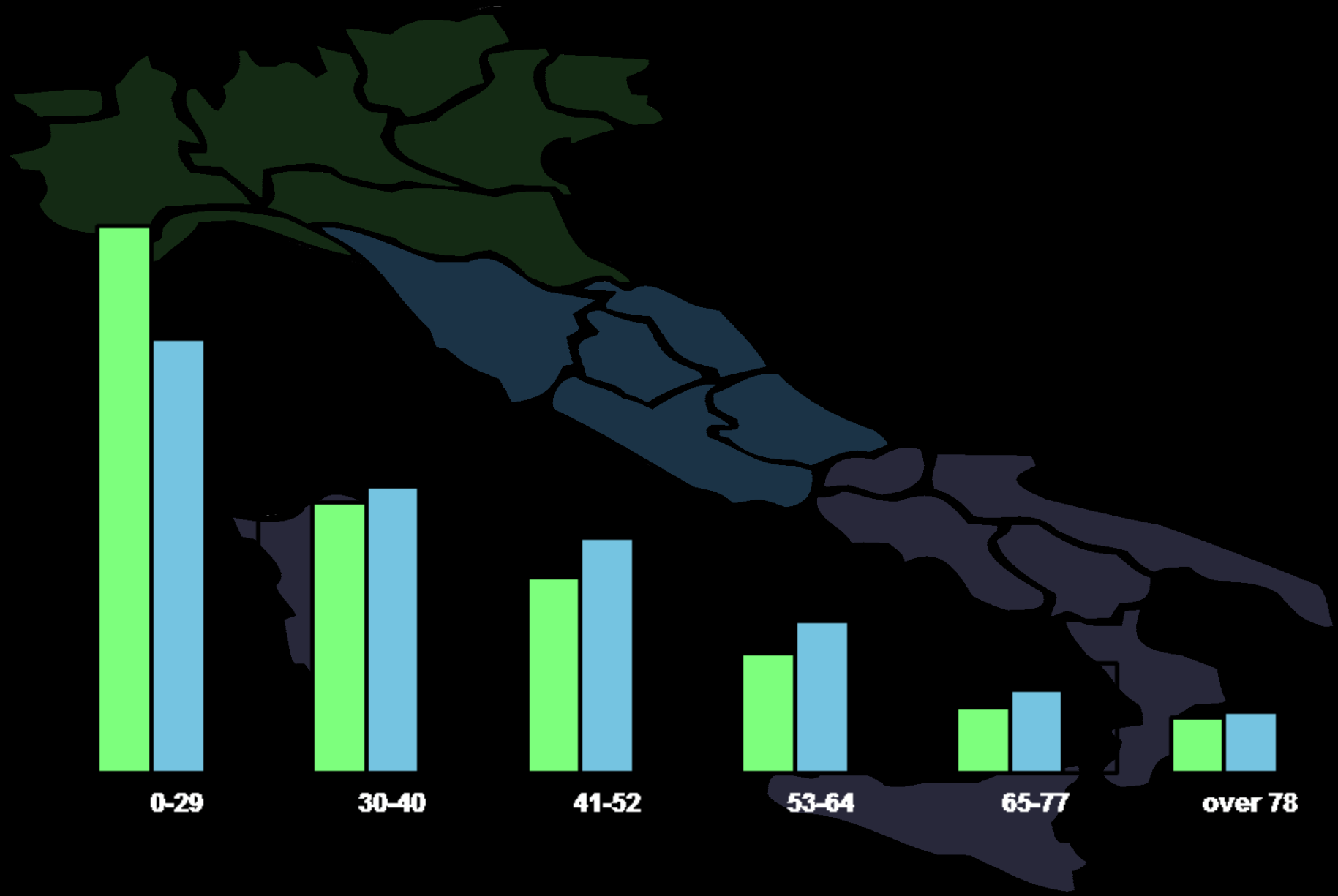

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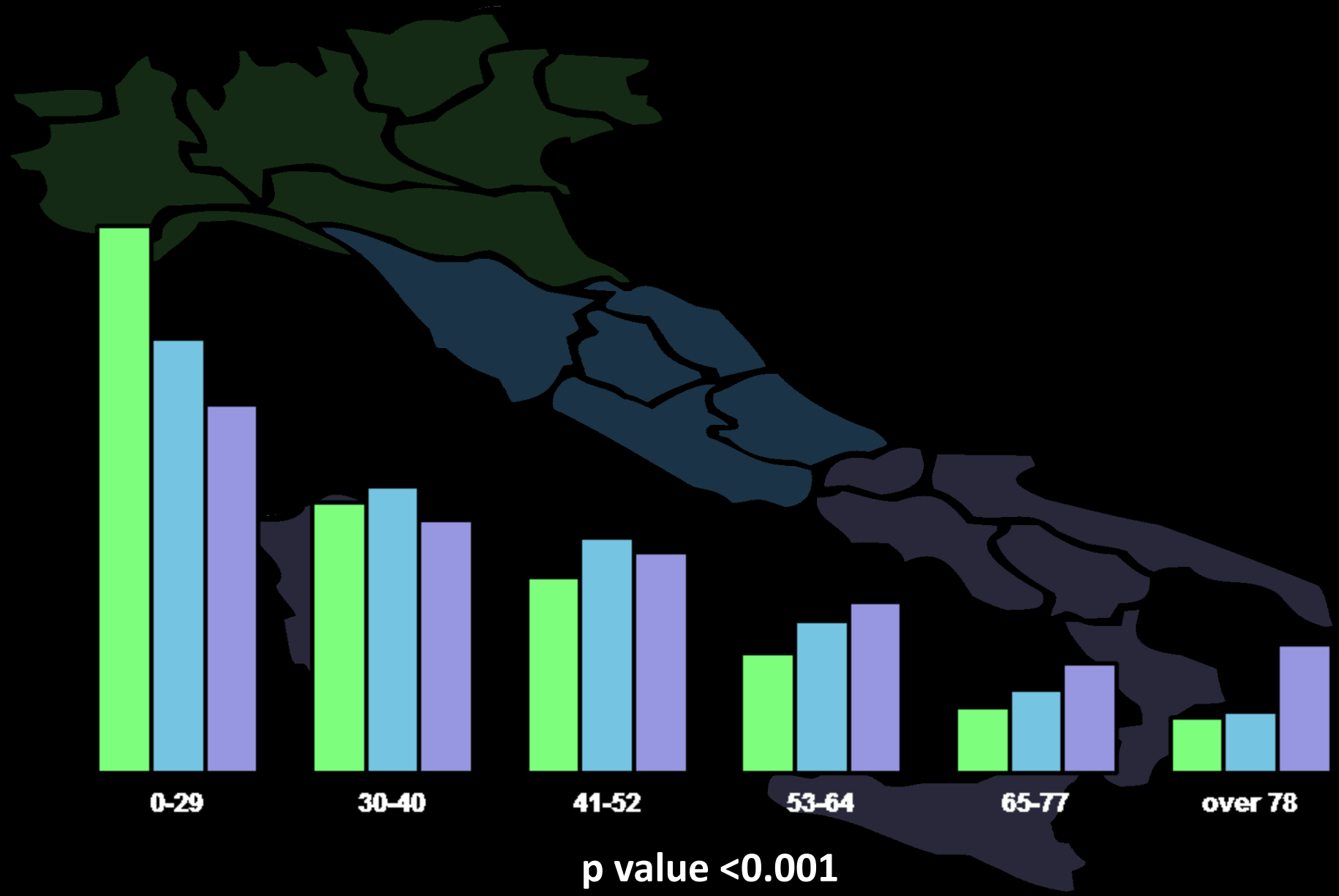

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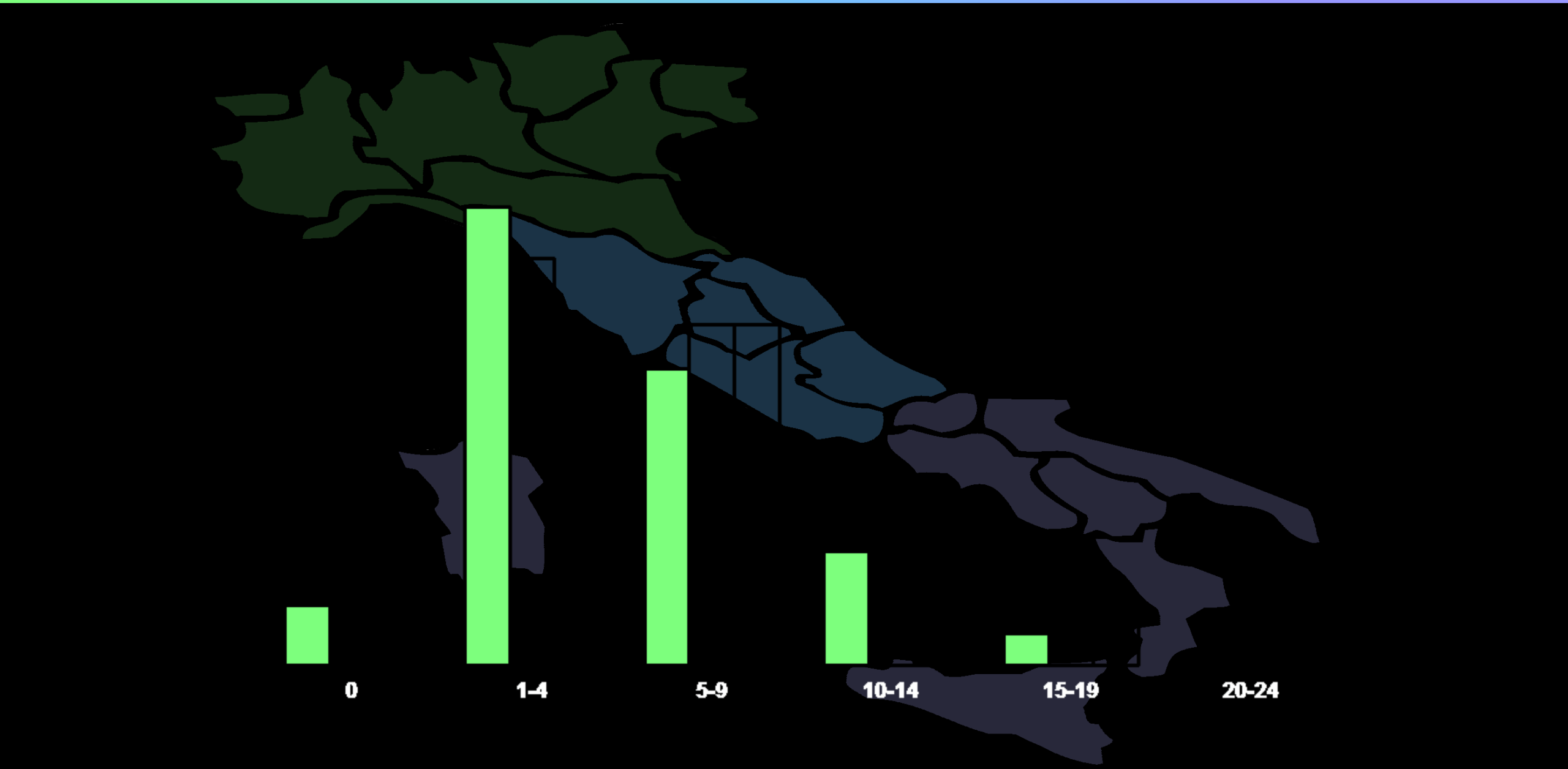

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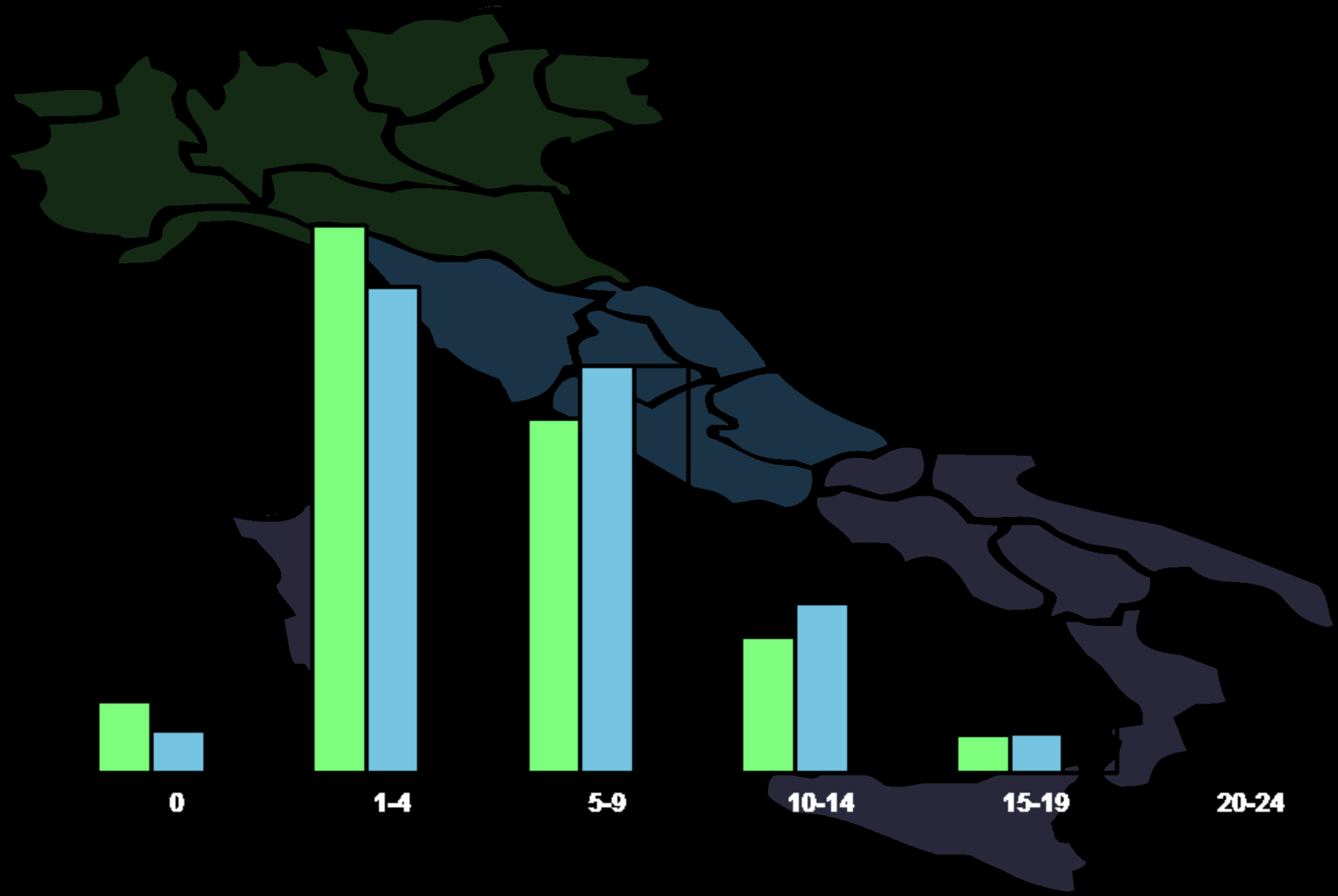

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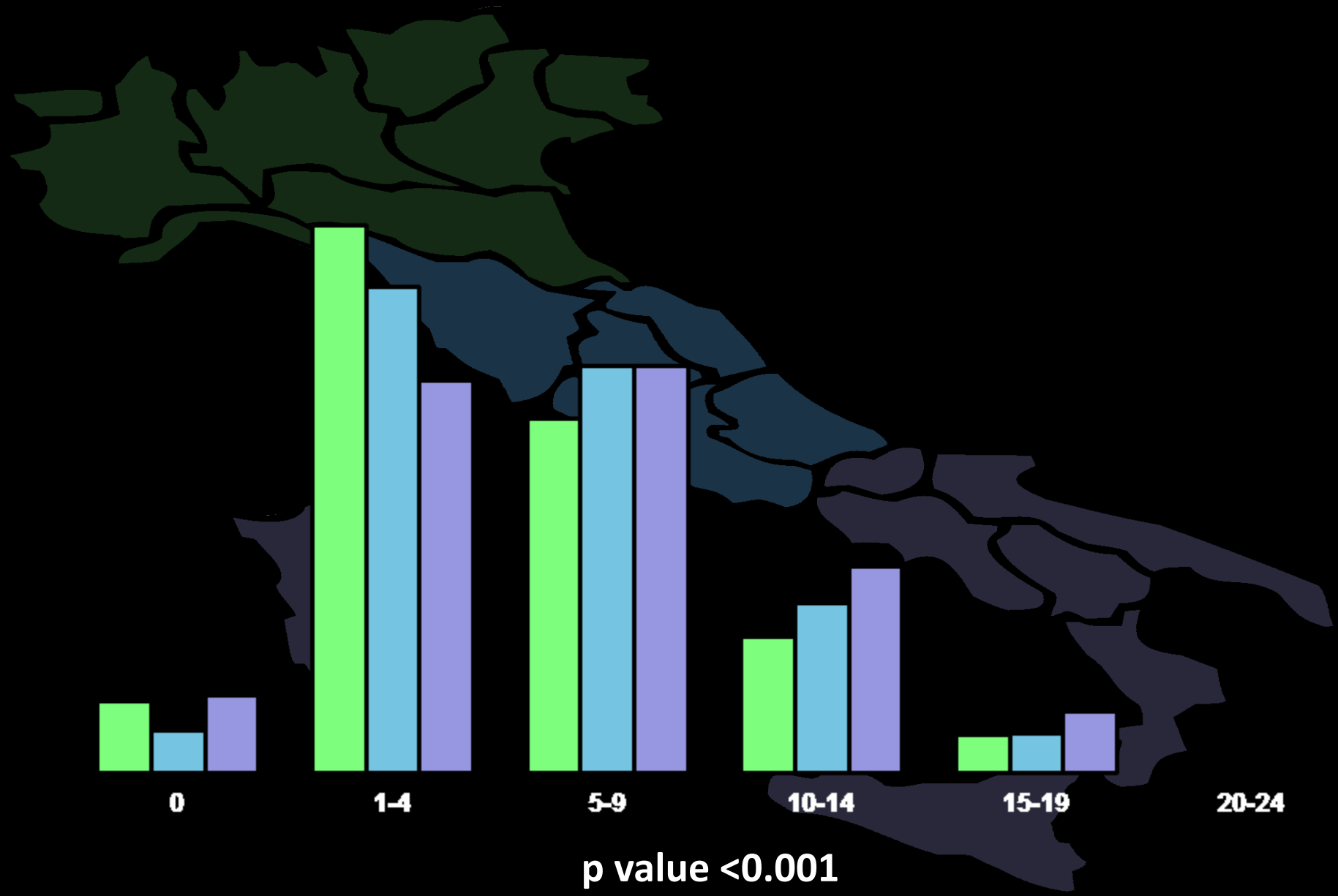

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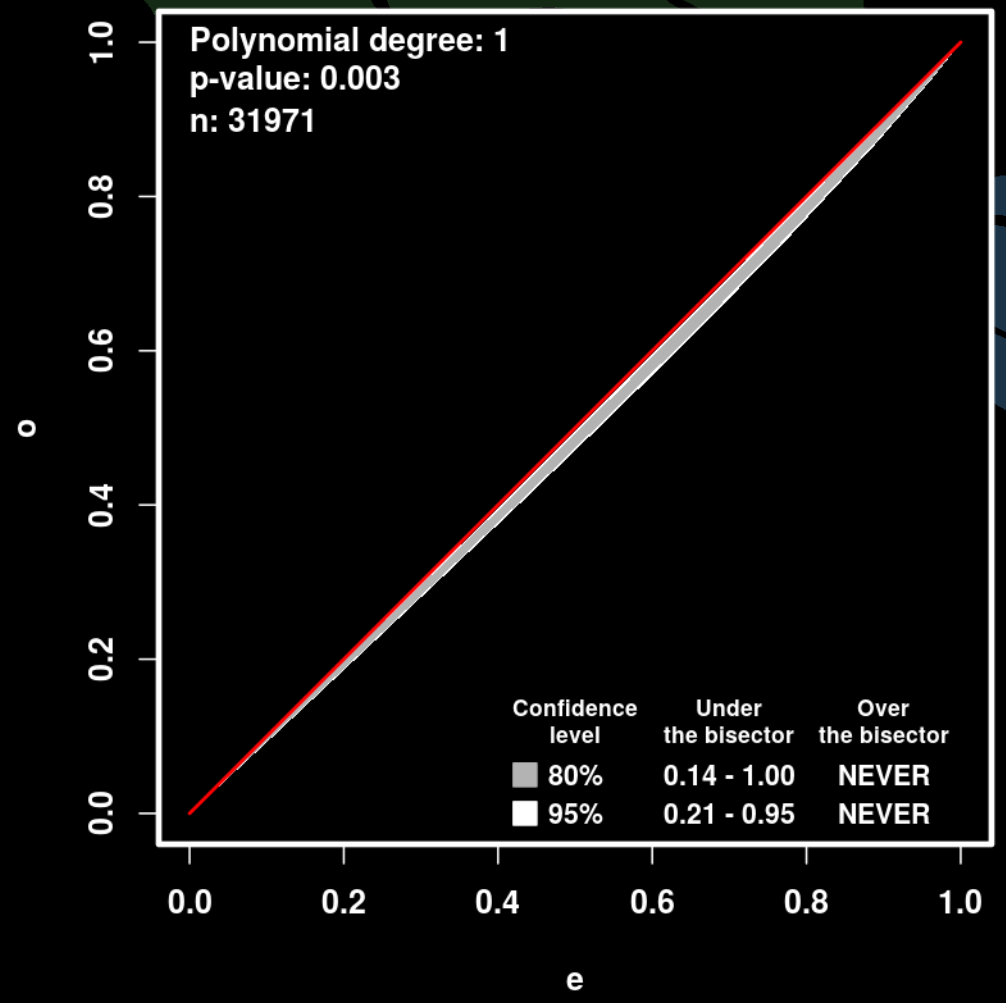
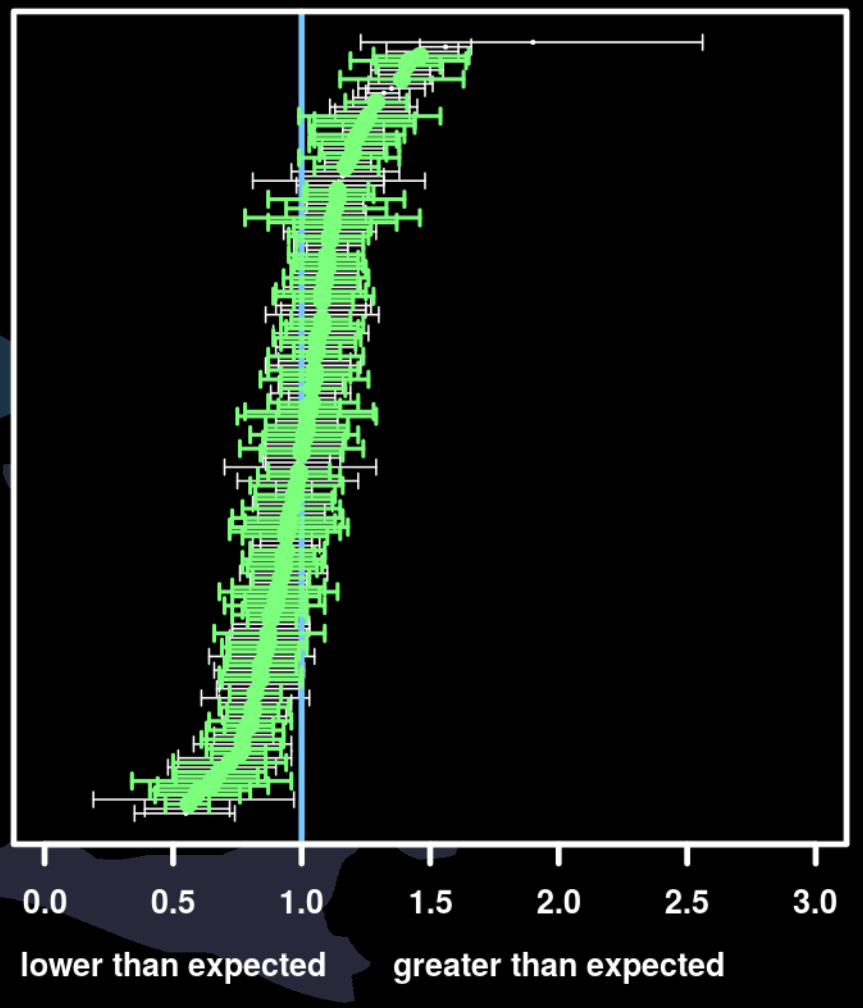
Adjusted Mortality

Adjusted Mortality

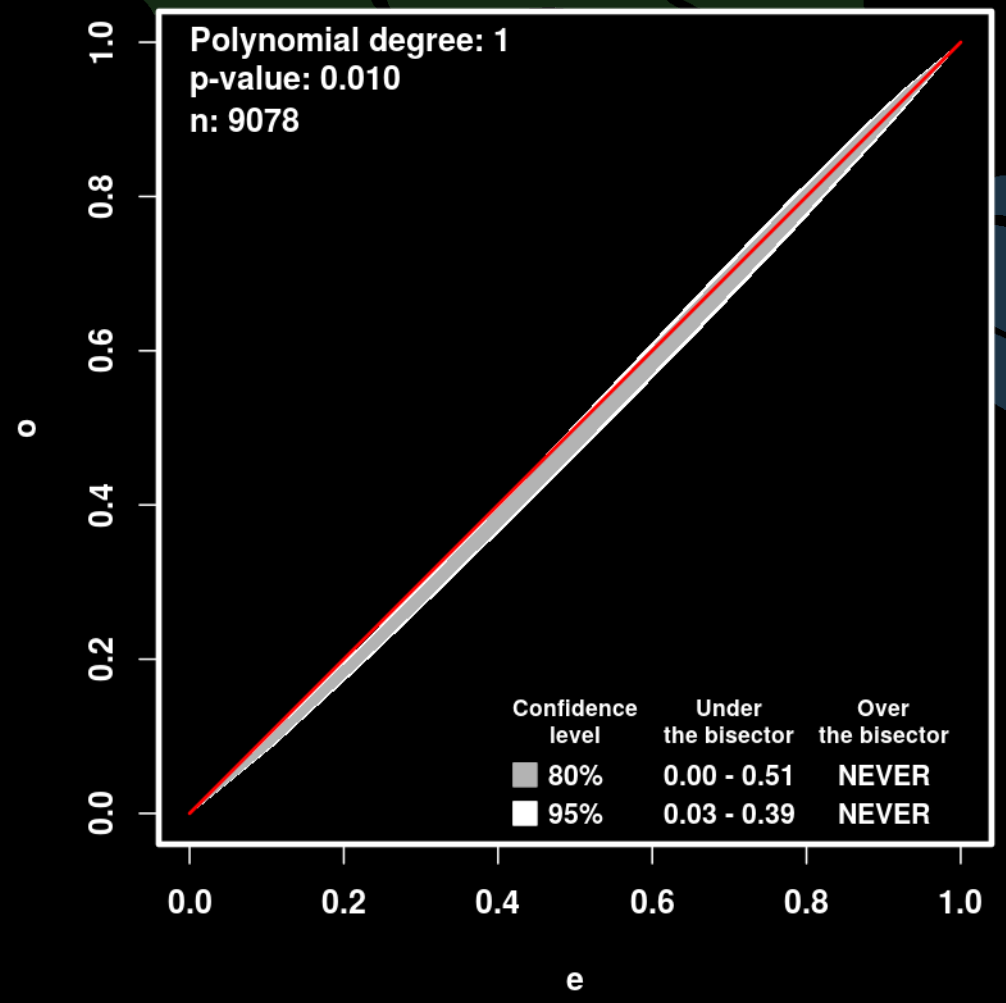
N

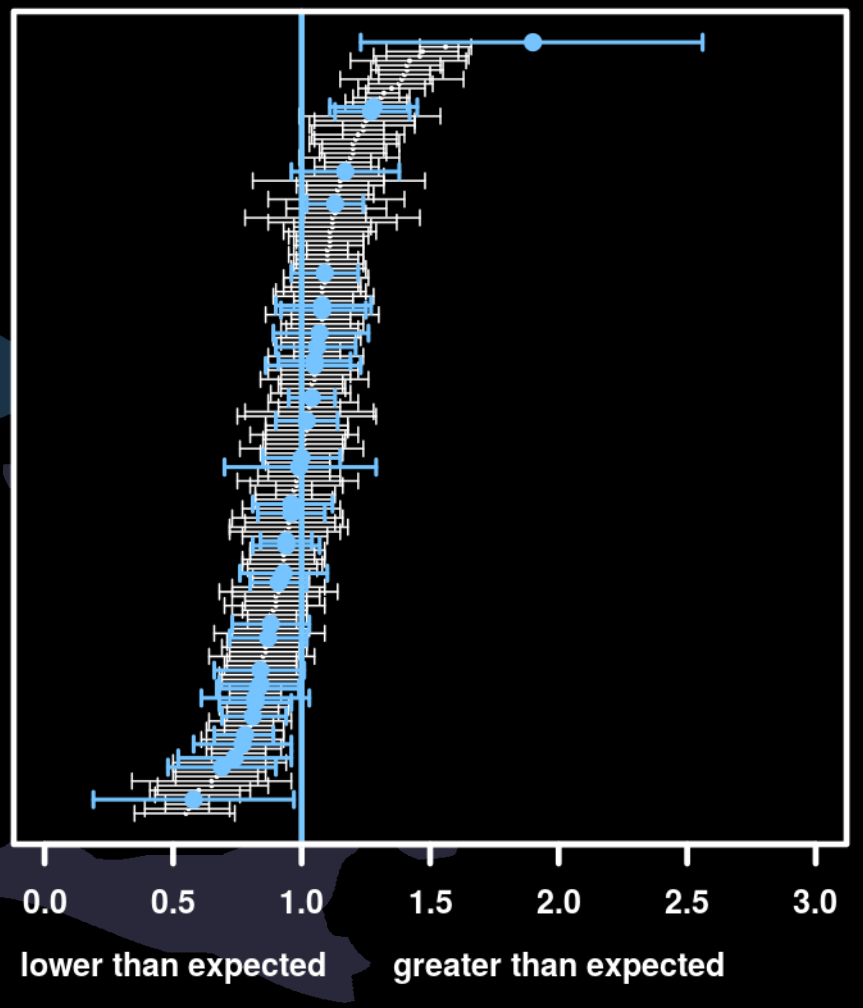




Adjusted Mortality

C





Adjusted Mortality

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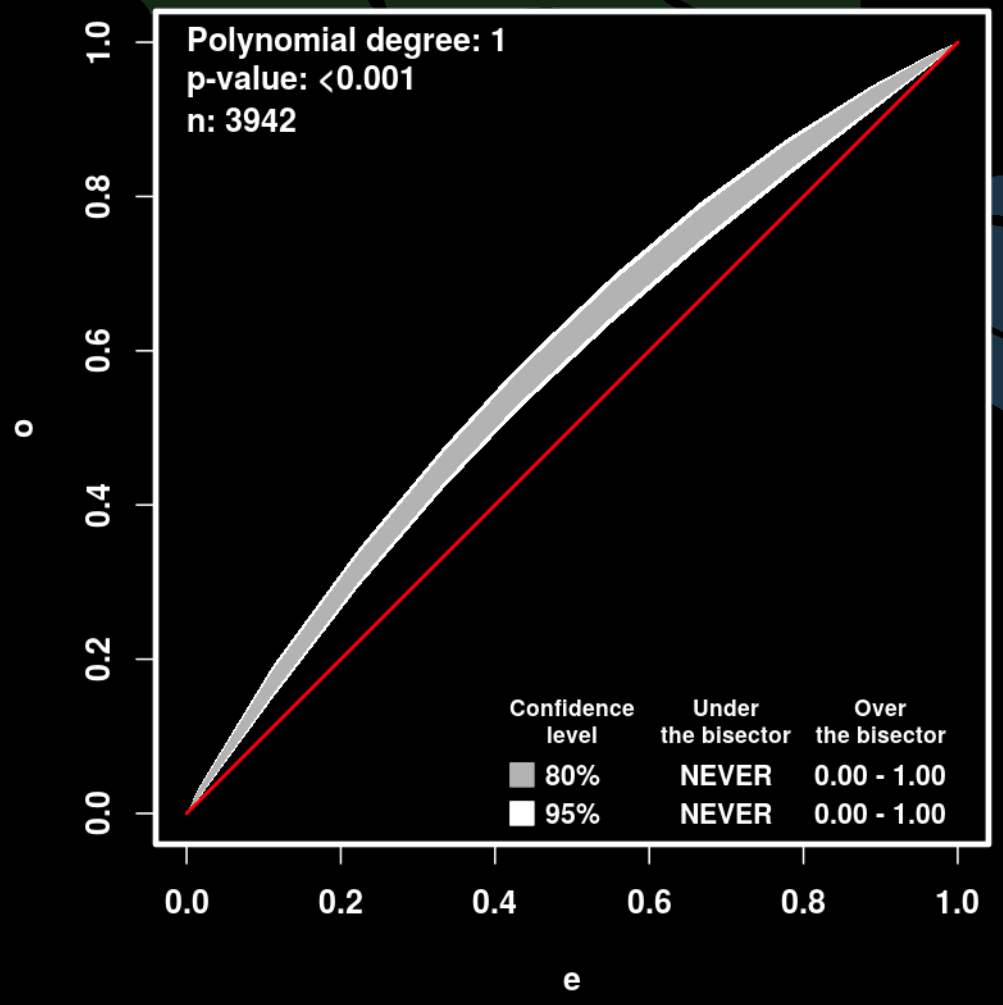
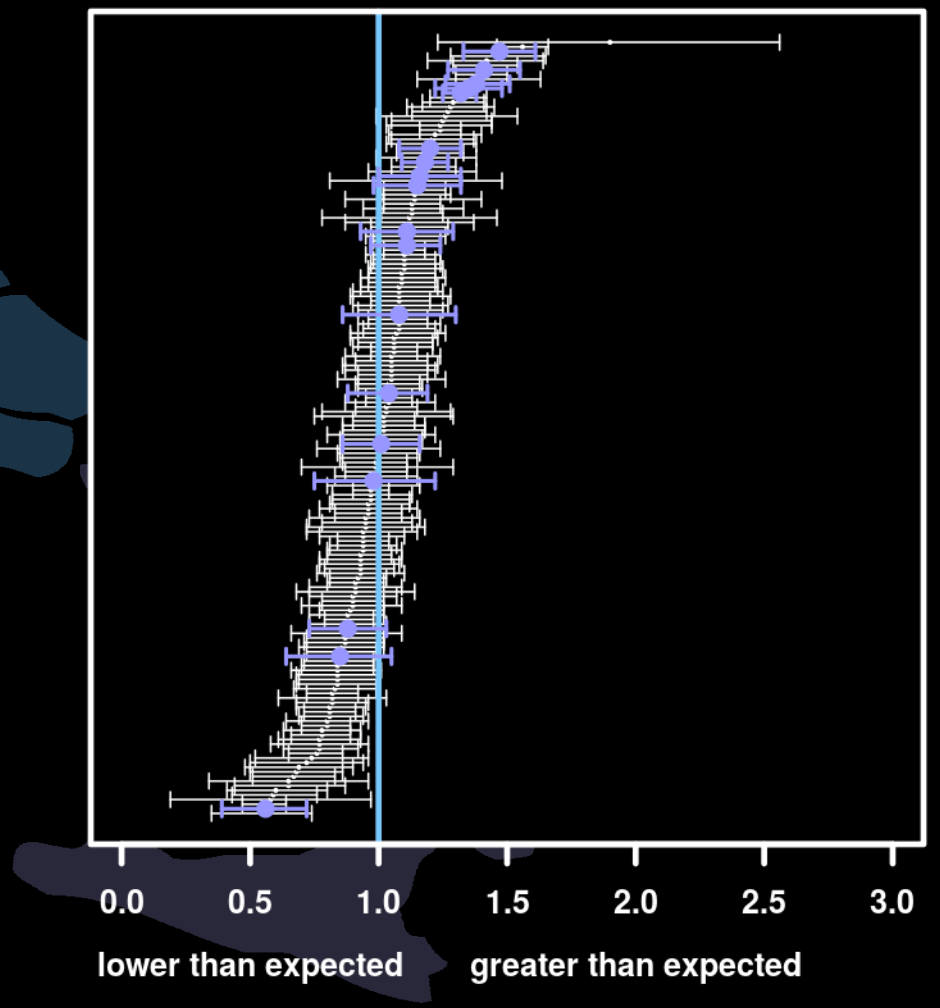
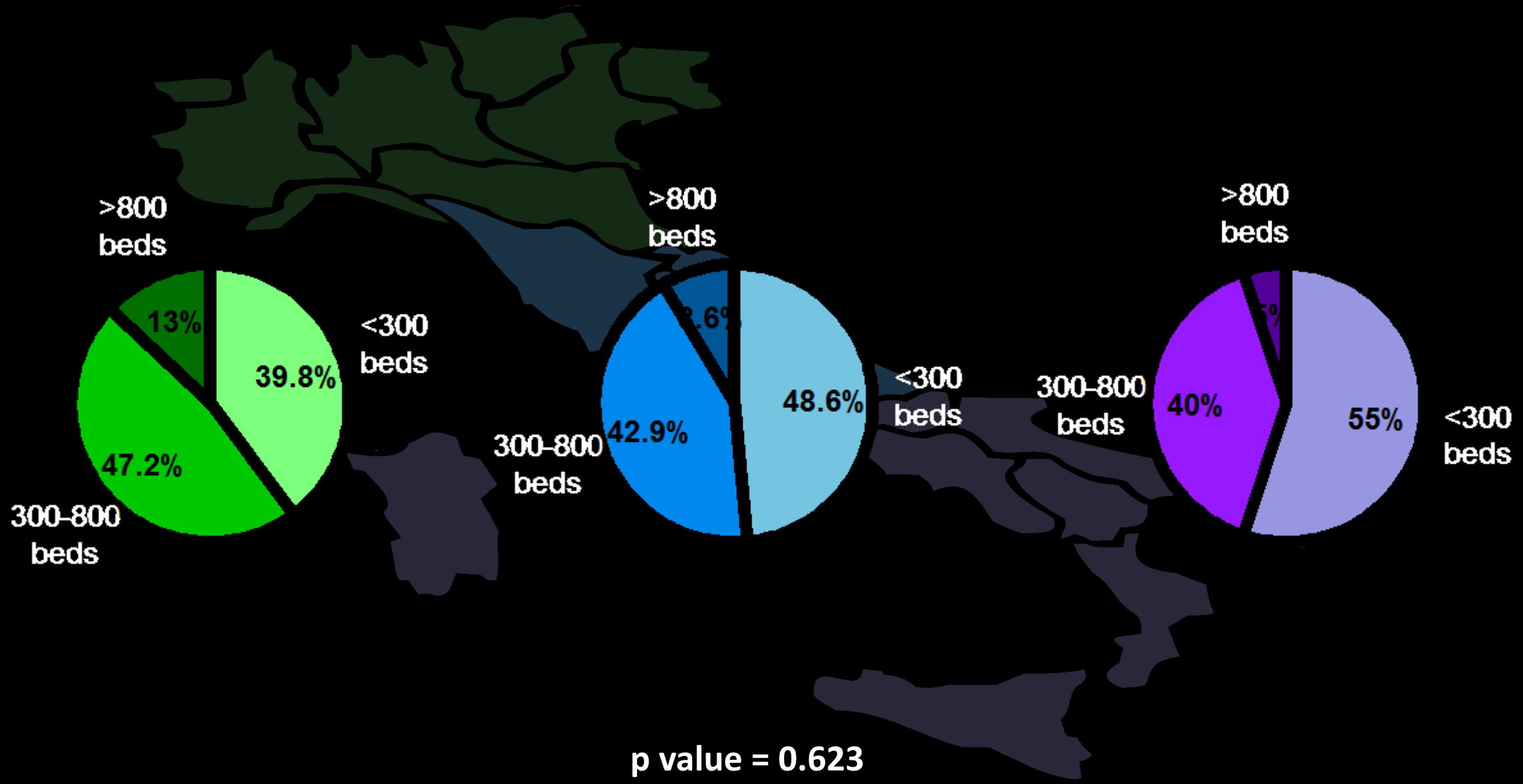




Structural Data

Number of beds in hospital



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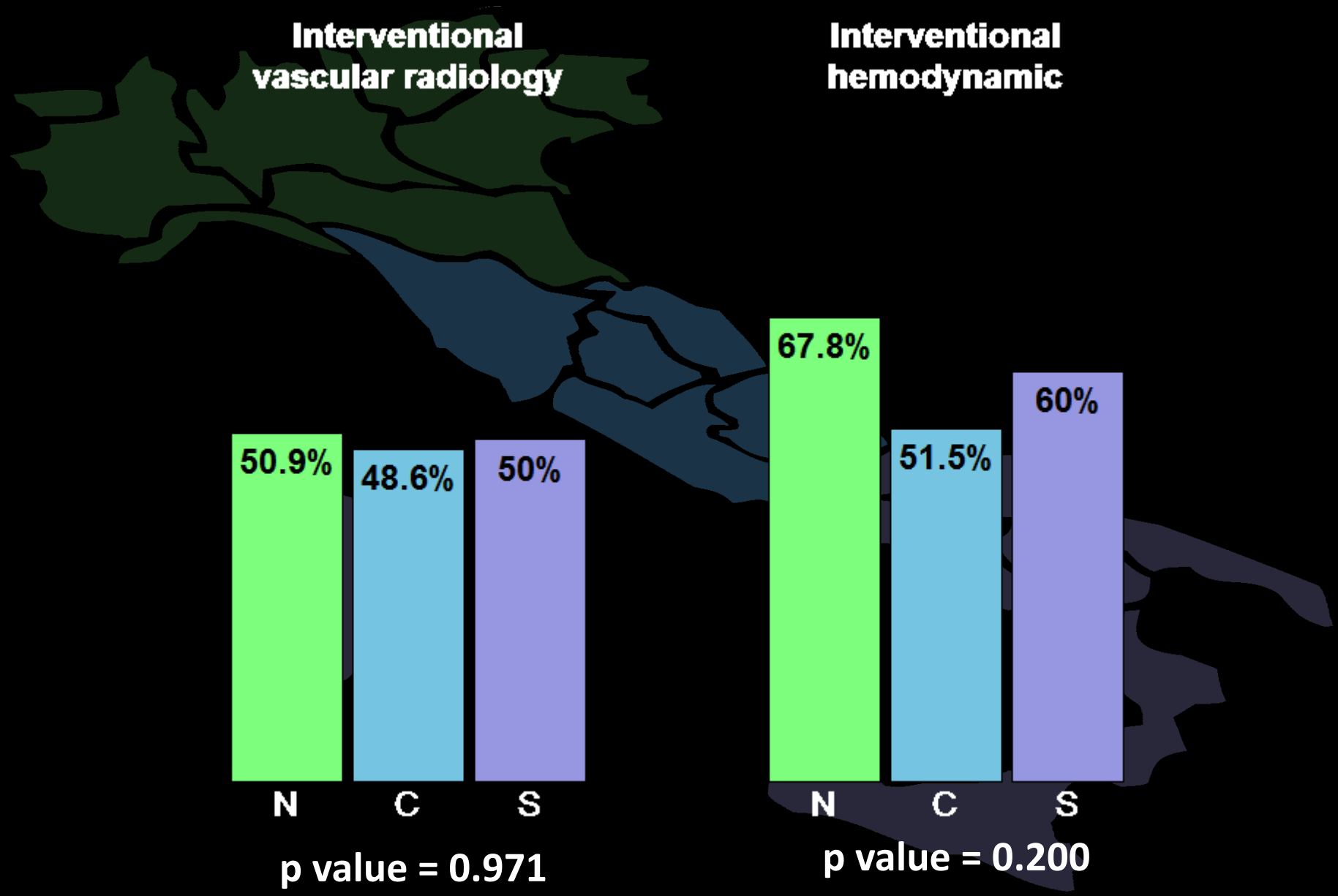
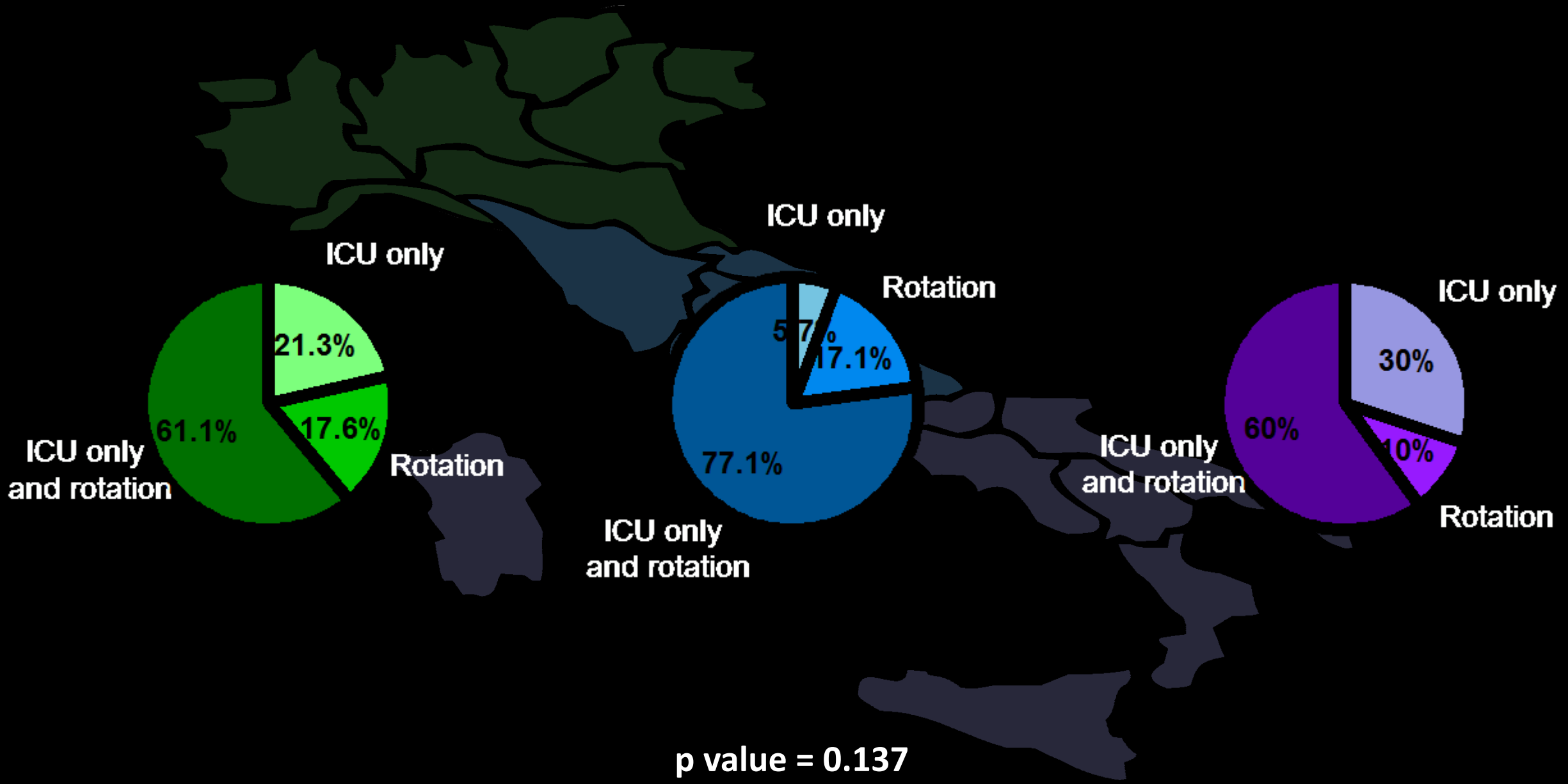
Services/activities available in H



Physicians



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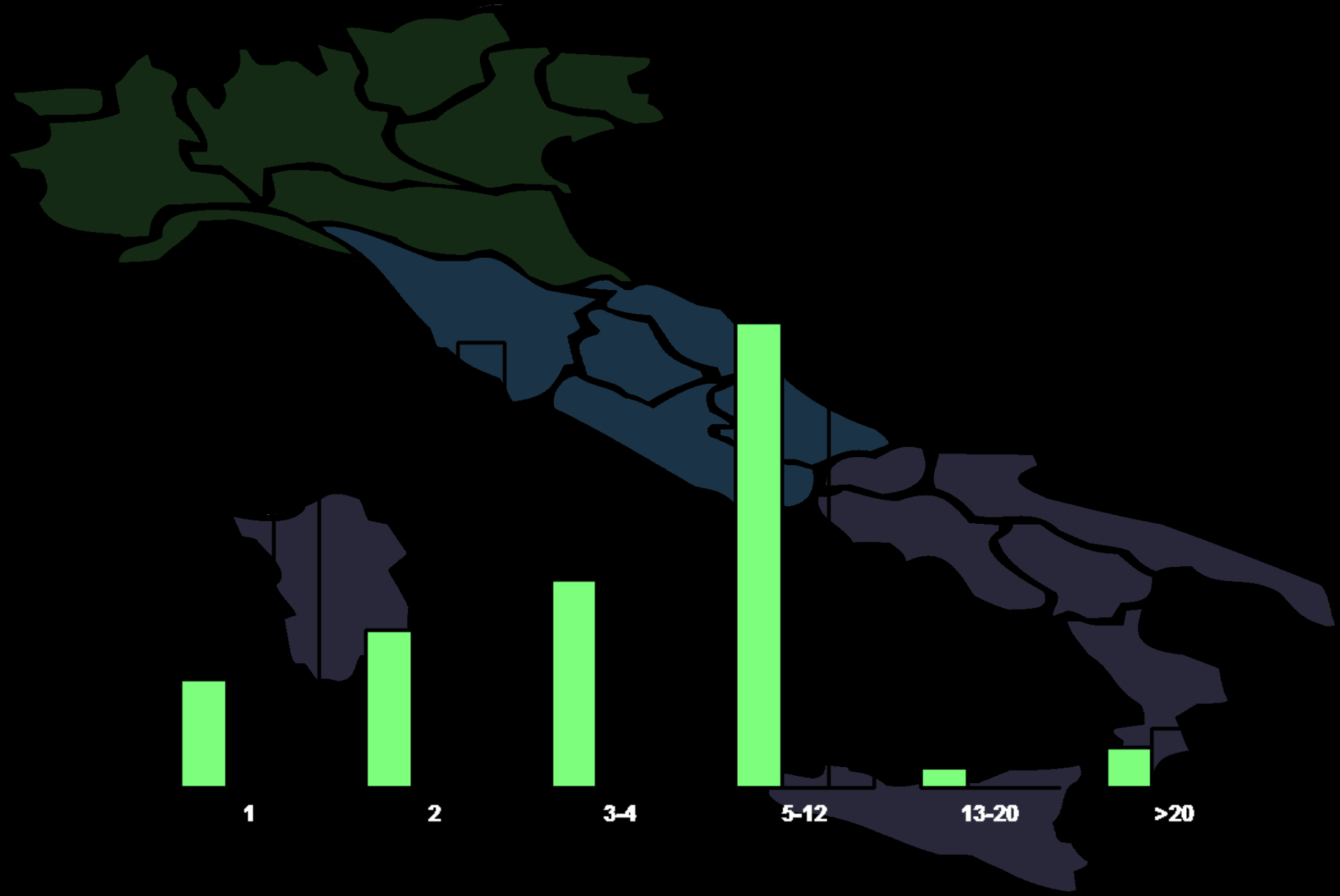
Hours conceeded for relatives' visits



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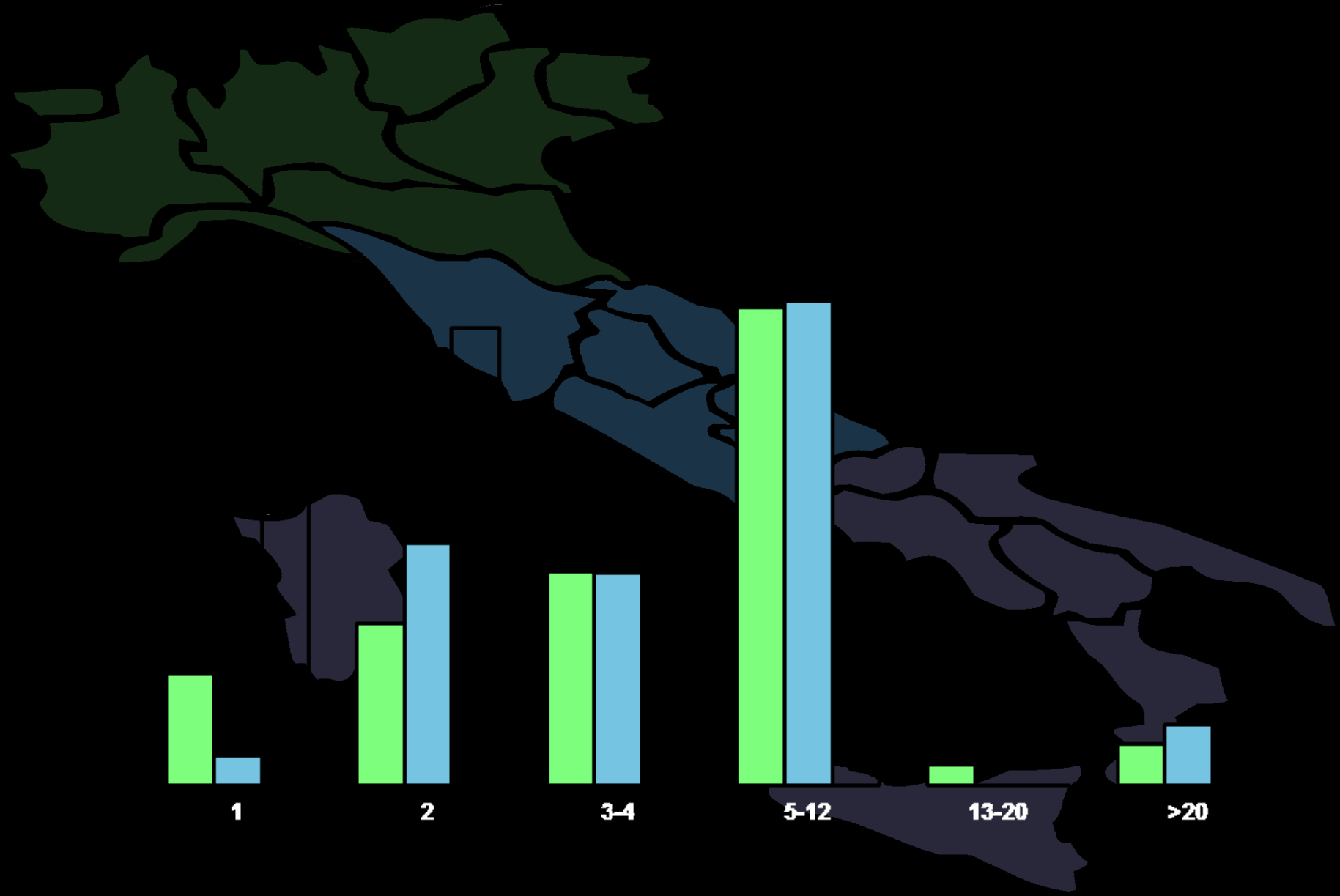

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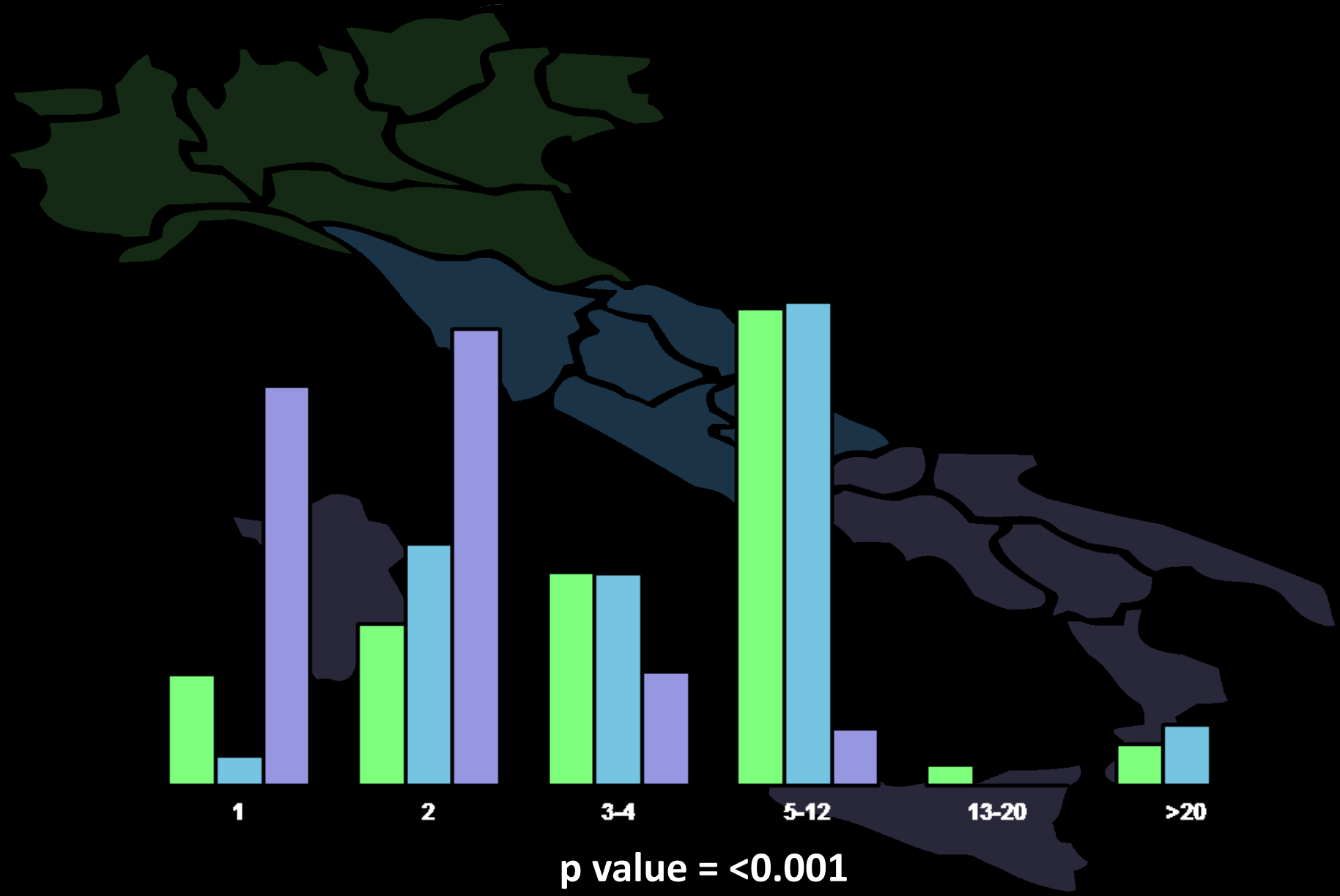
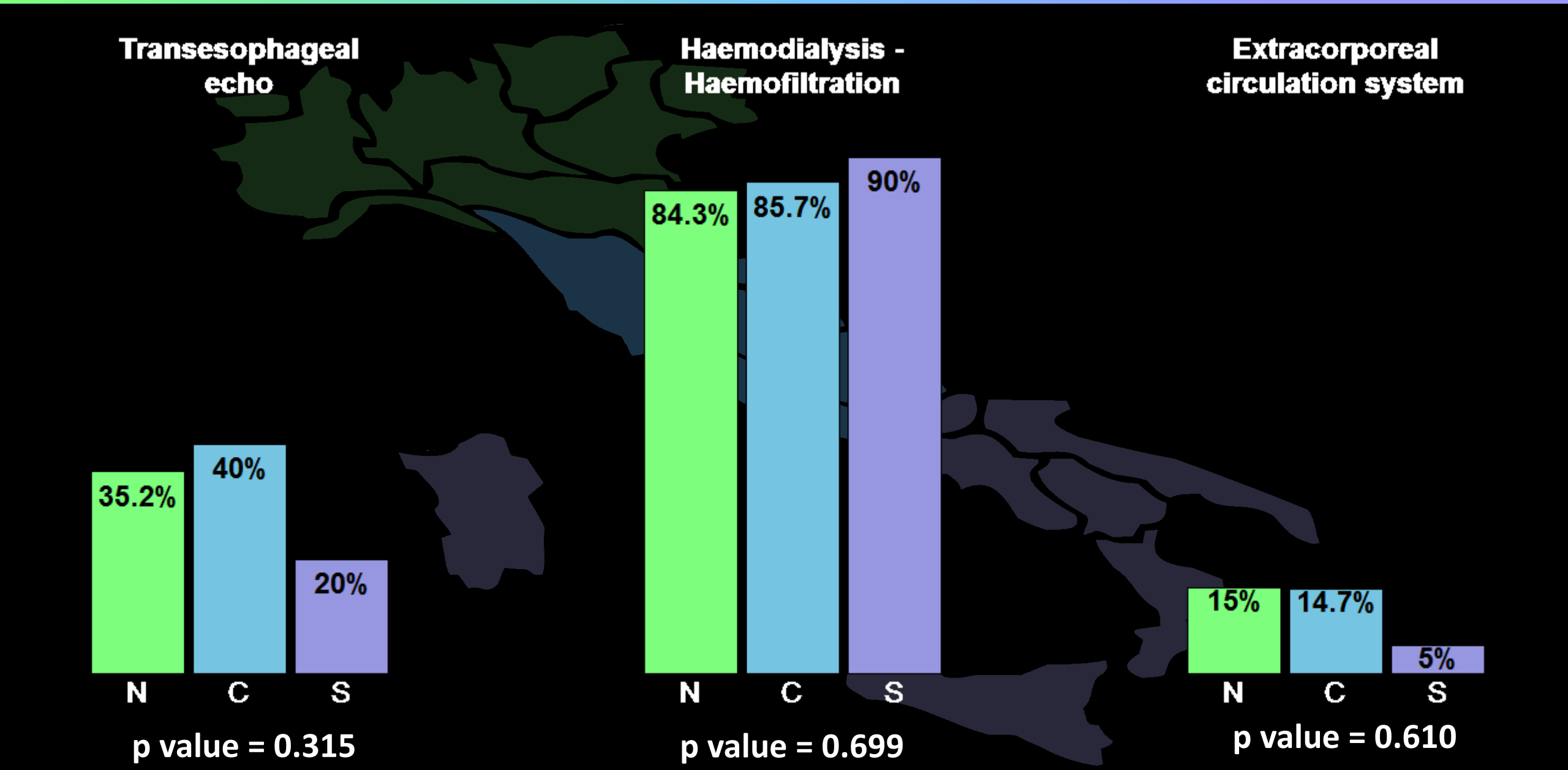
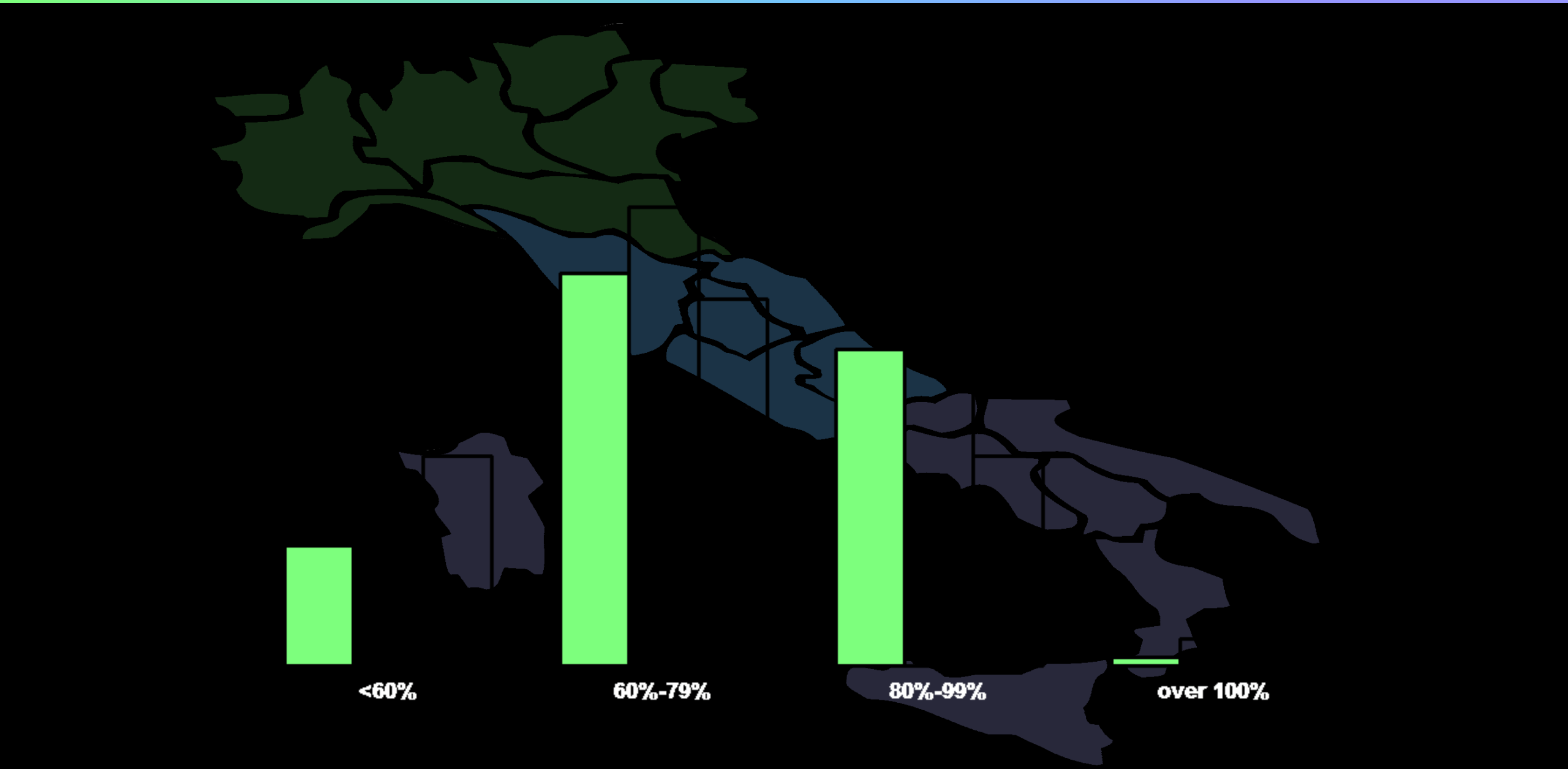


p value = <0.001

Biomedical equipment in ICU



Occupancy rate



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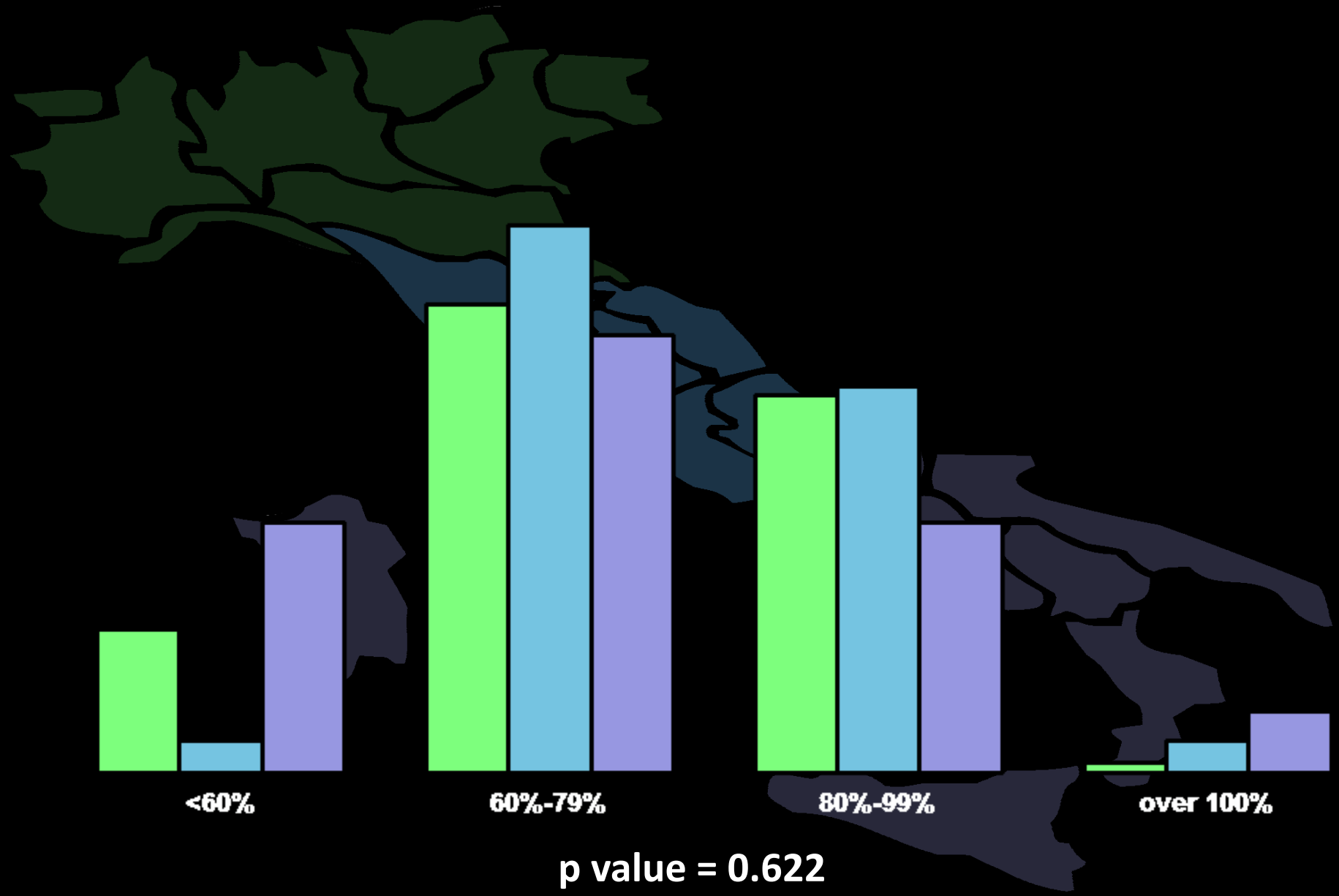

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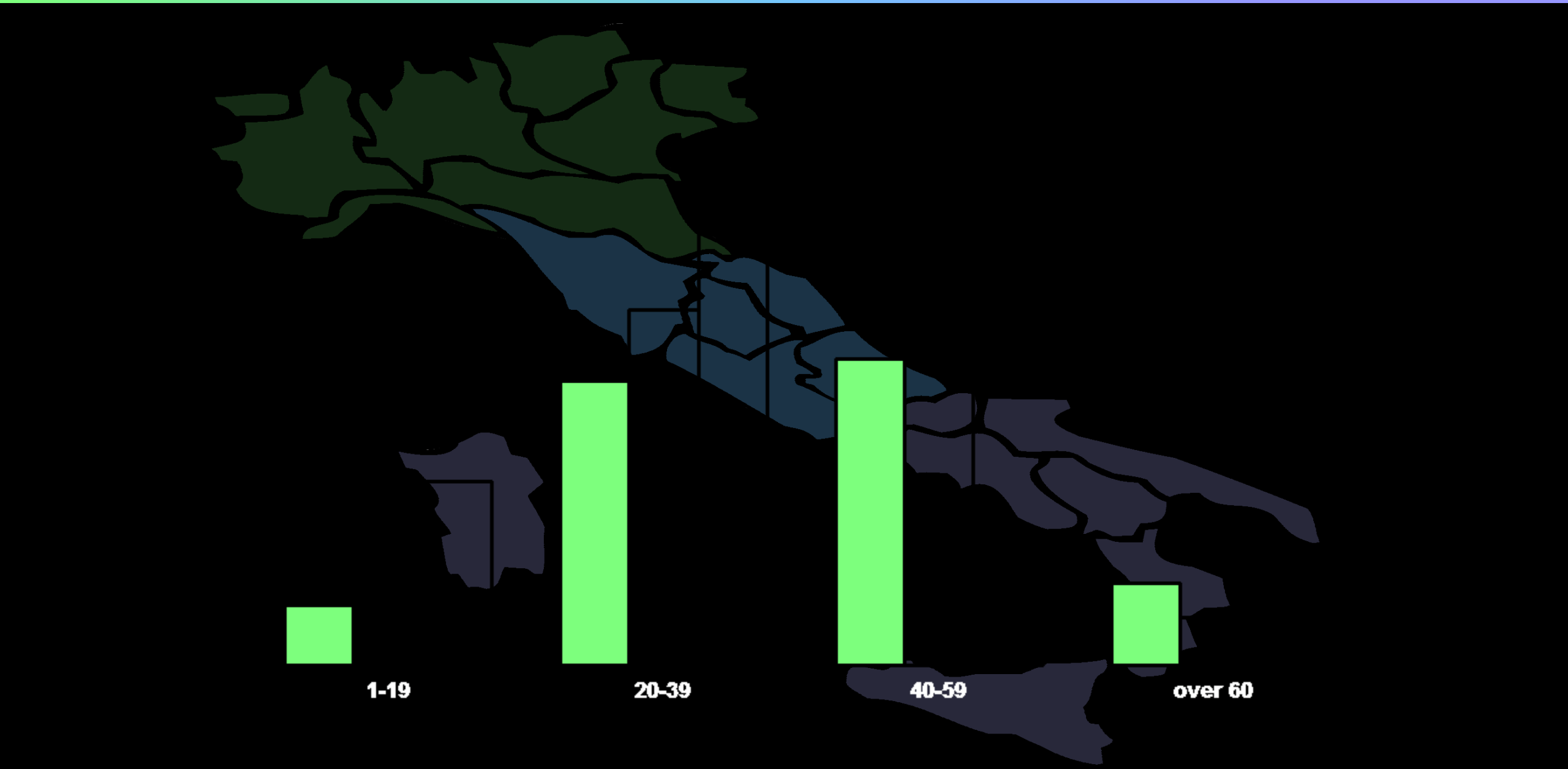
Rotation index (patients/bed)



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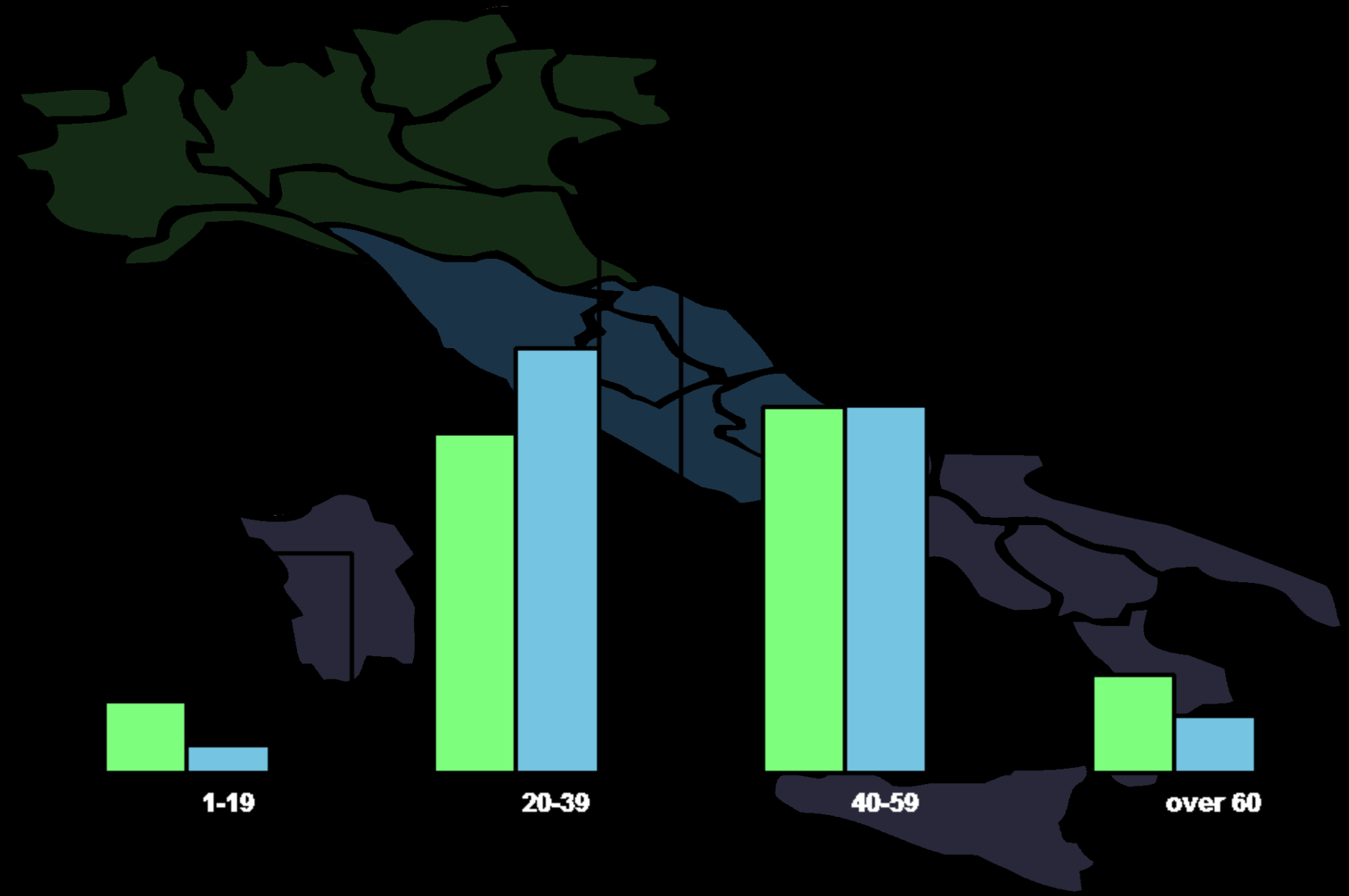

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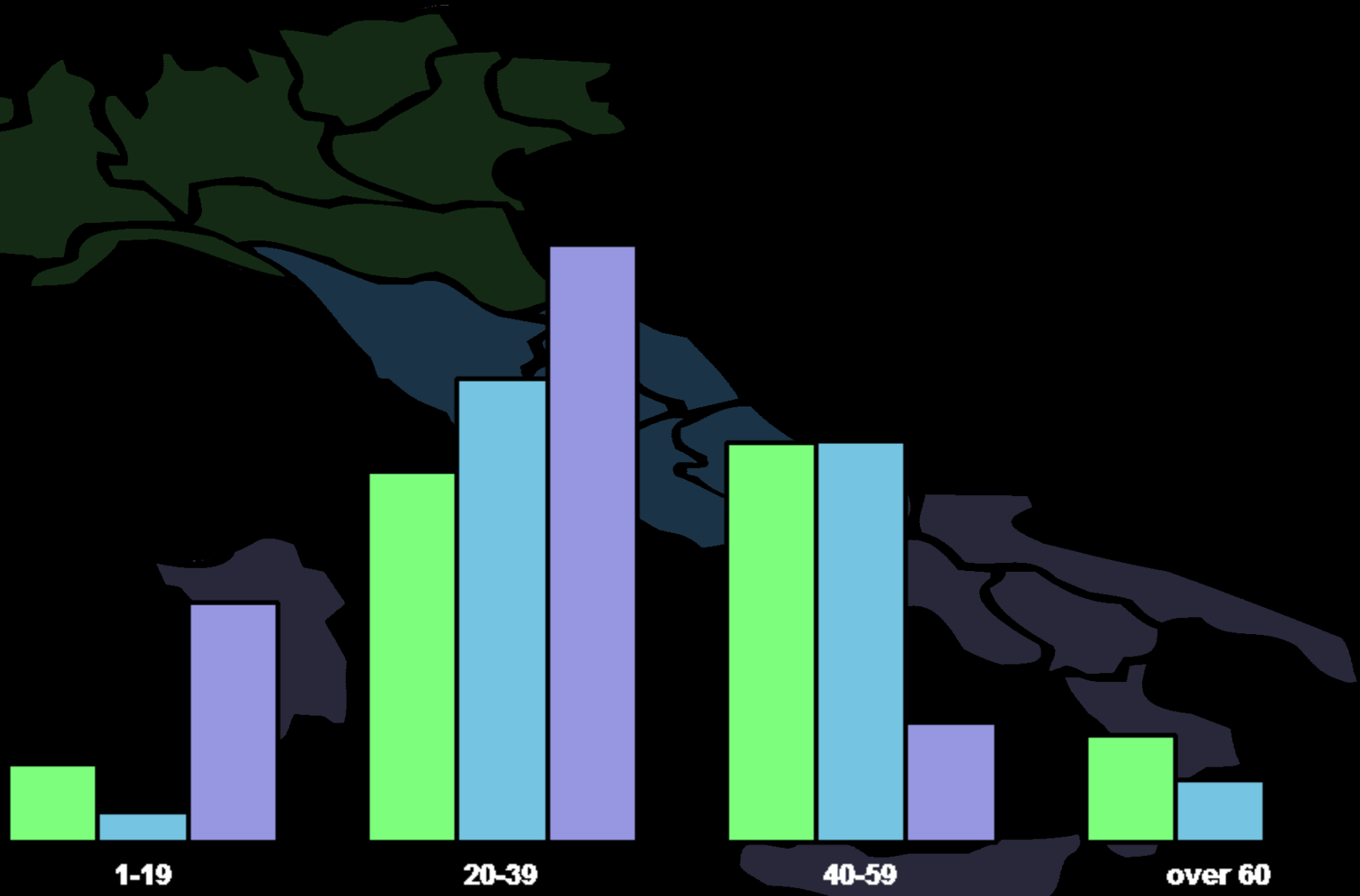

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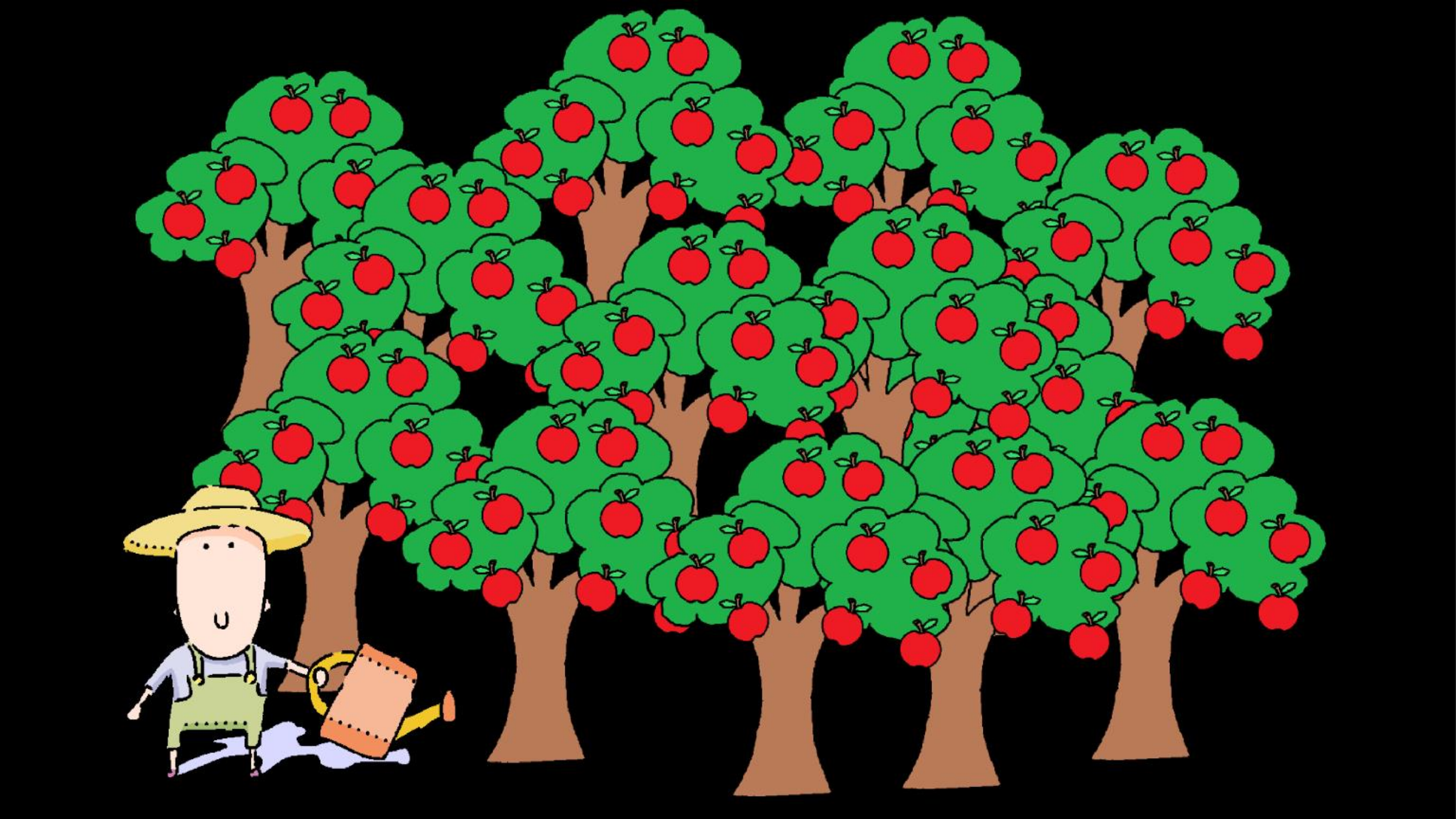
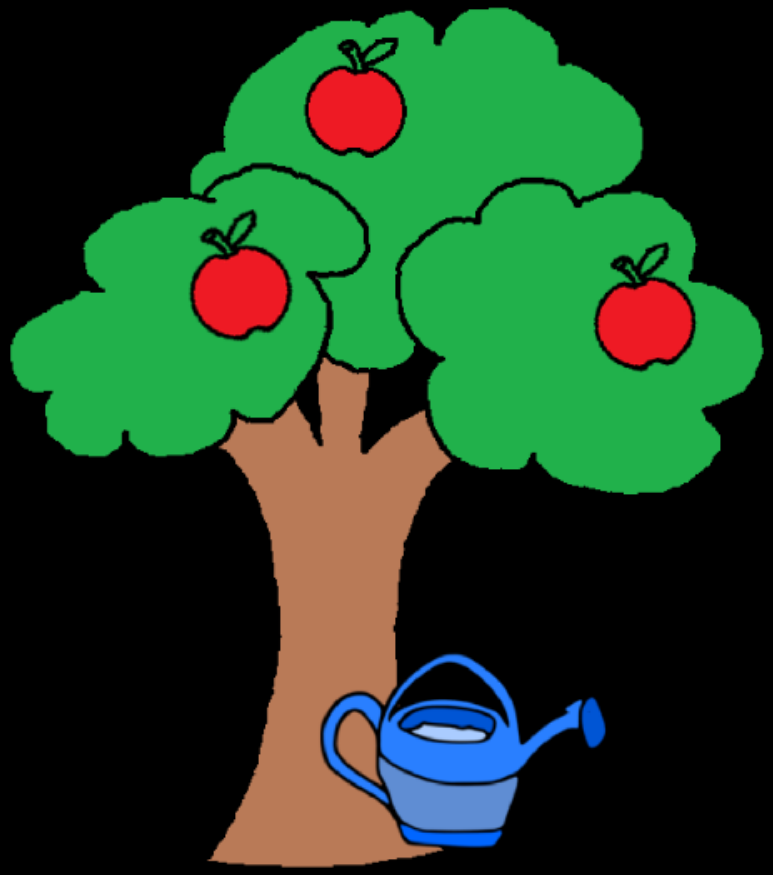
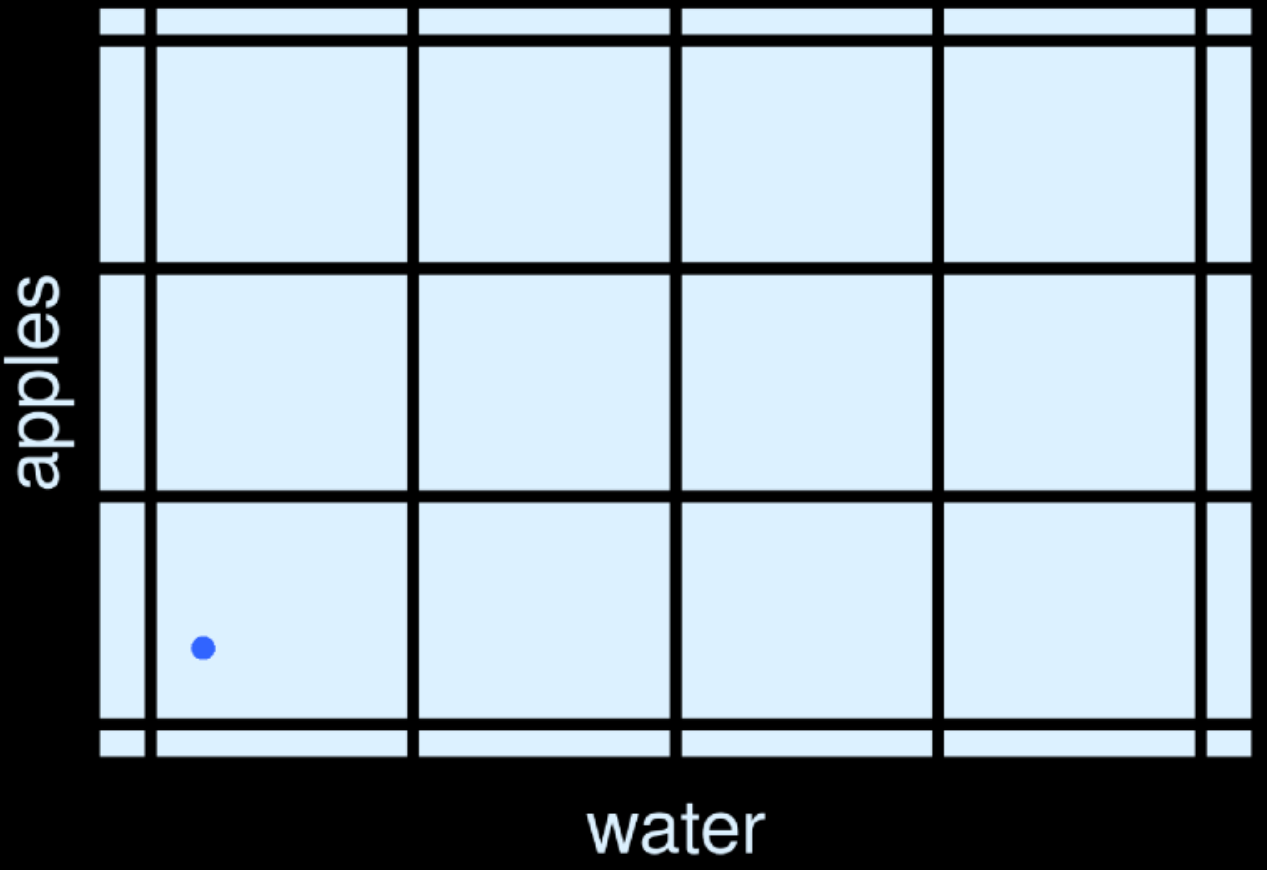
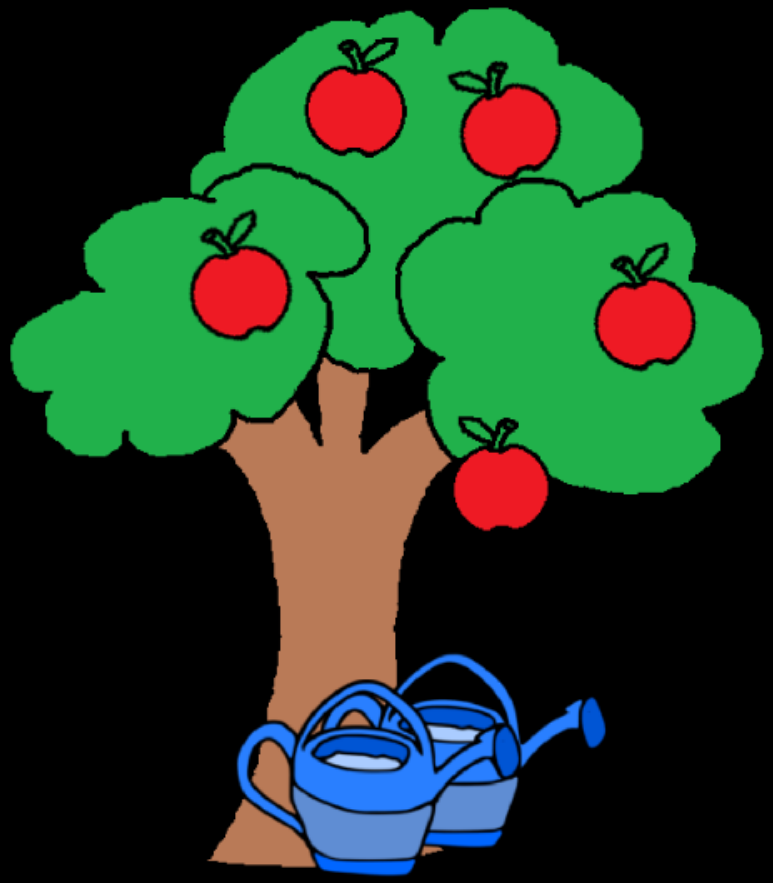
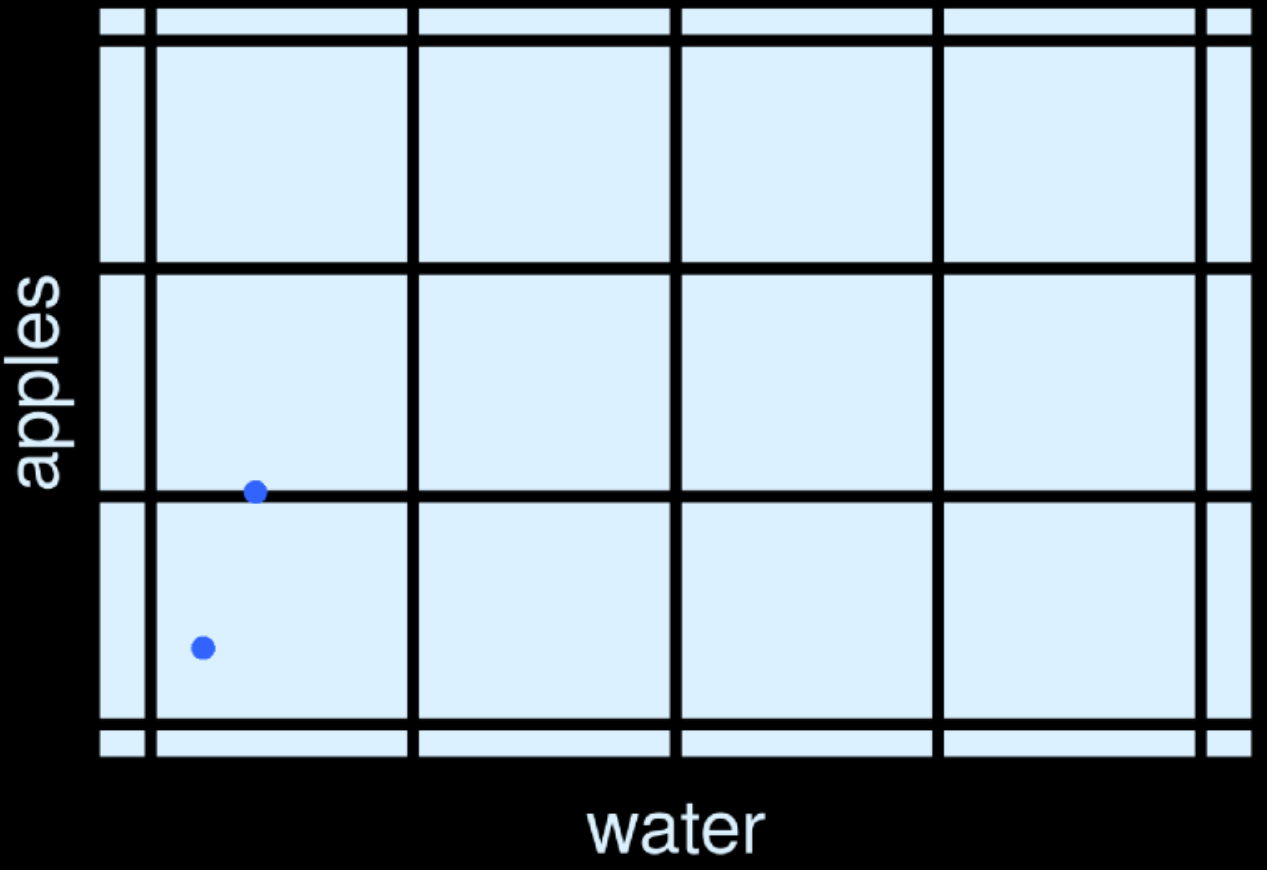
Multilevel model - theory






apples
water

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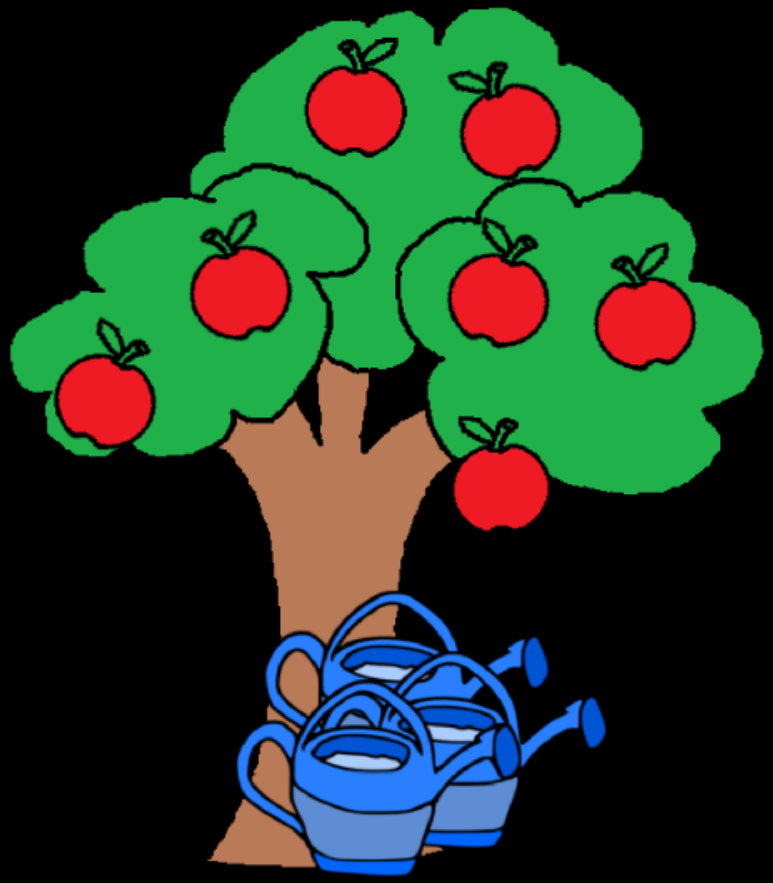

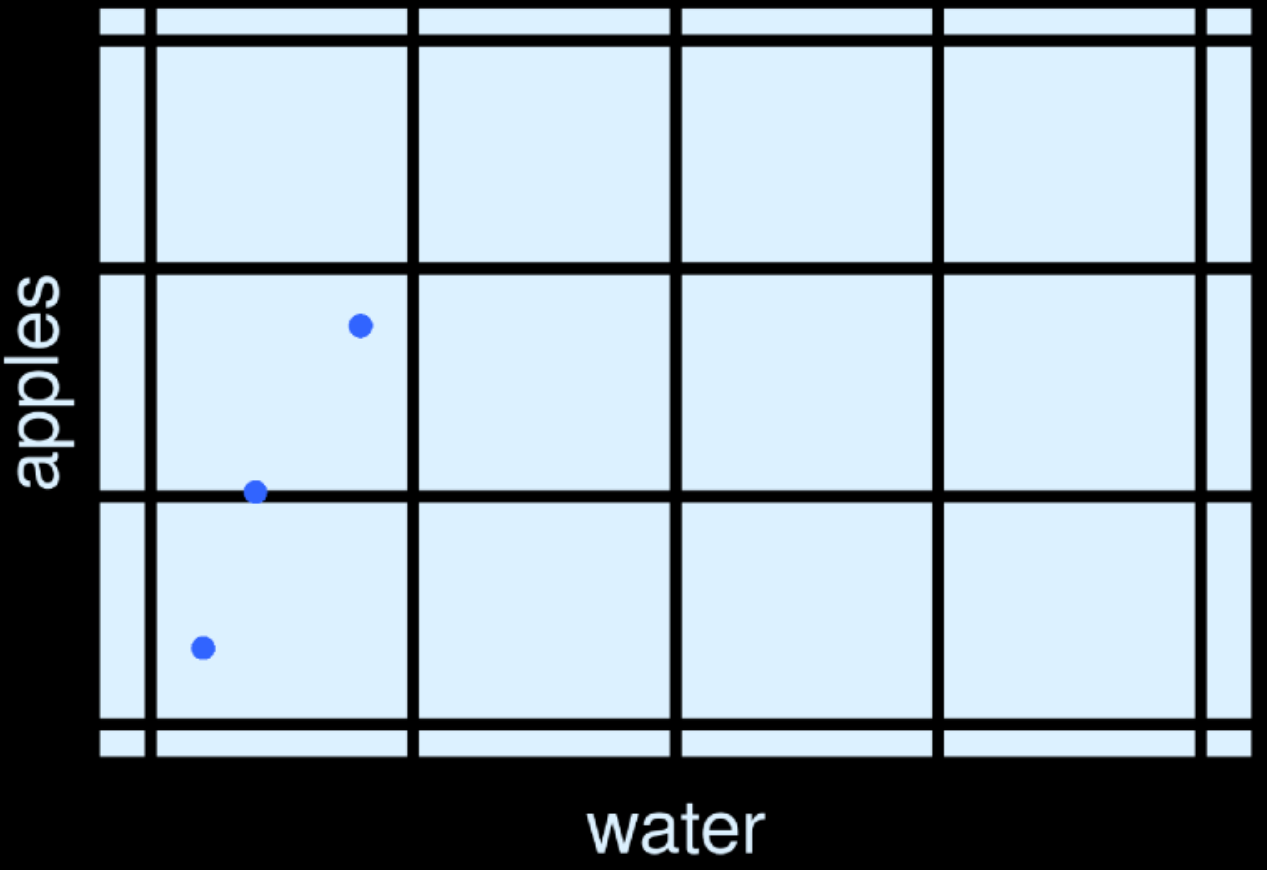
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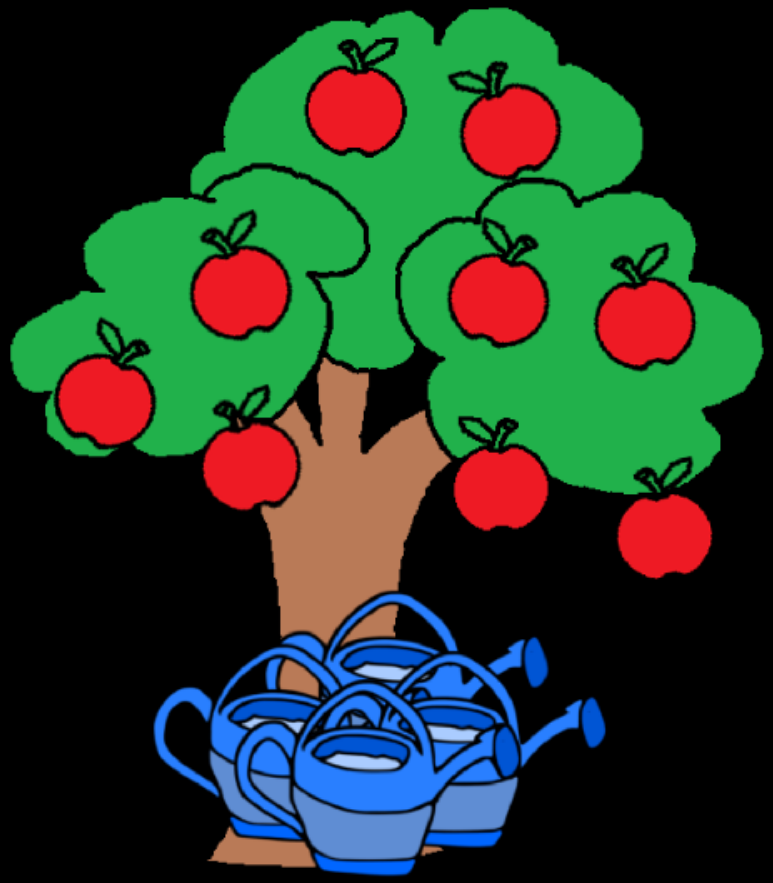

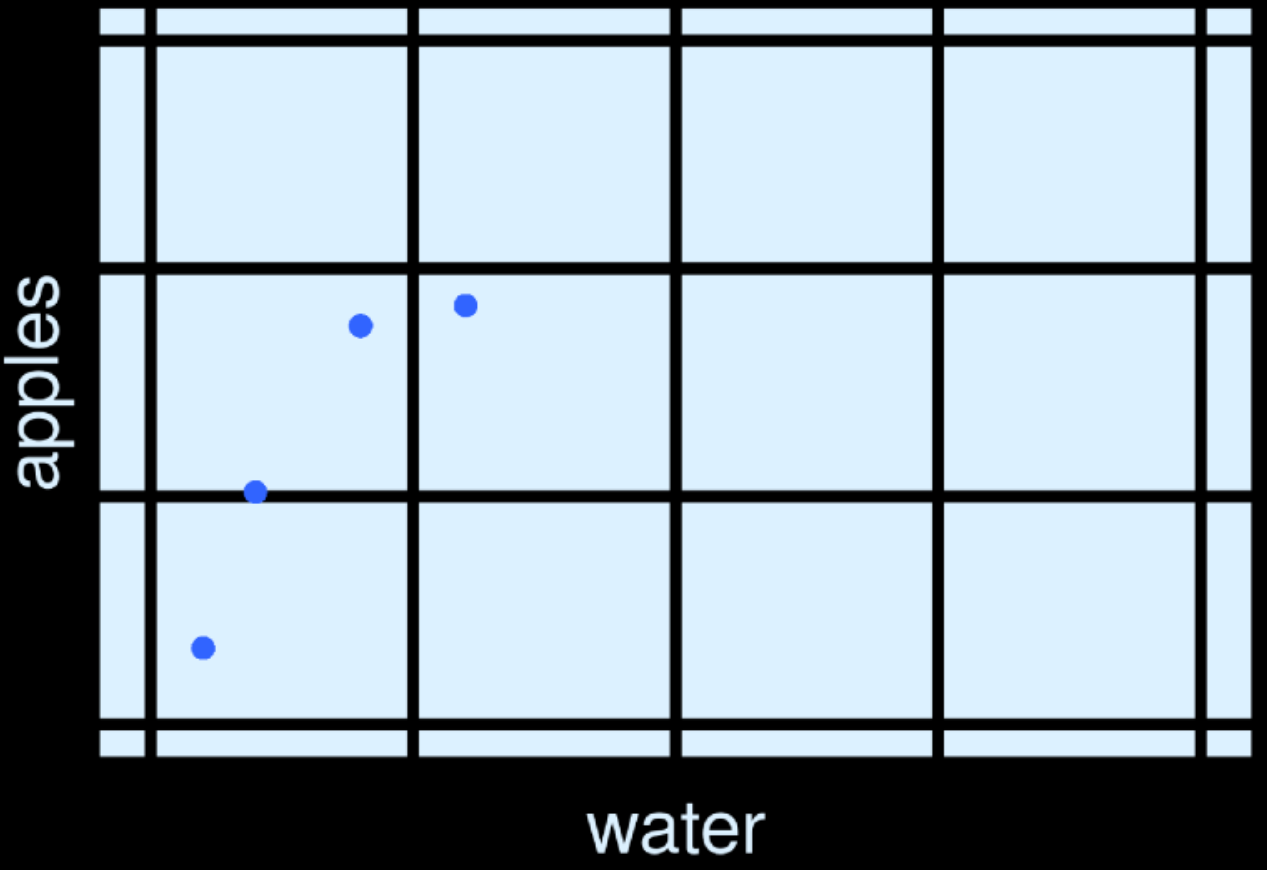
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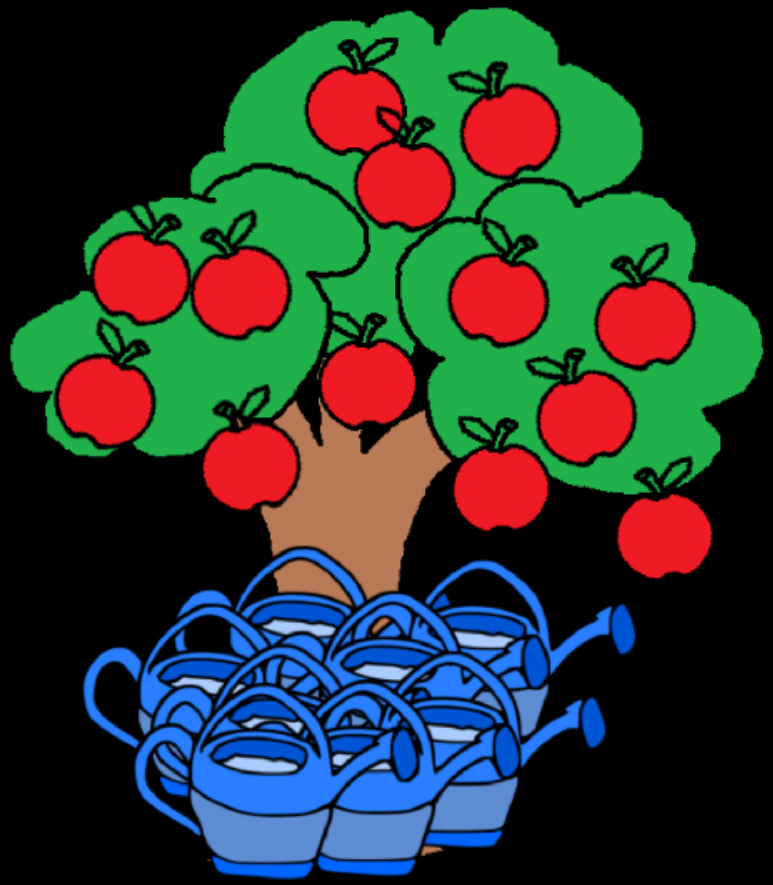

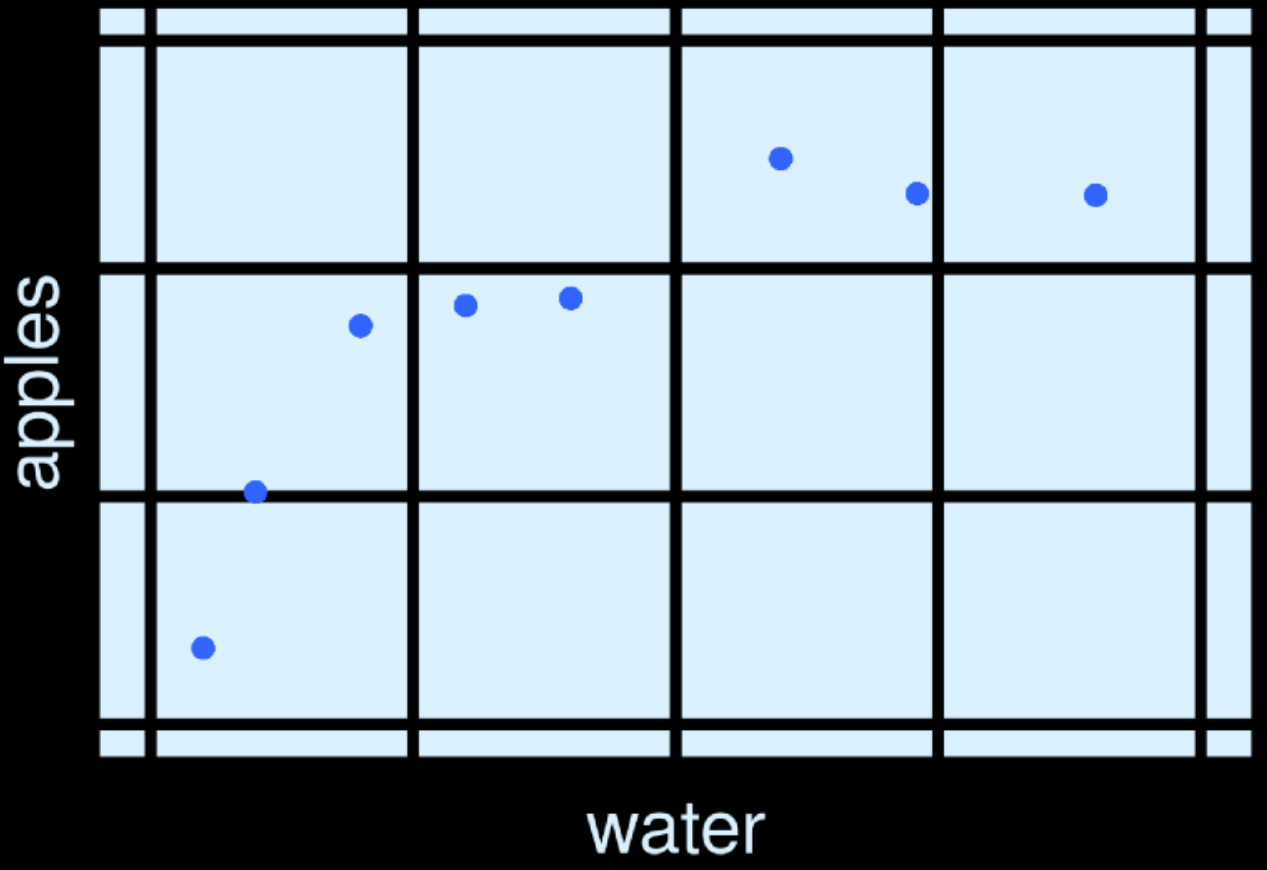
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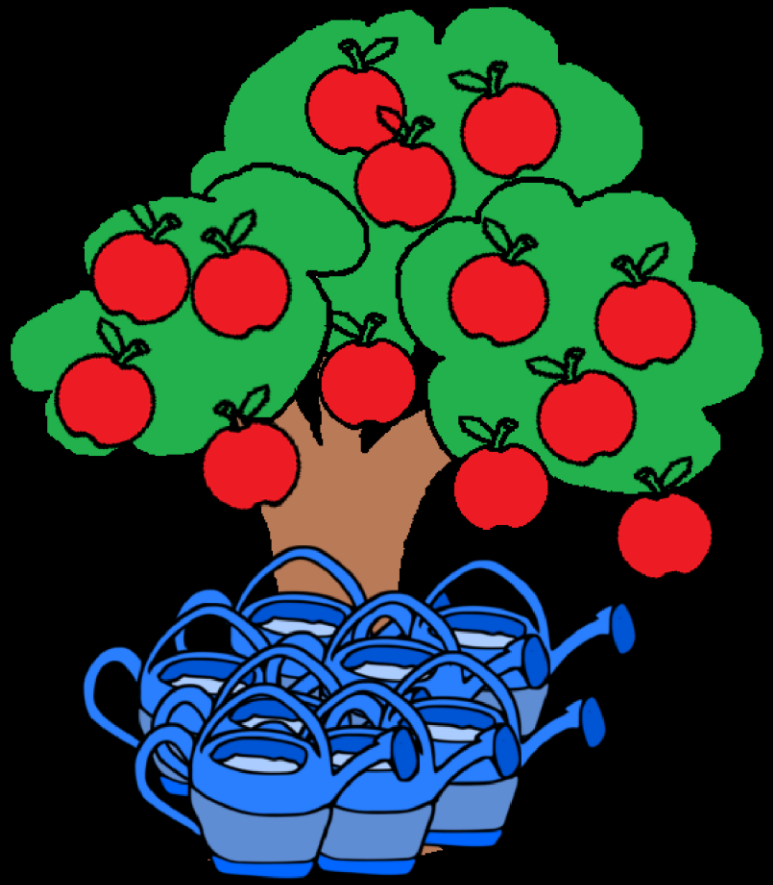

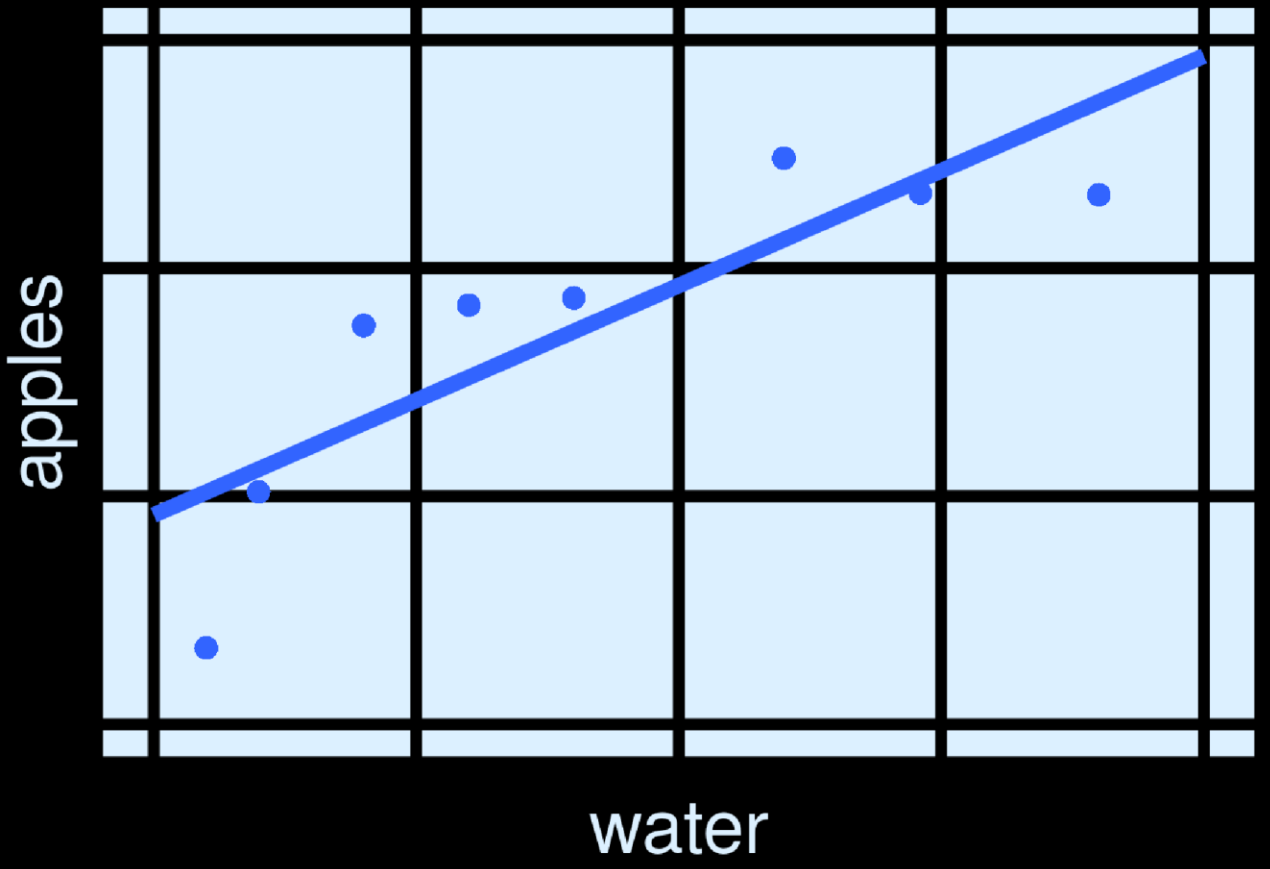
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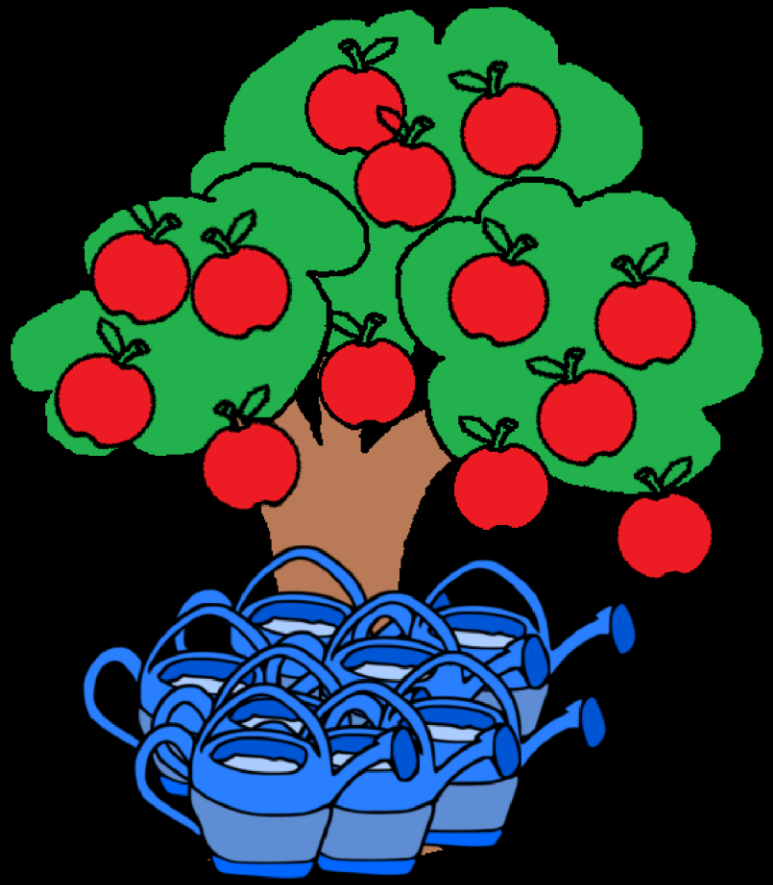

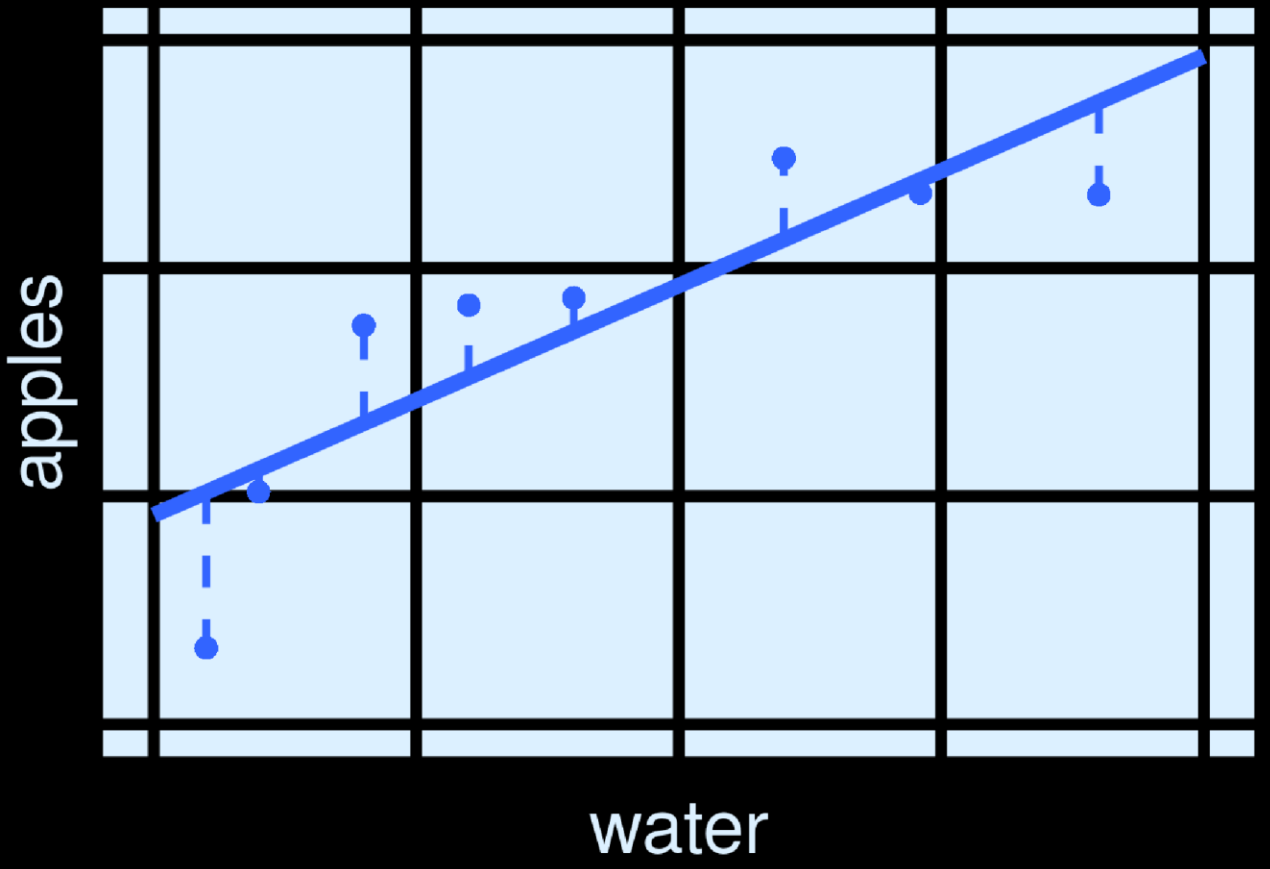
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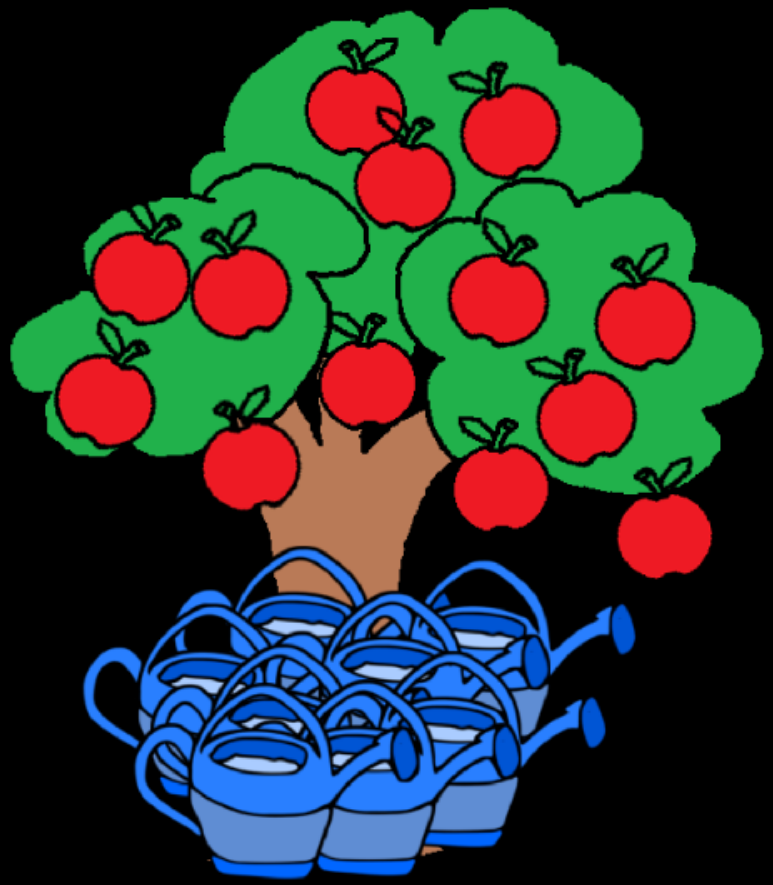

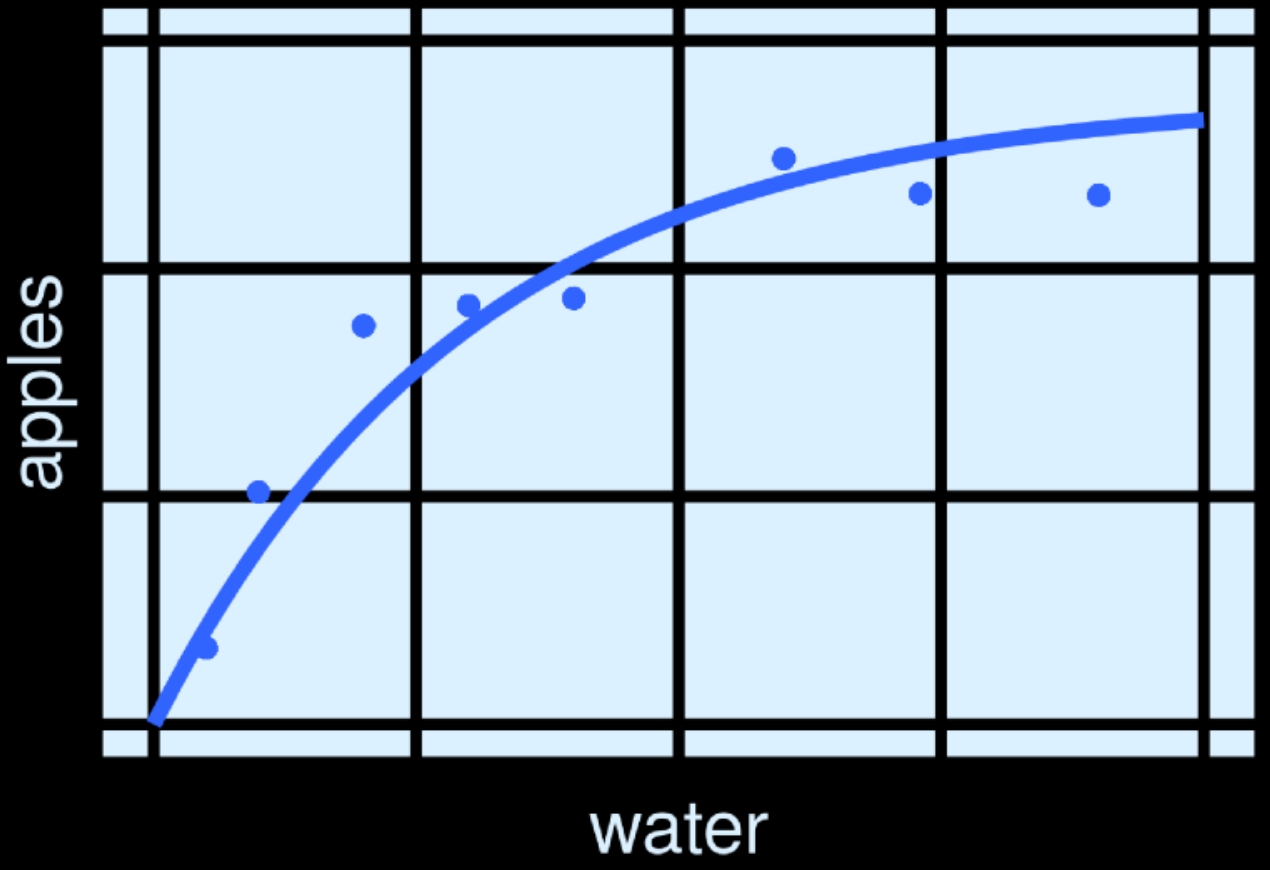
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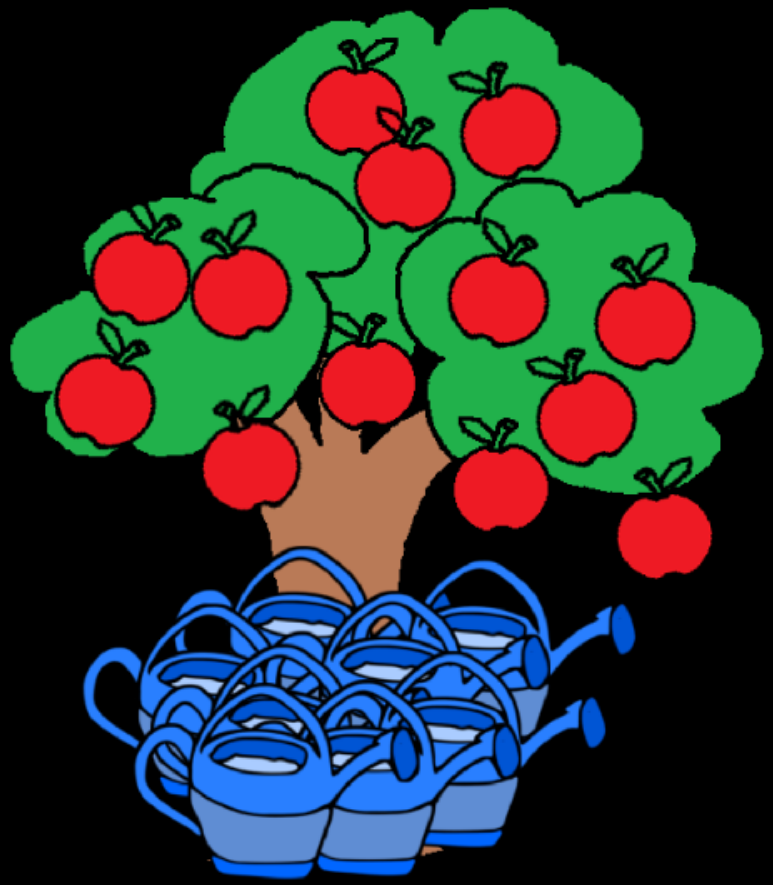

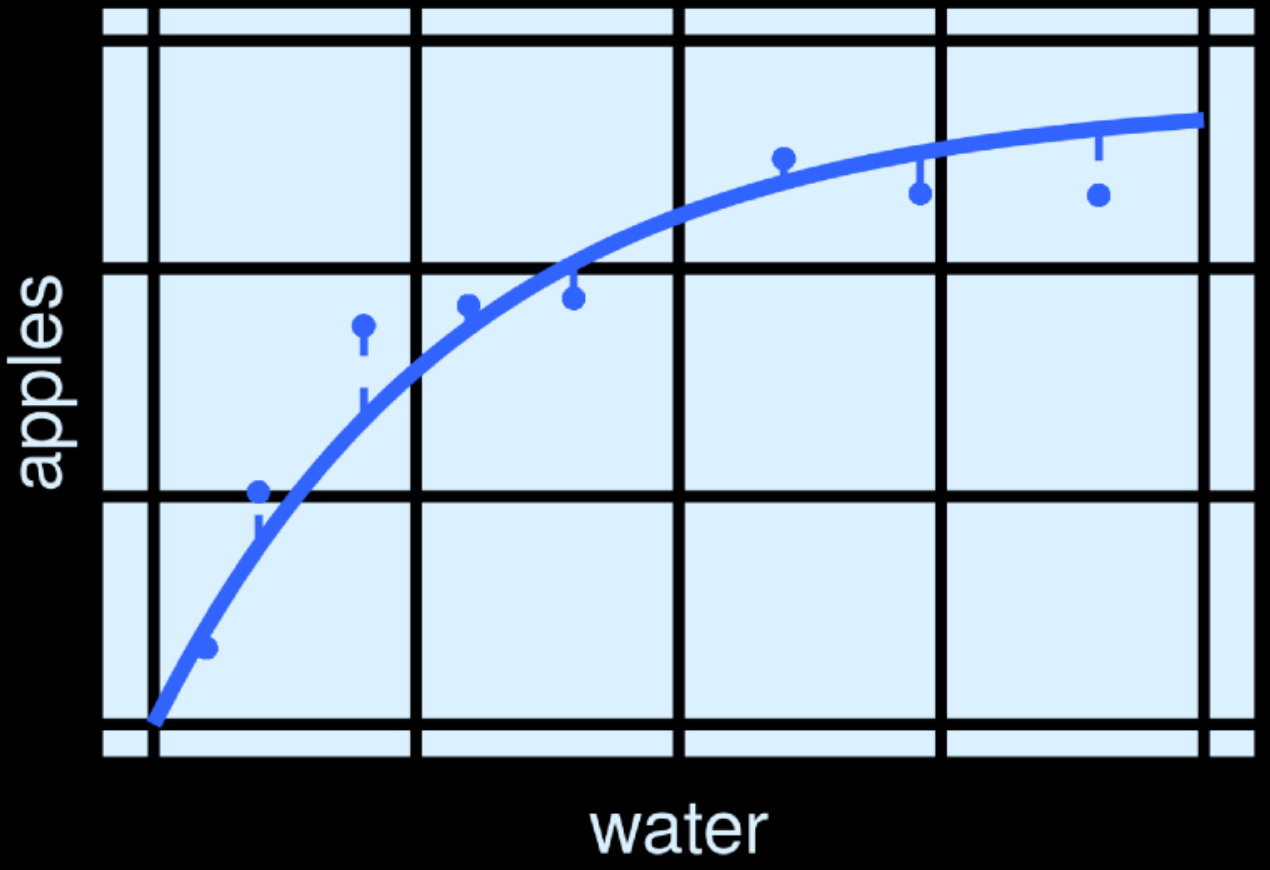
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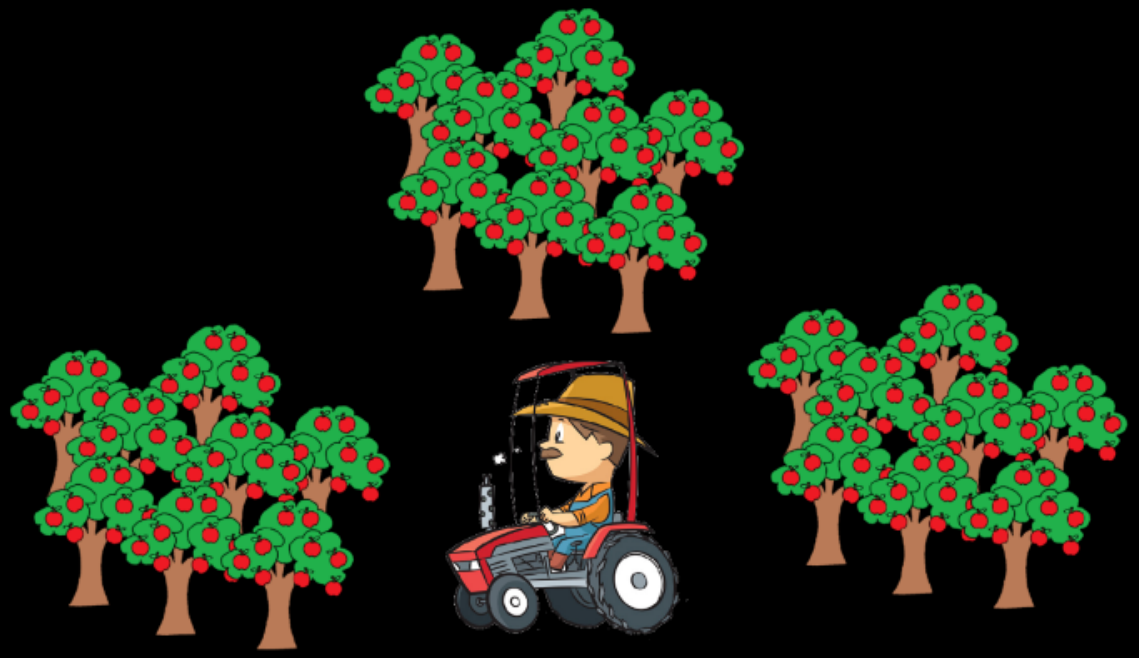

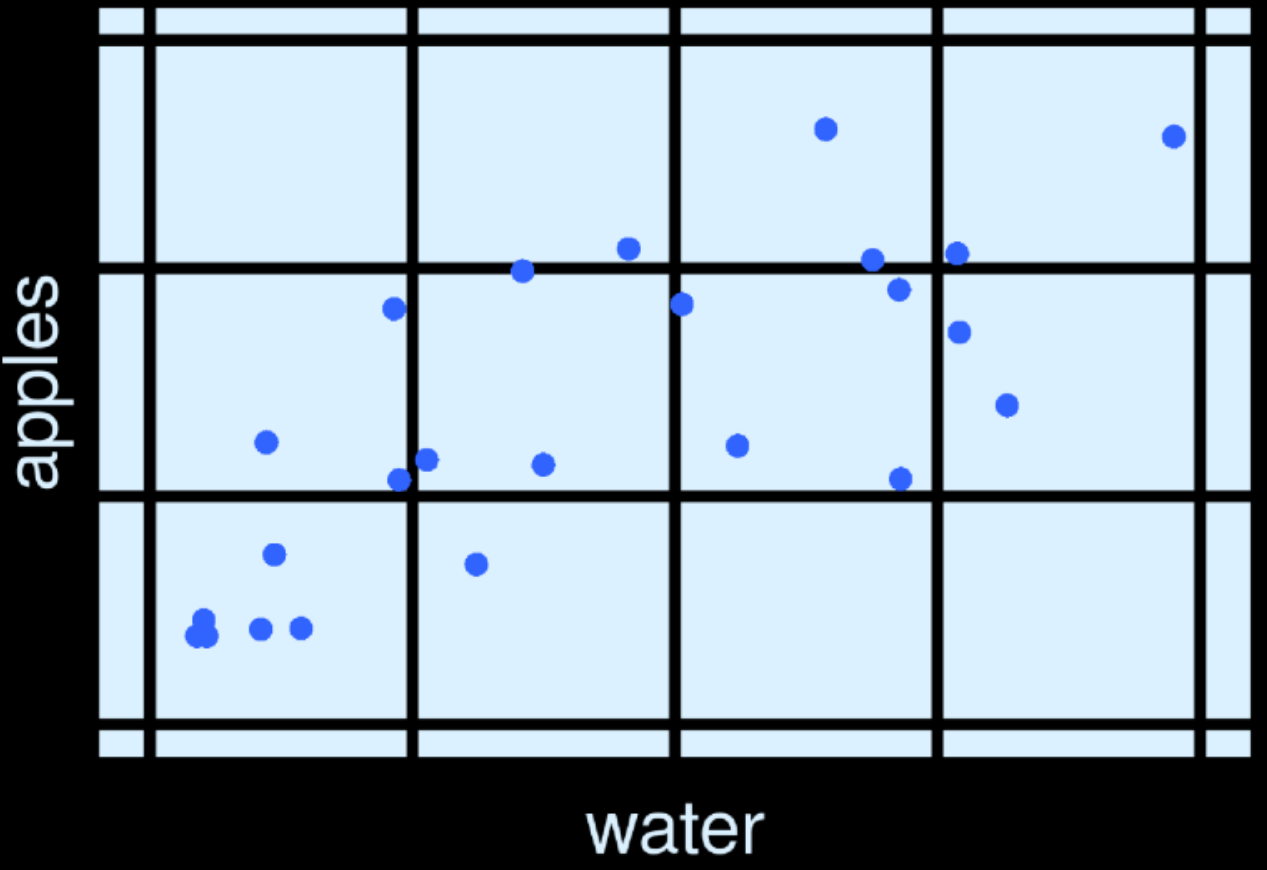
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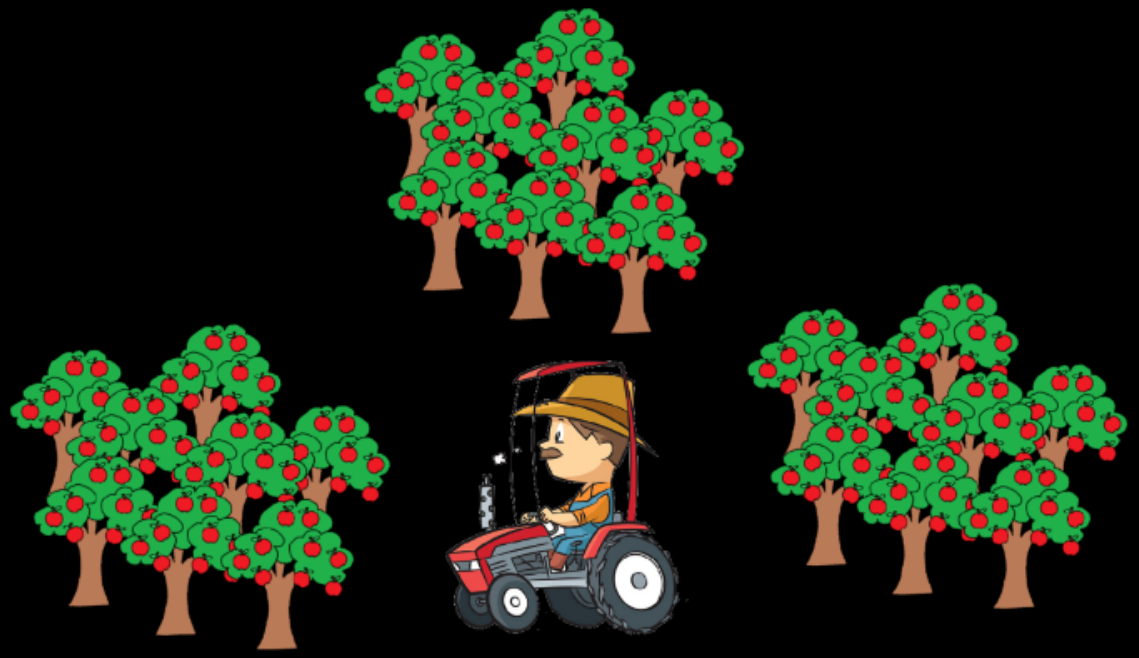

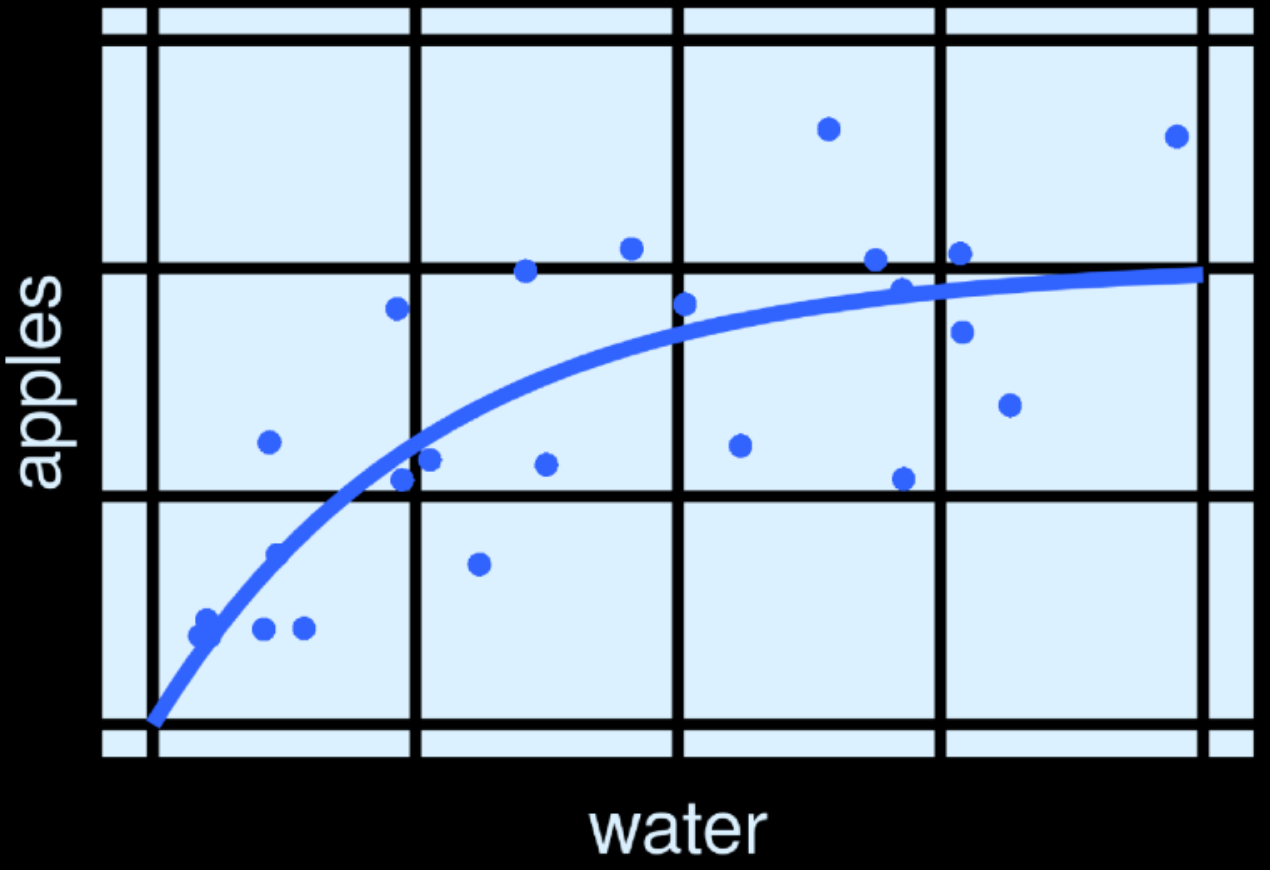
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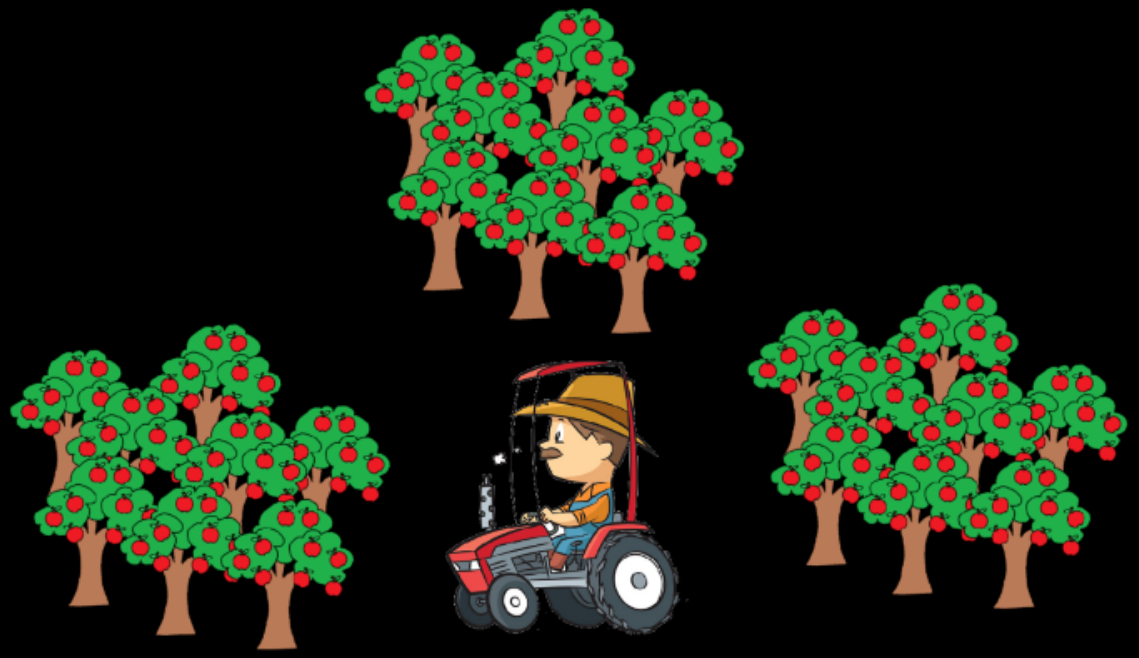

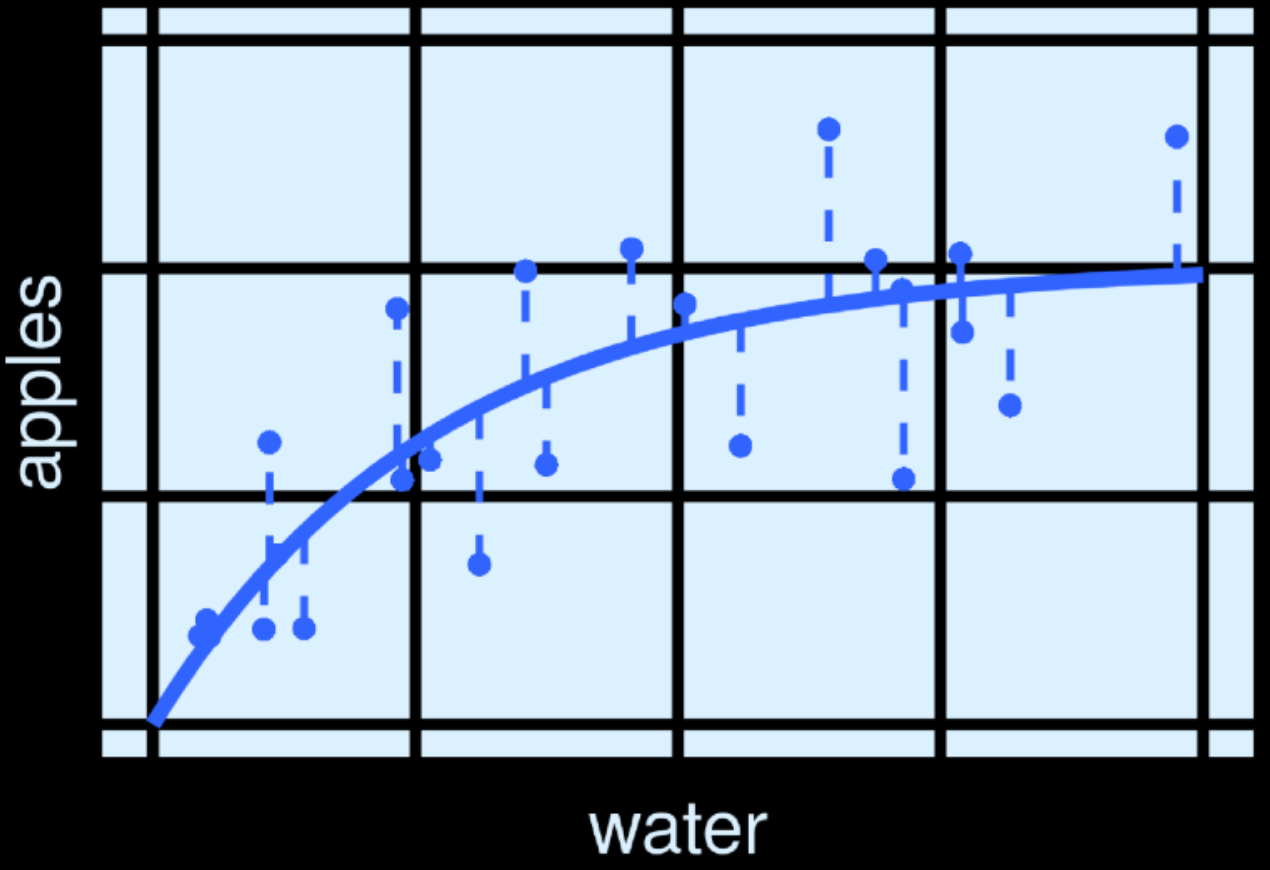
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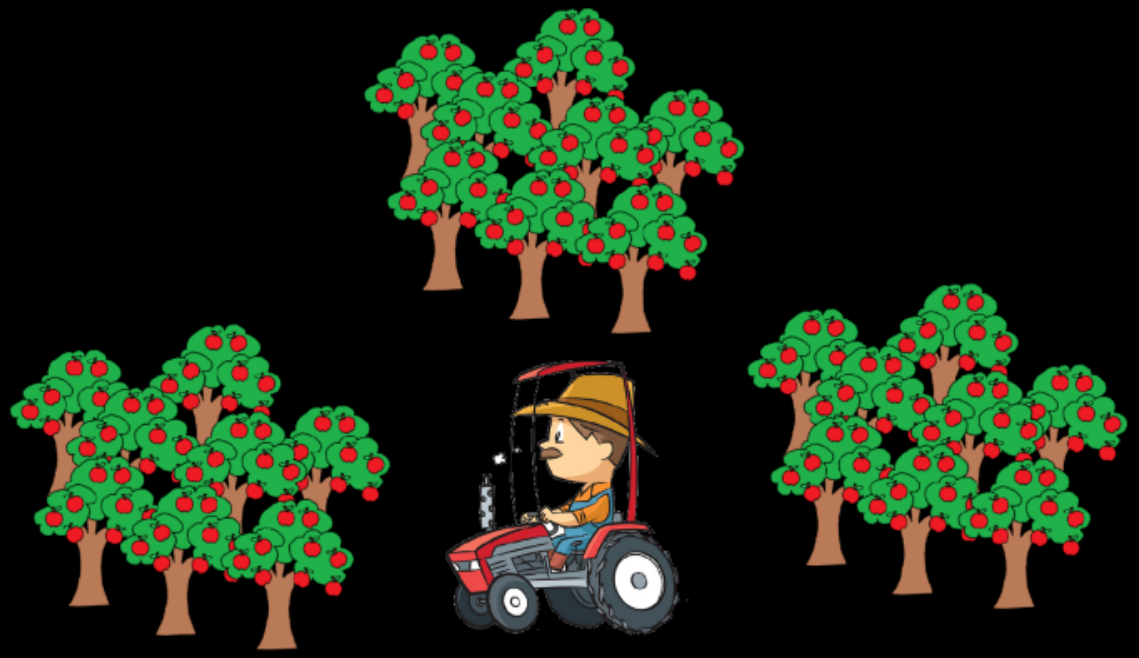

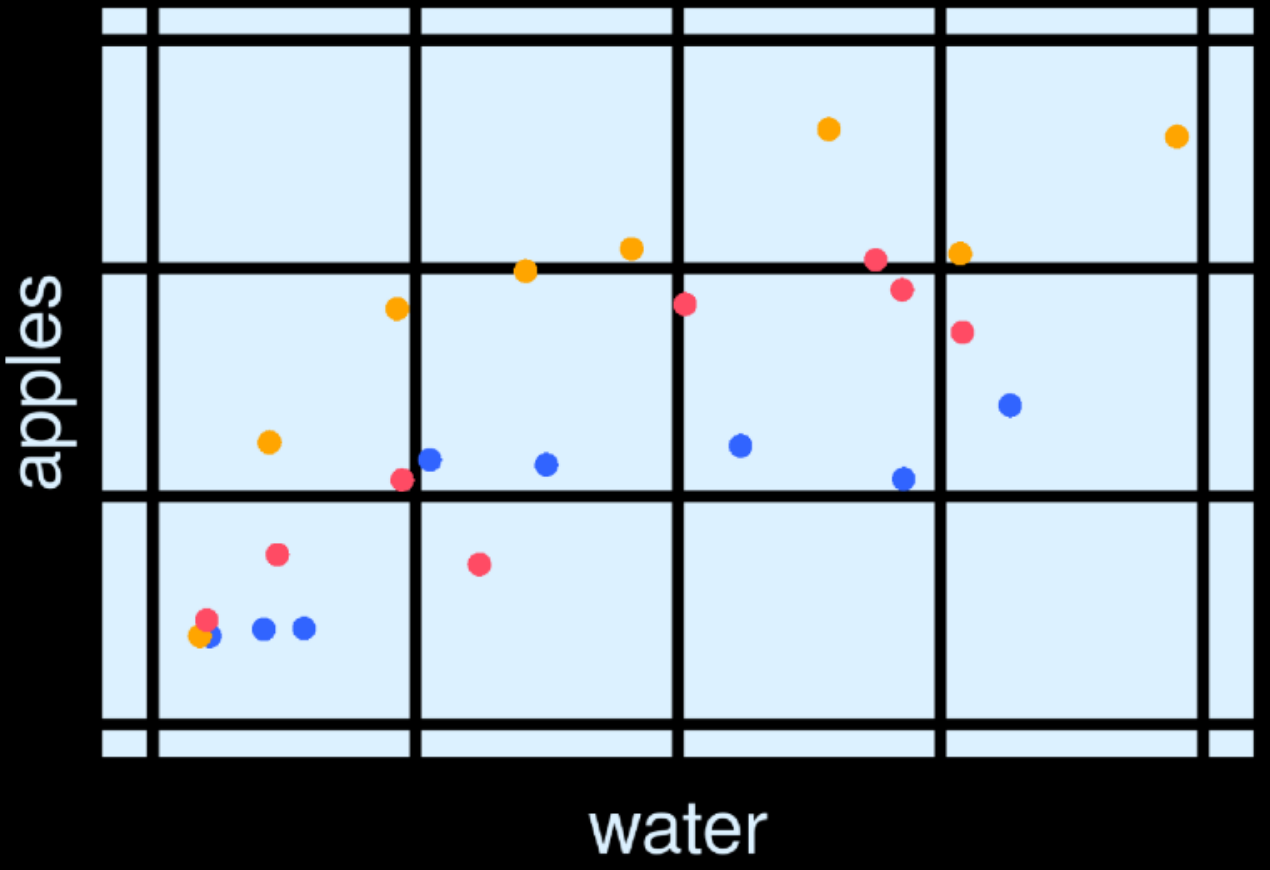
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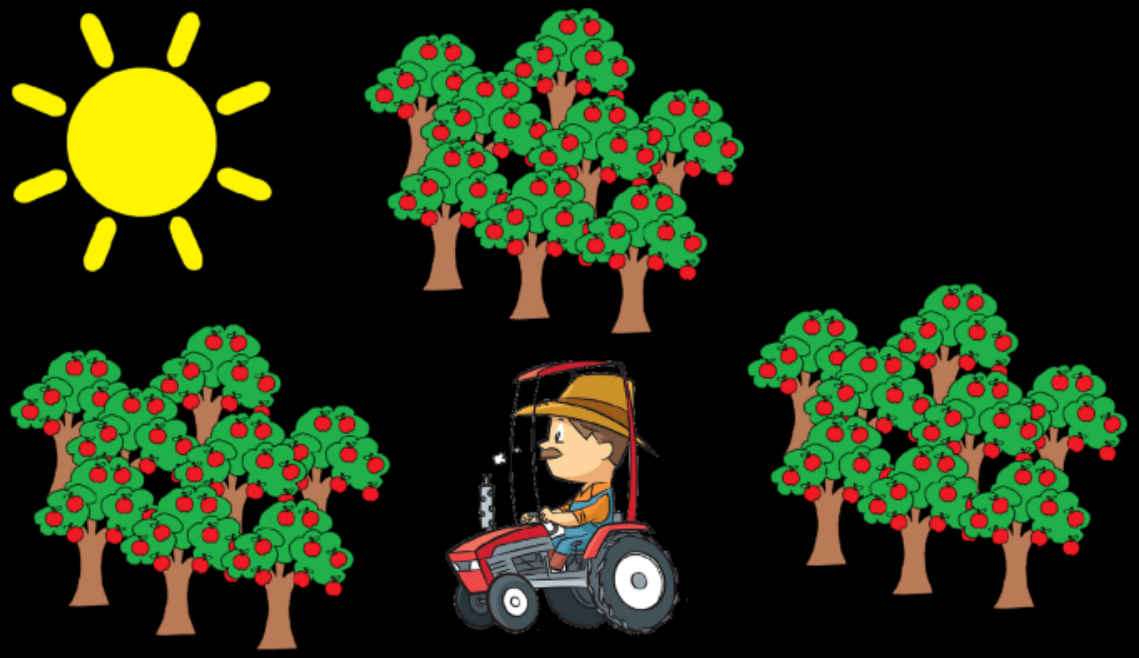

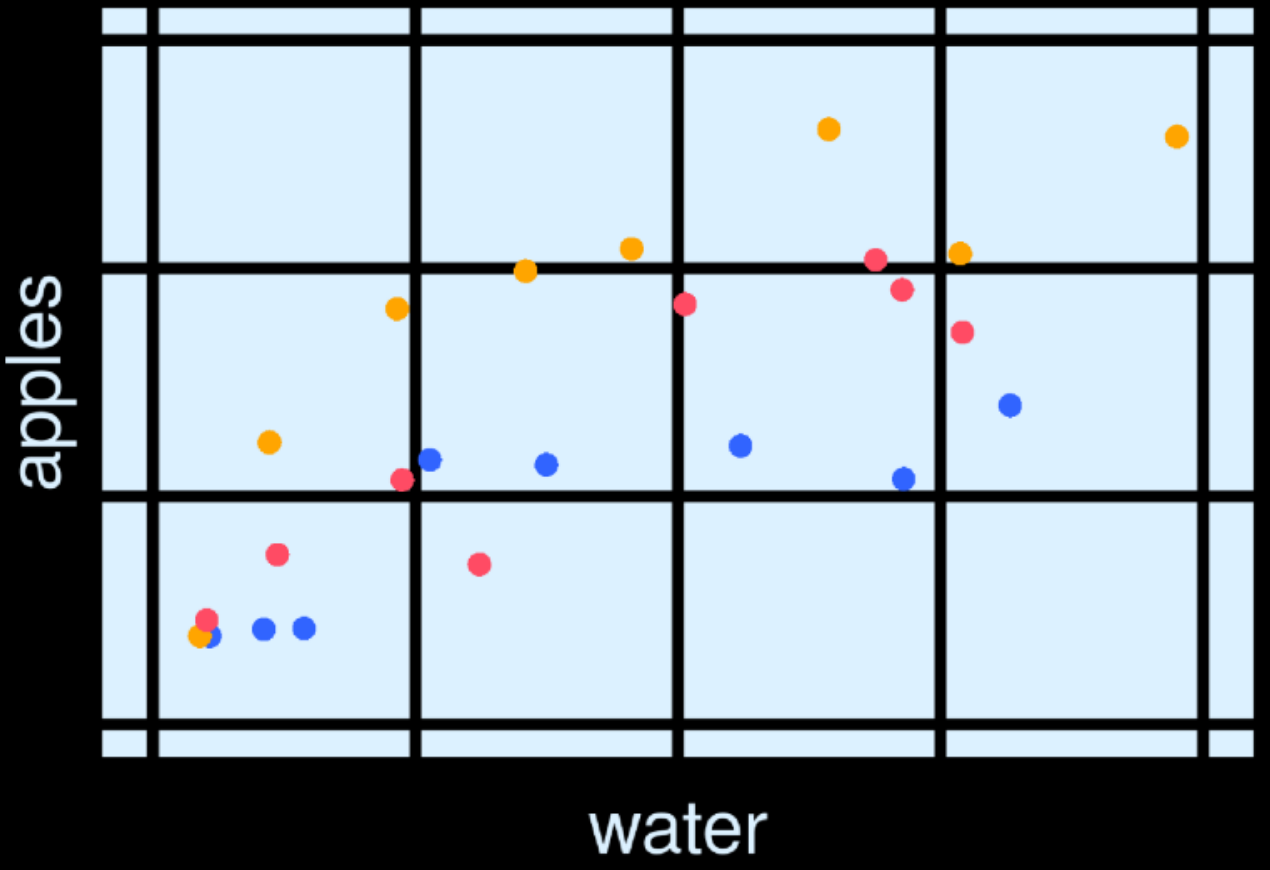
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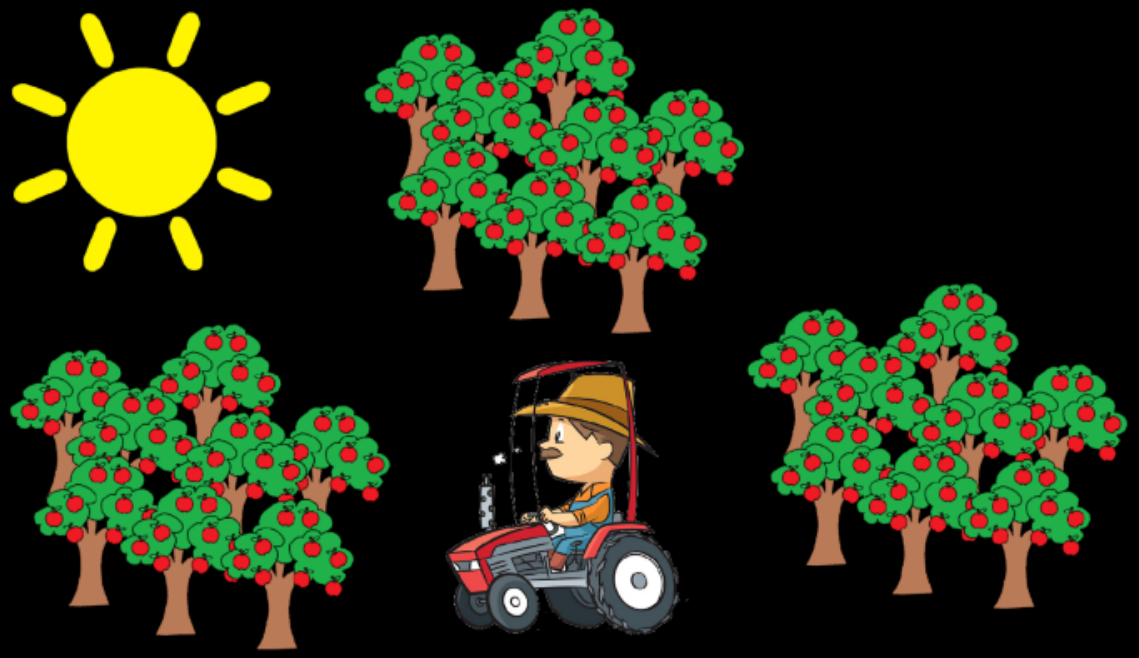

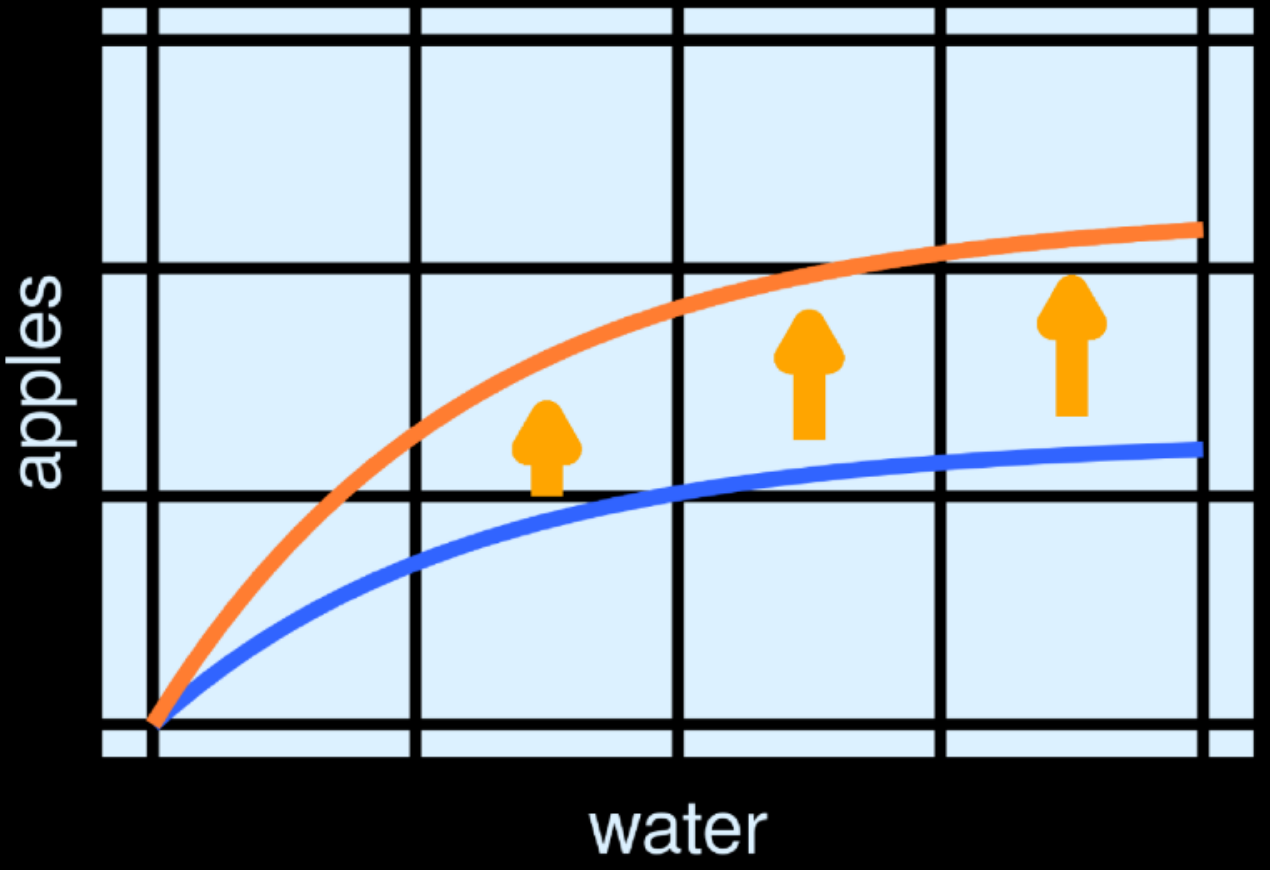
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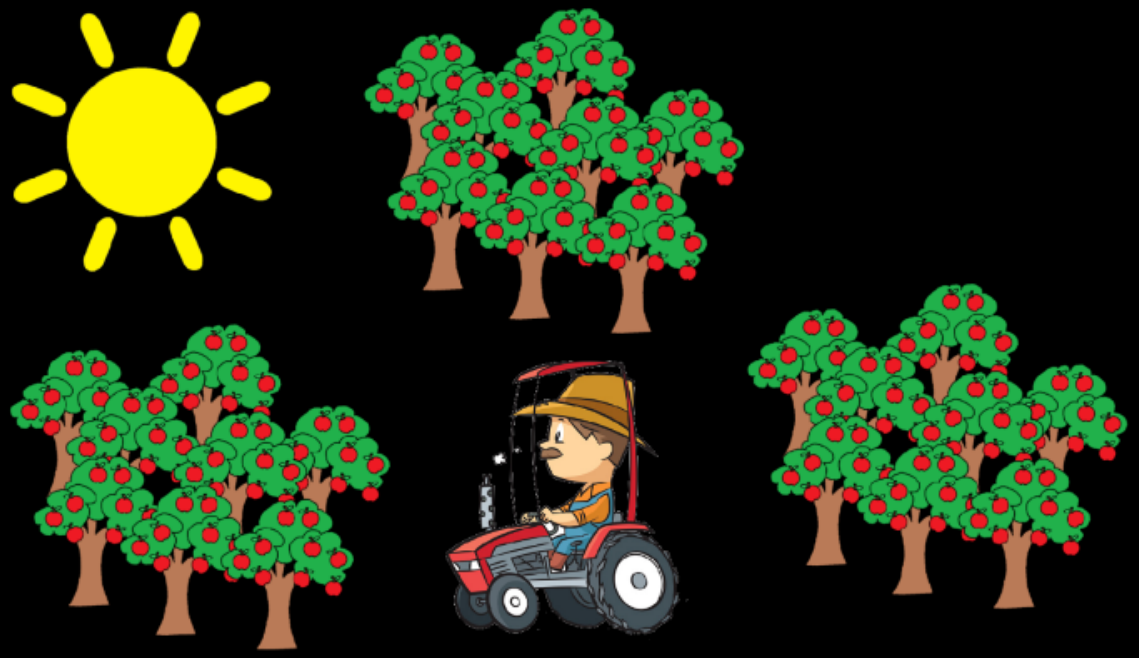

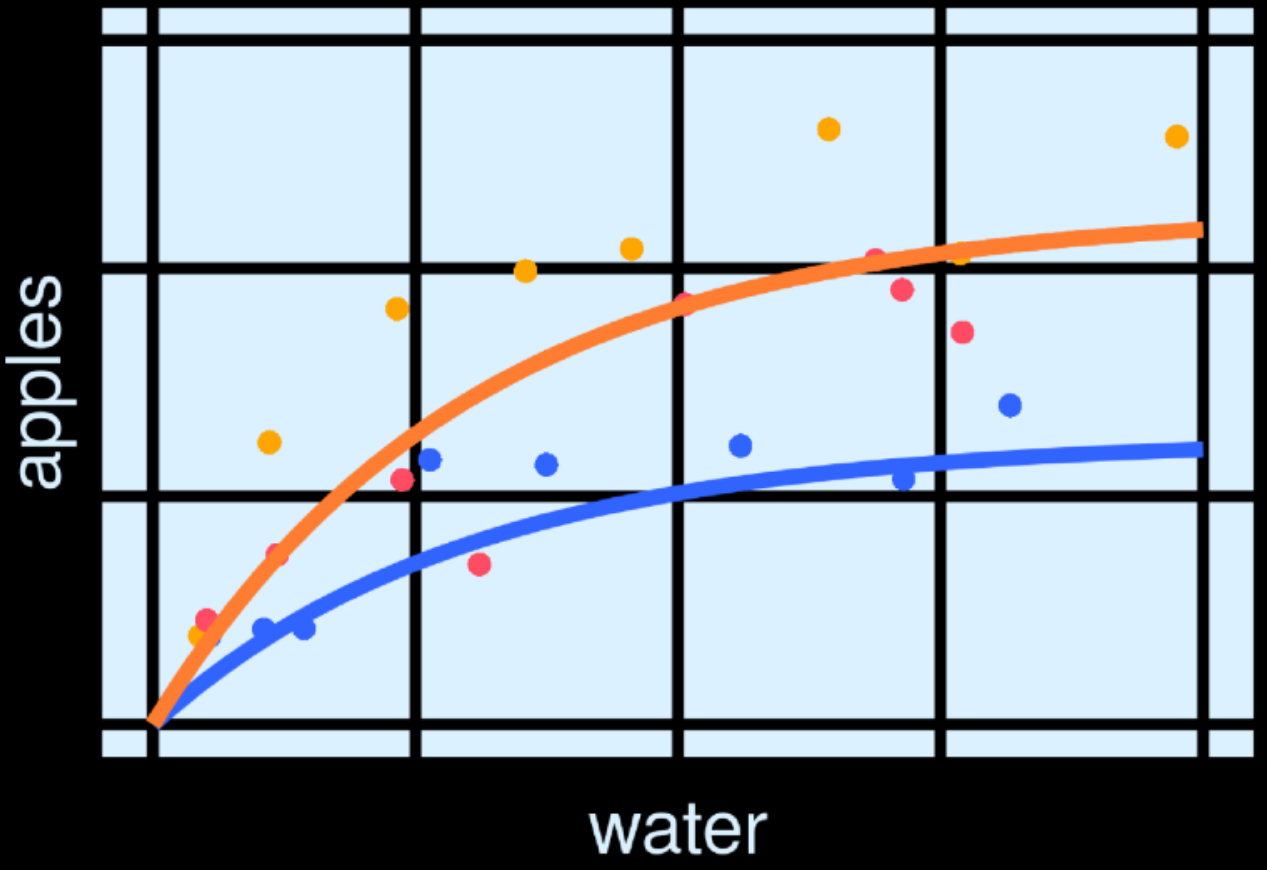
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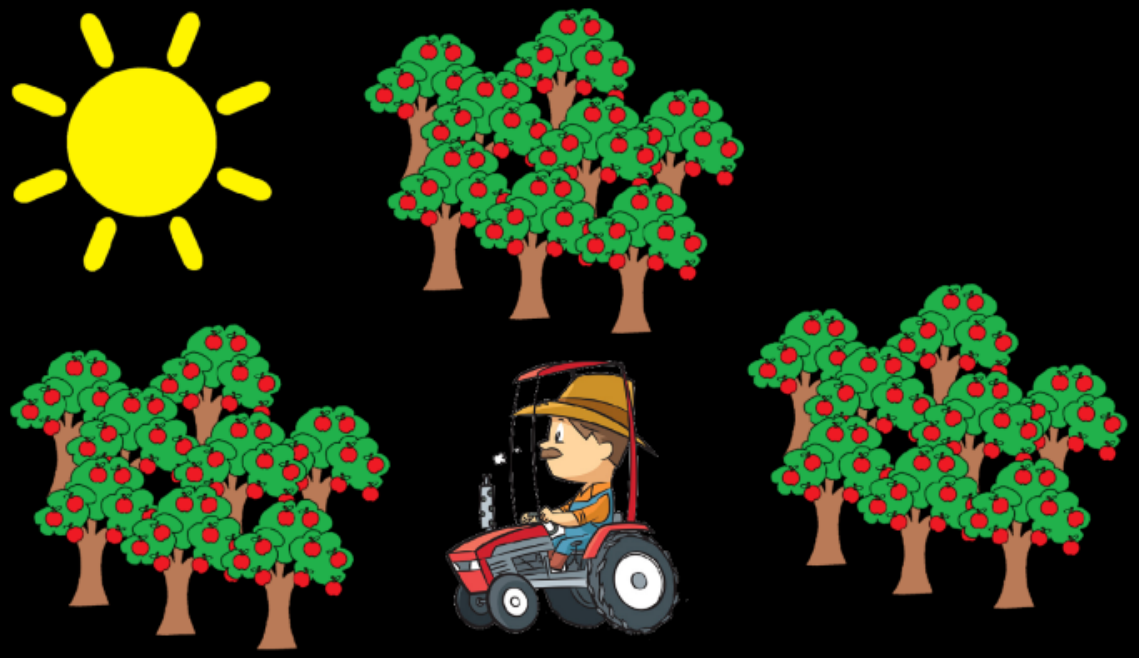
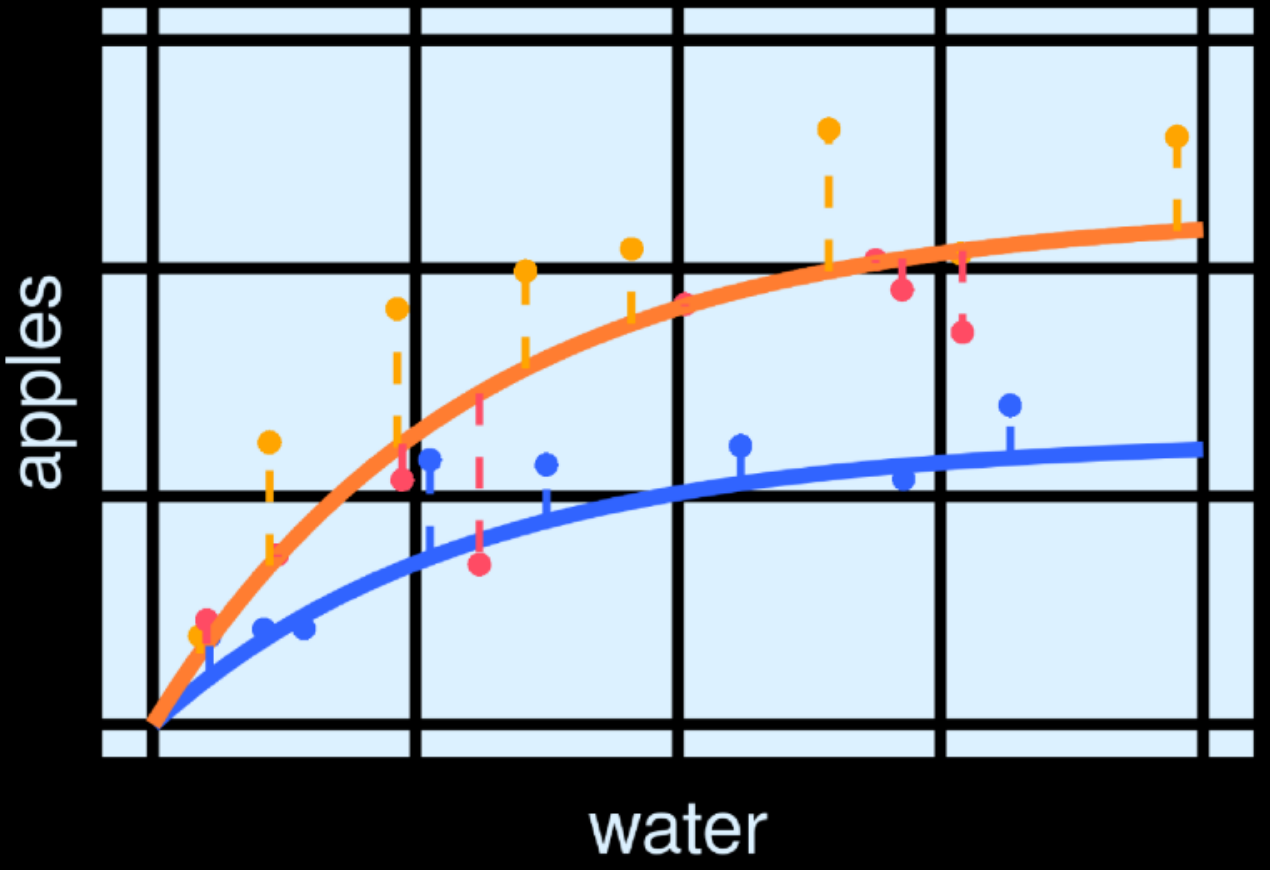
water

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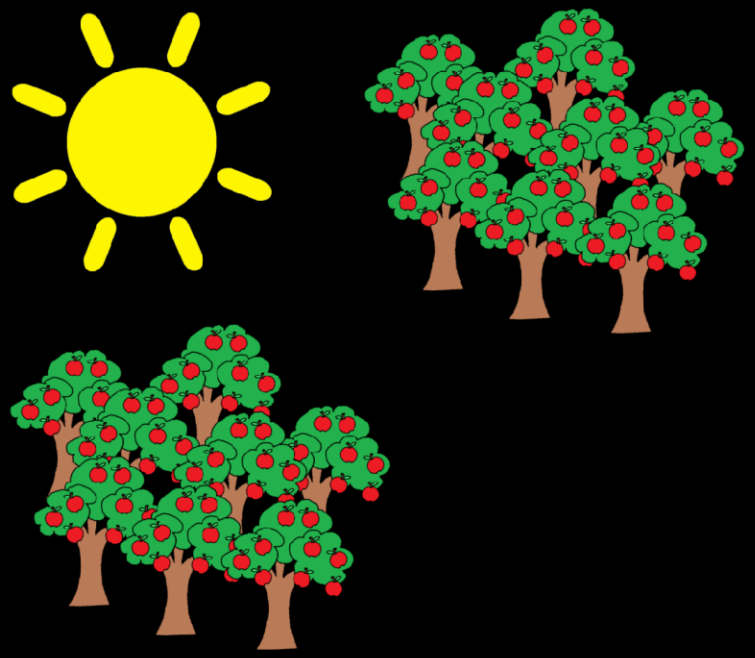

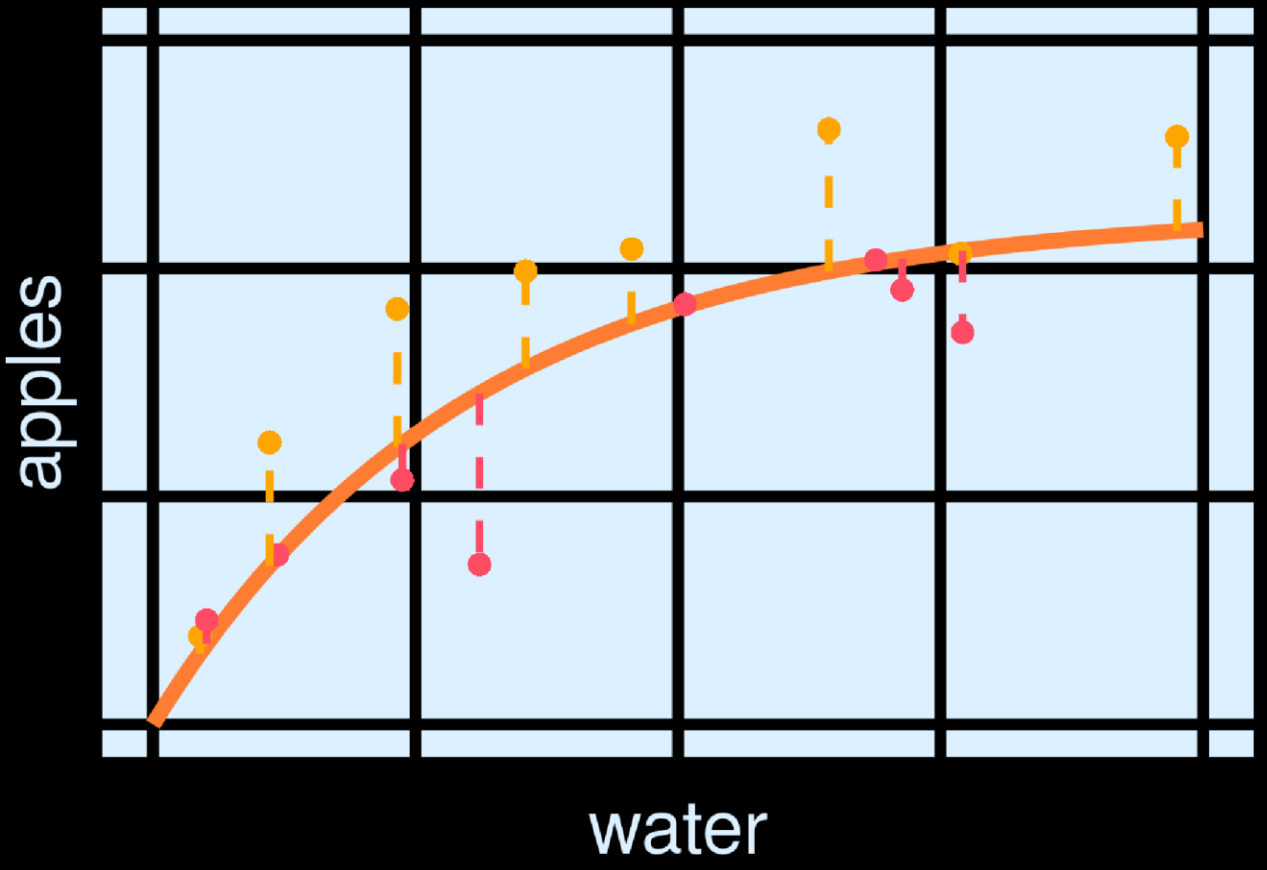
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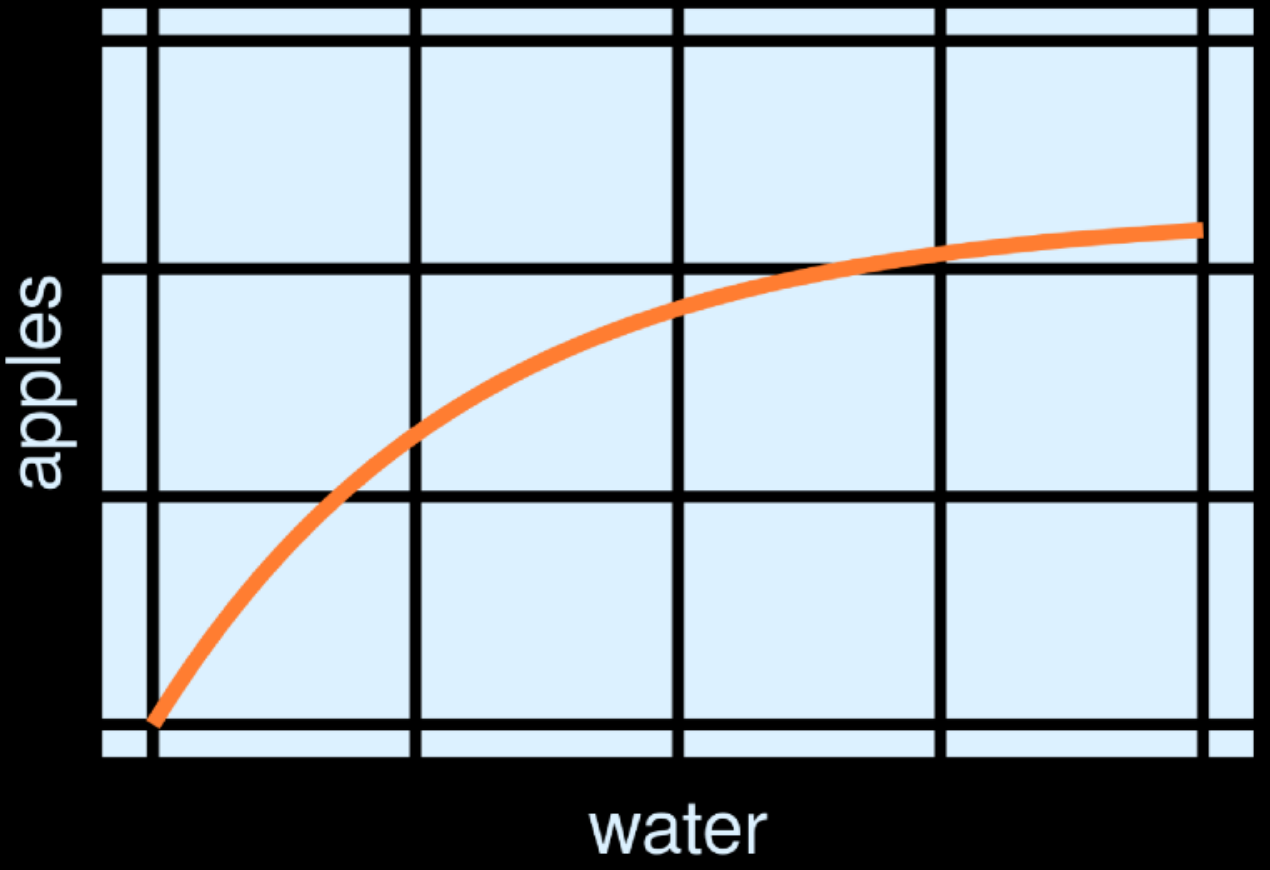
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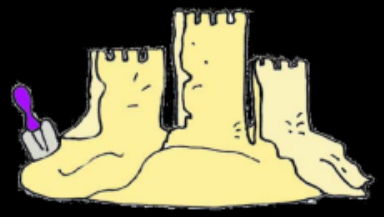

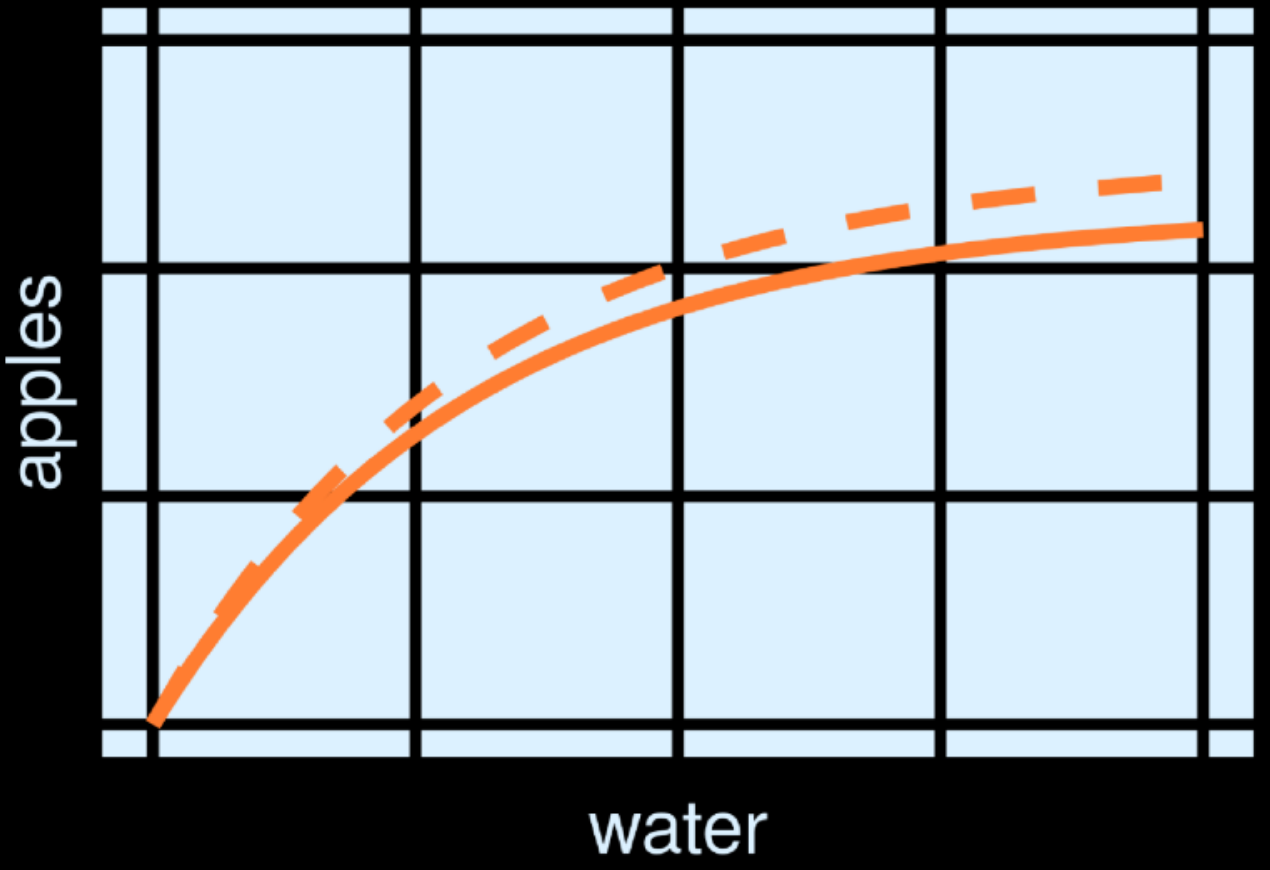
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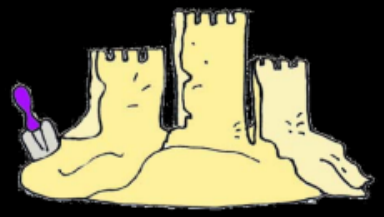

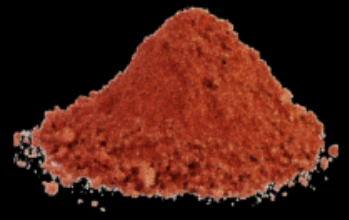

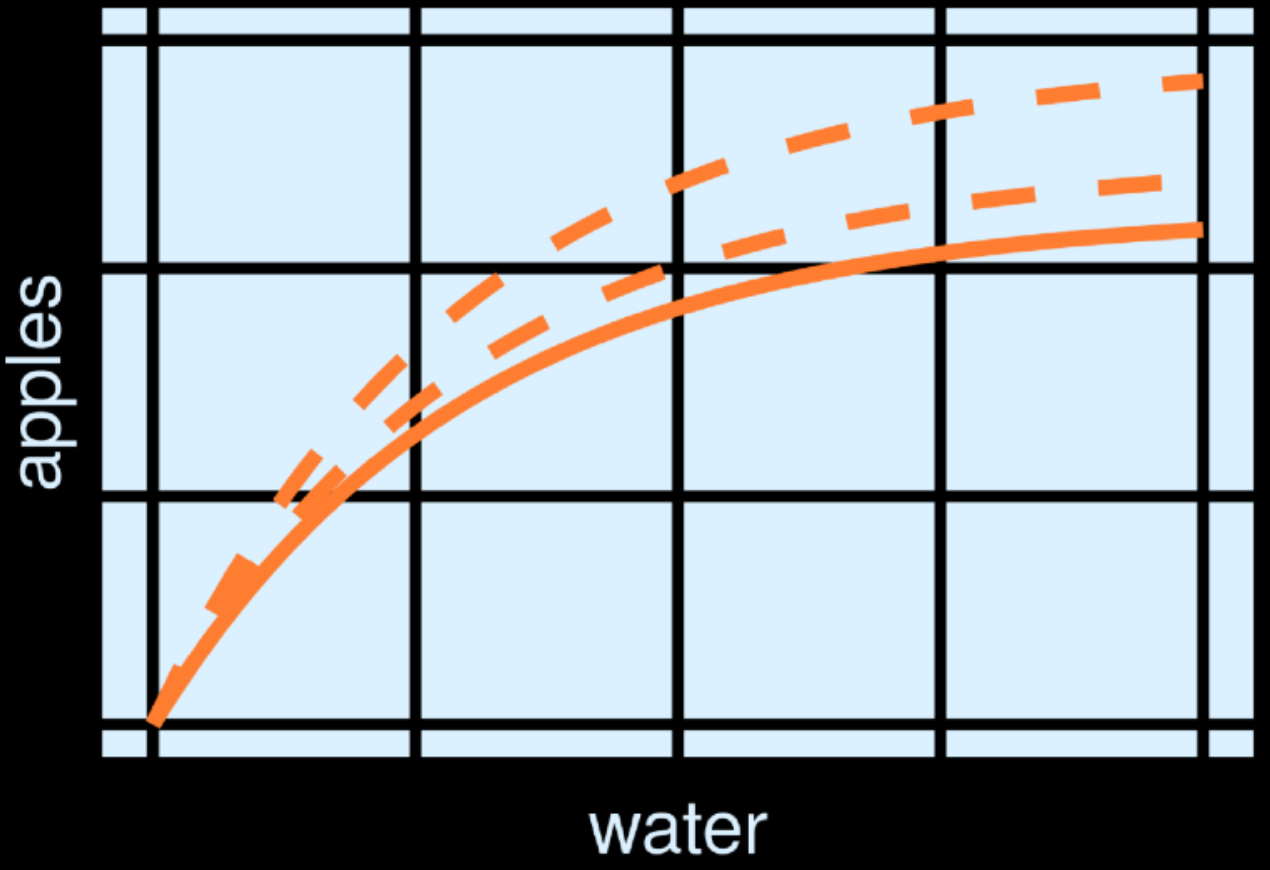
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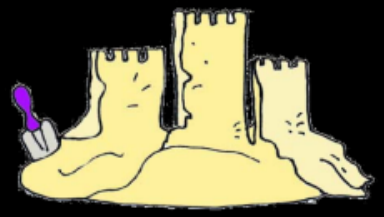

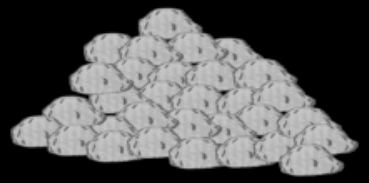

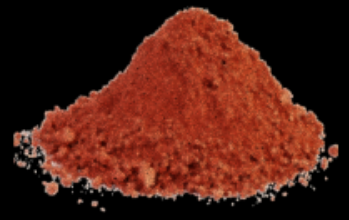

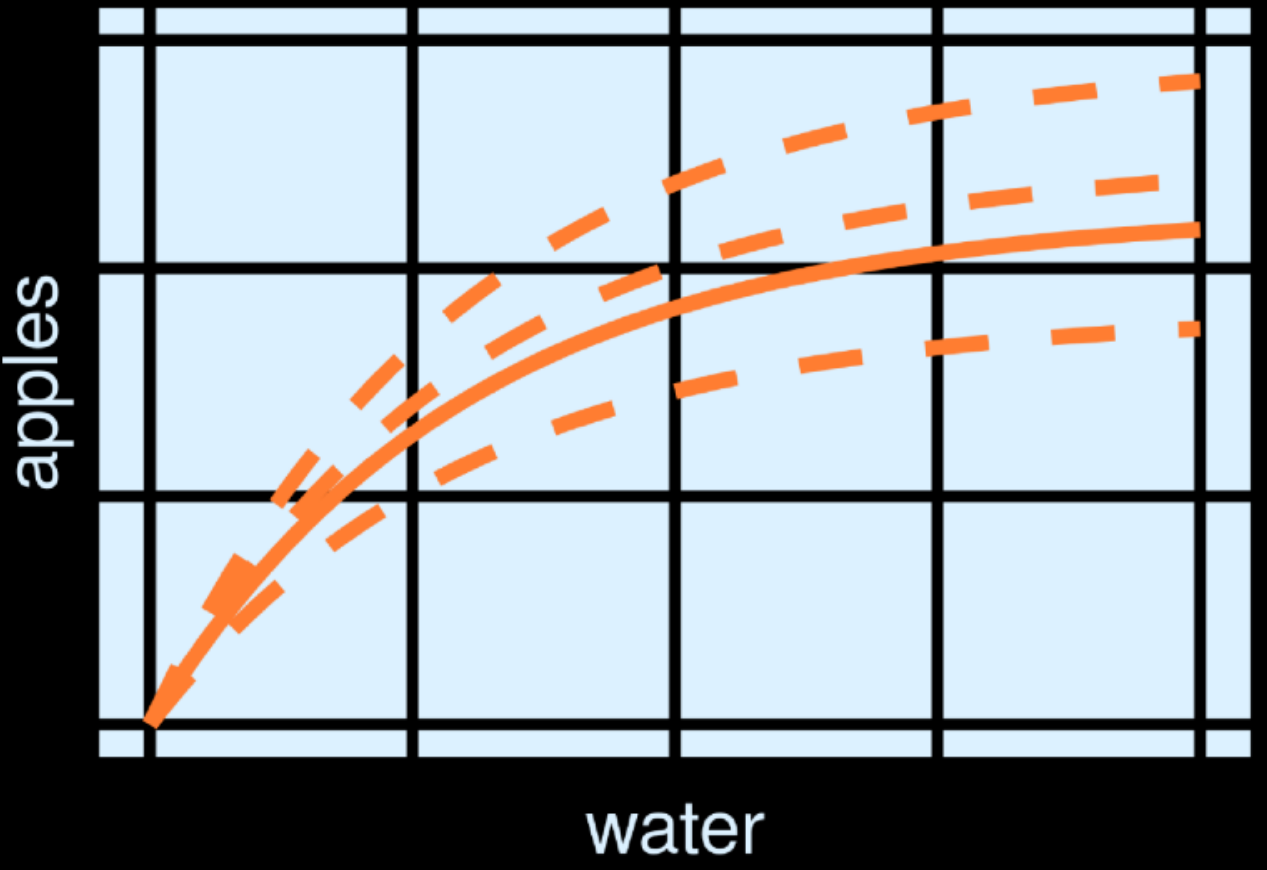
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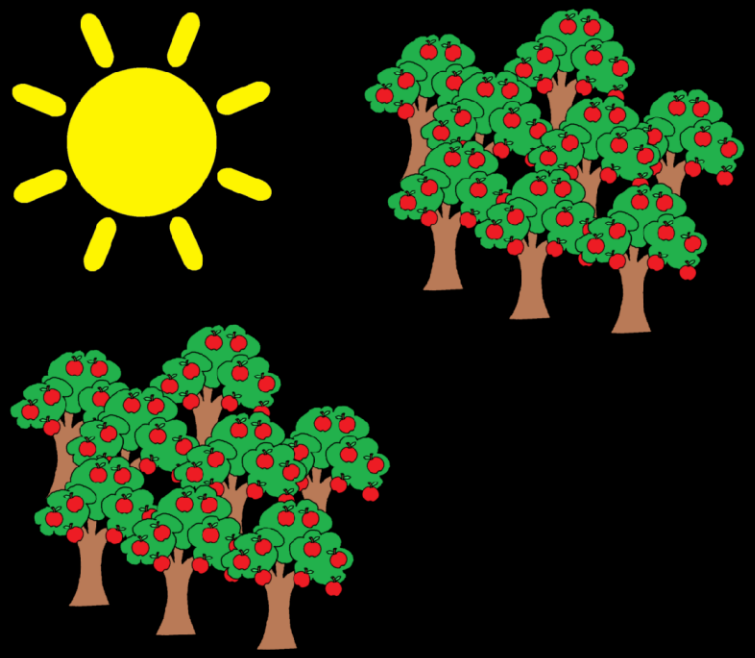

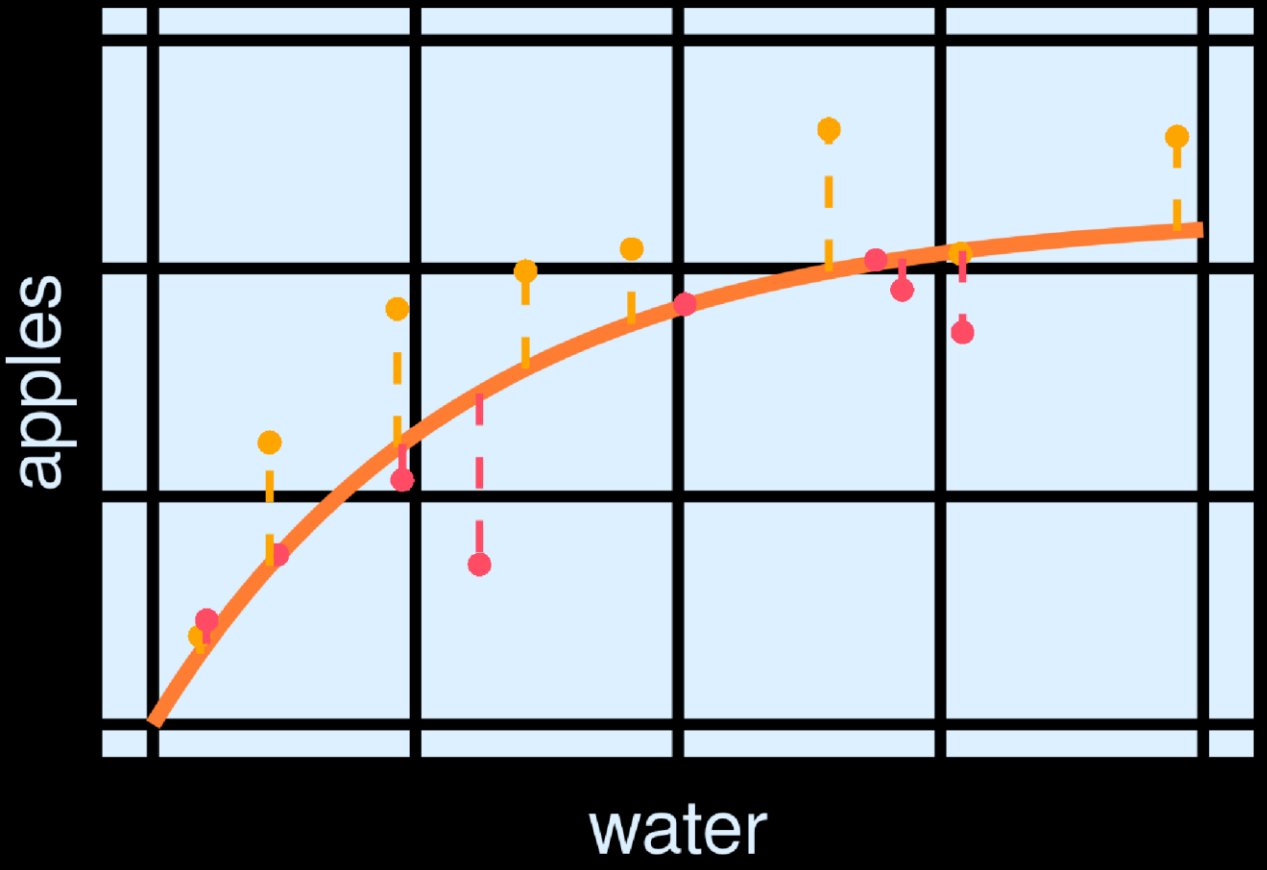
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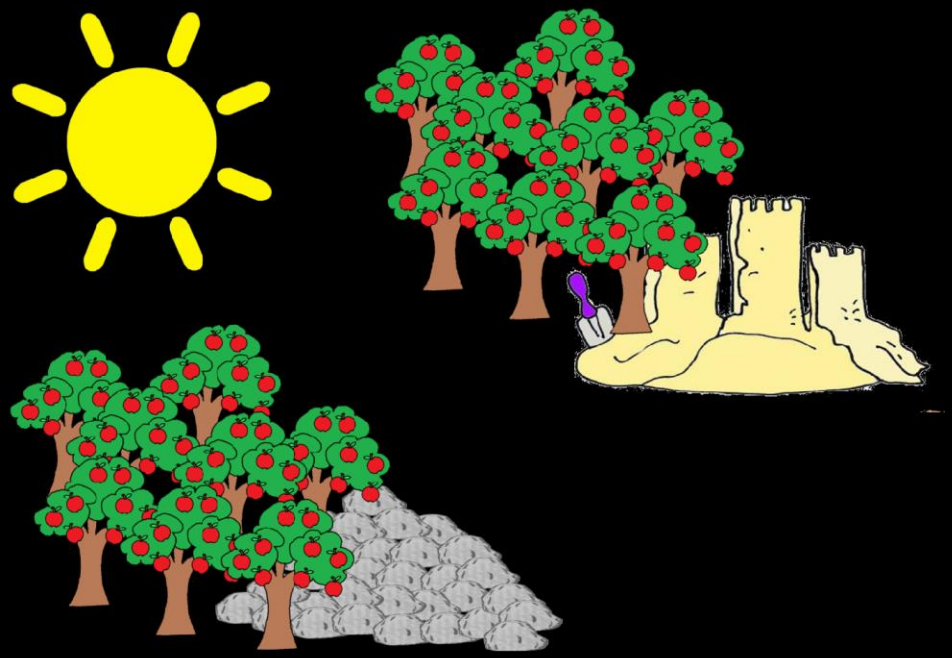

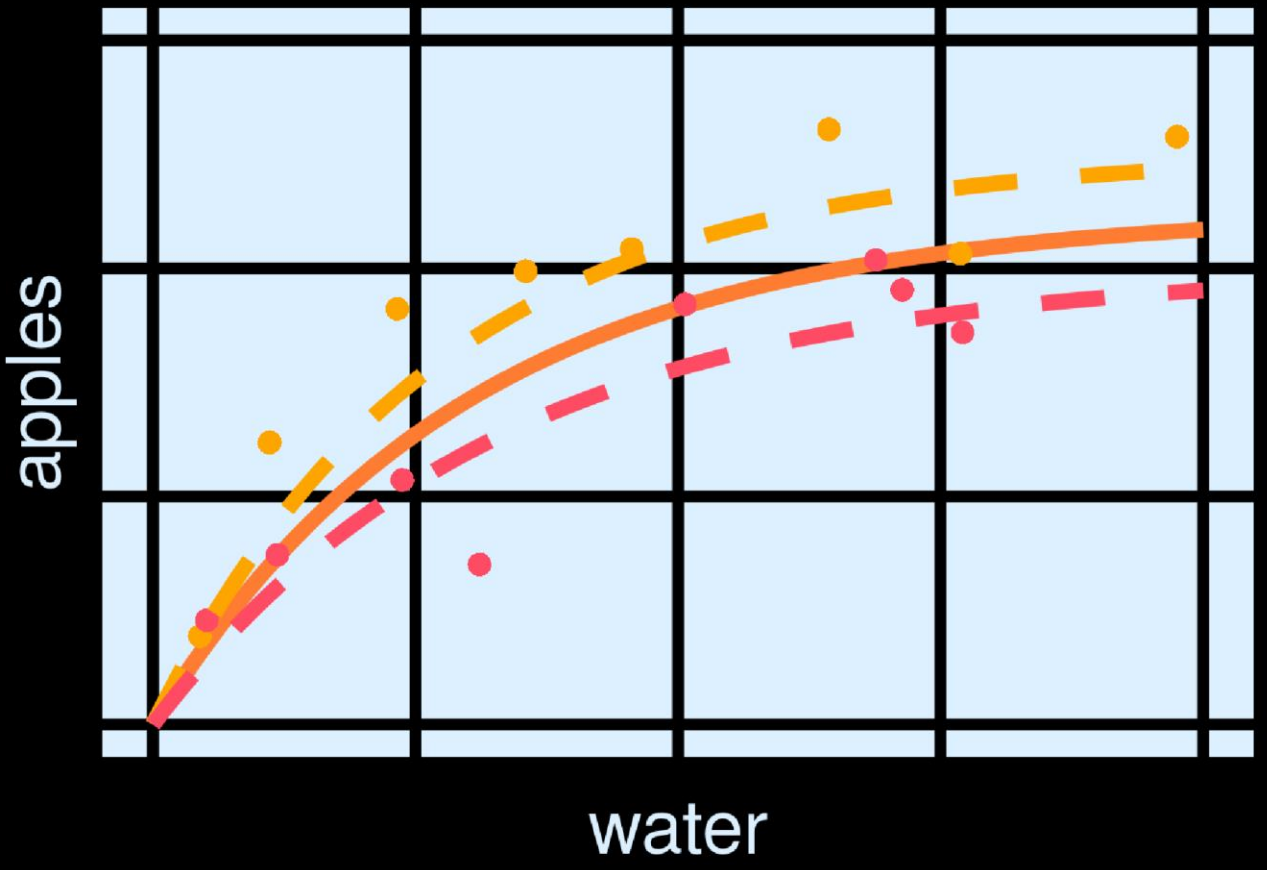
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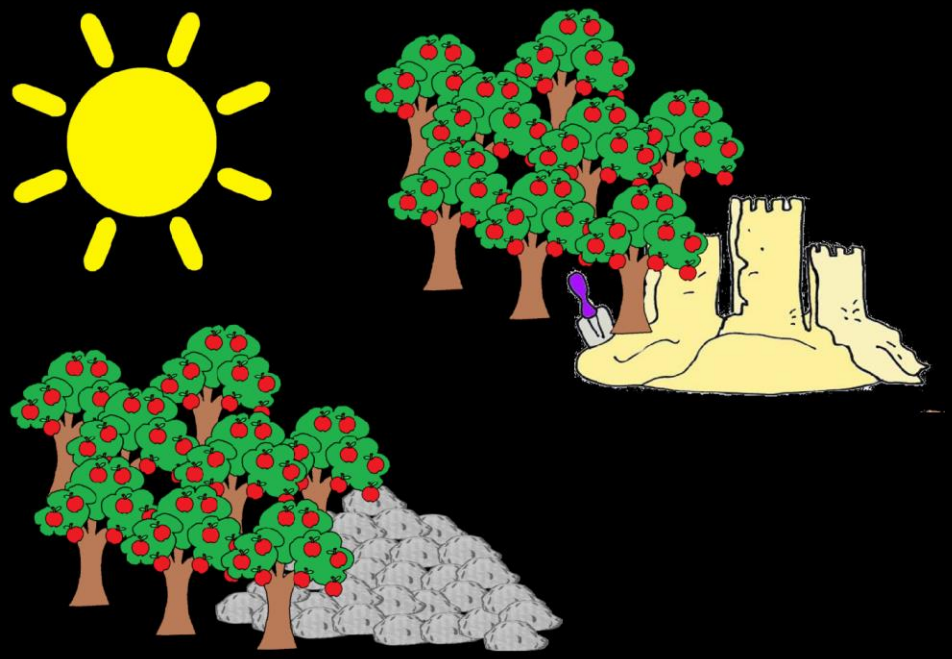

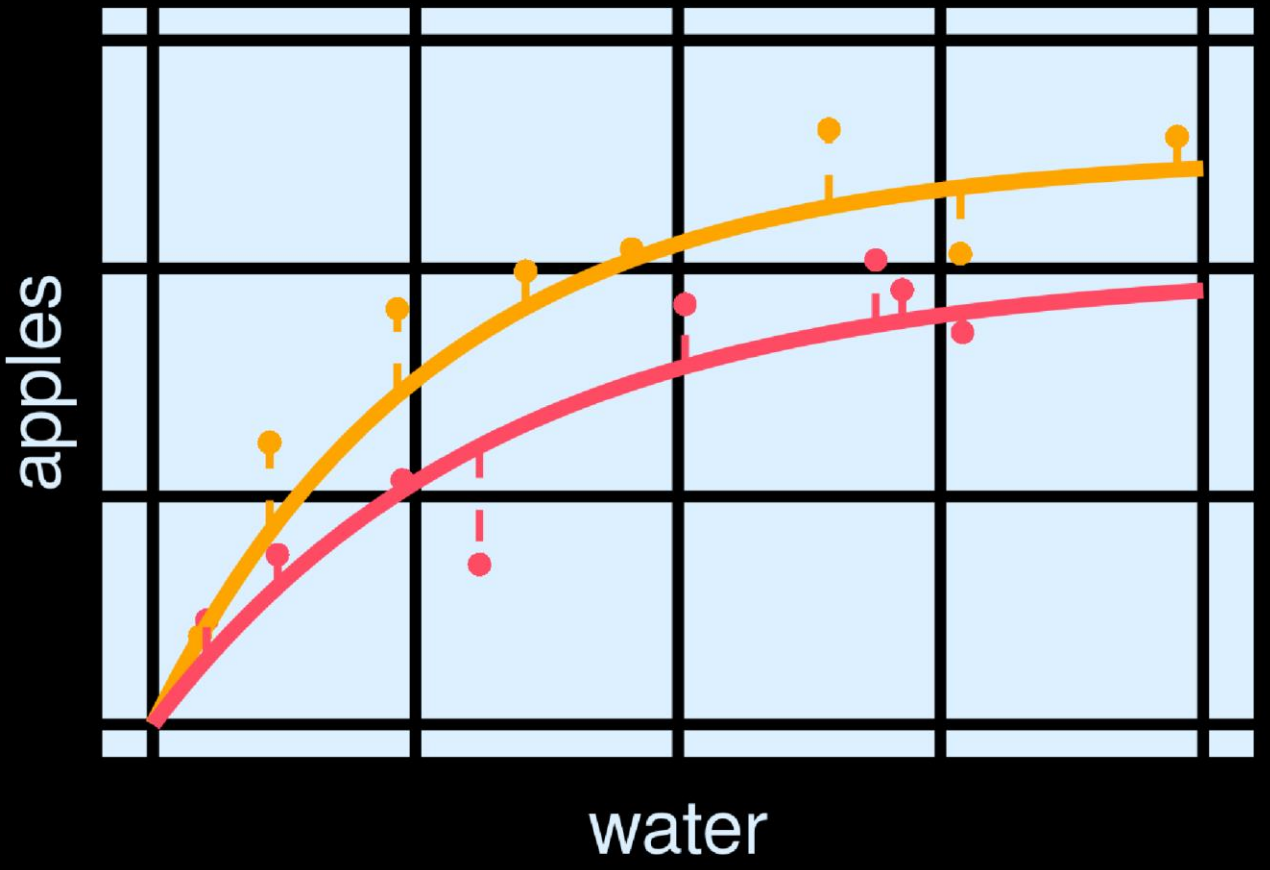
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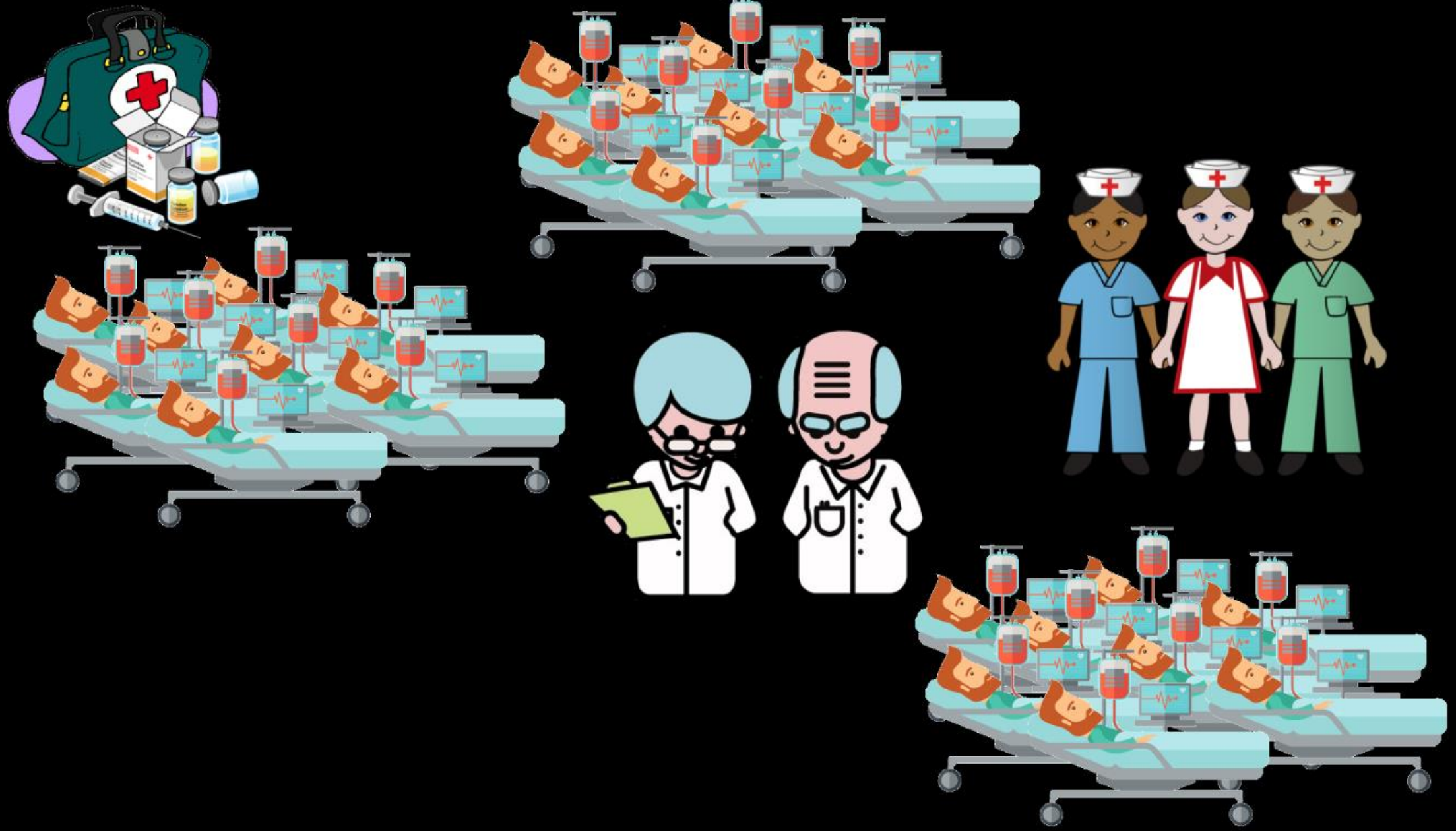

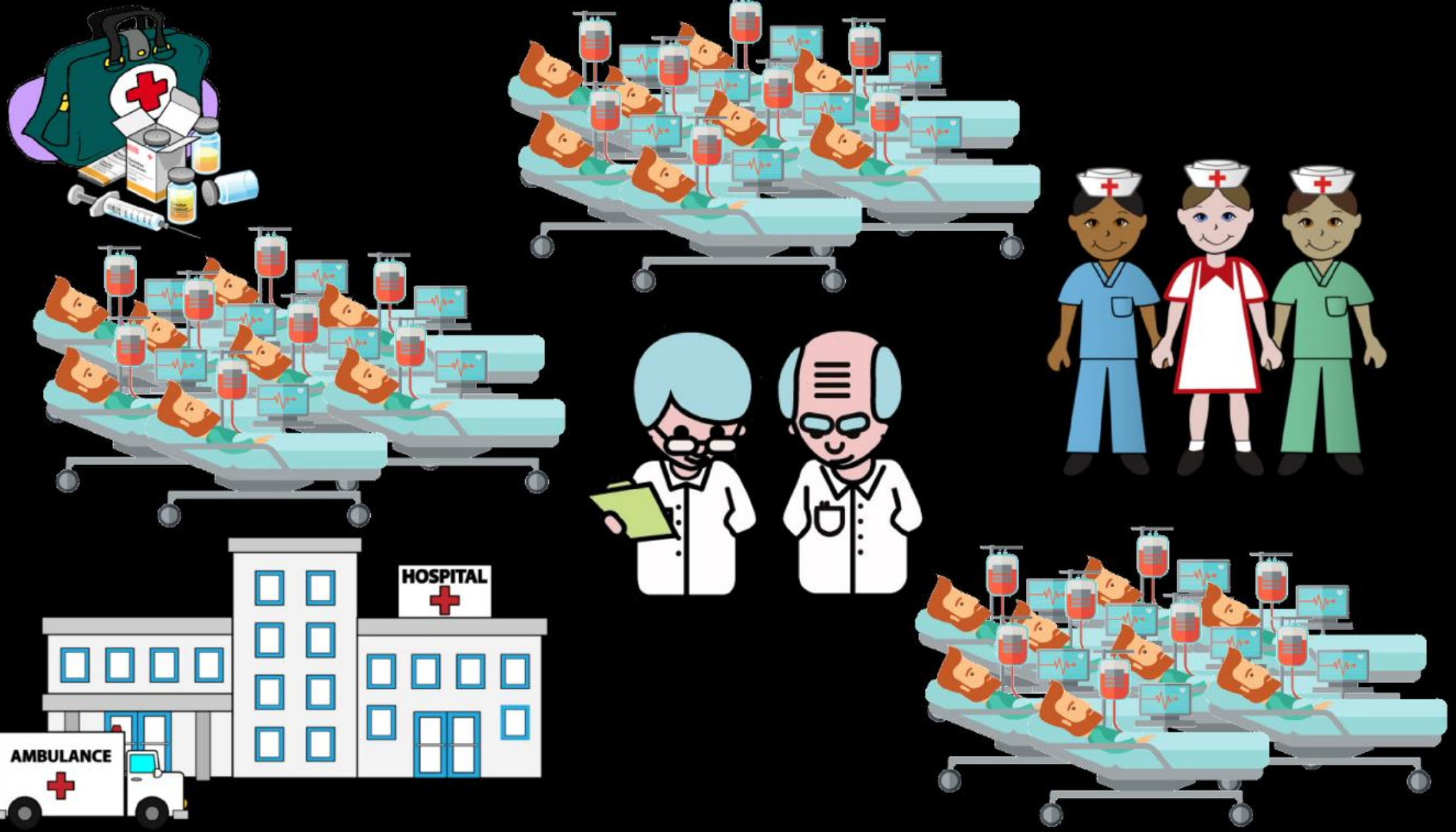
HOSPITAL
AMBULANCE

Multilevel Model - Results

Included variables

- **Hospital**
  - number of specialistic wards
  - number of important surgical specialties
- **ICU**
  - Non human resources
    - number of pumps
    - rotation index
  - Human resources
    - severe patients per physician (per year)
  - Management
    - physicians dedicated to ICU only or on a rotation basis
    - number of hours conceeded for relatives' visit

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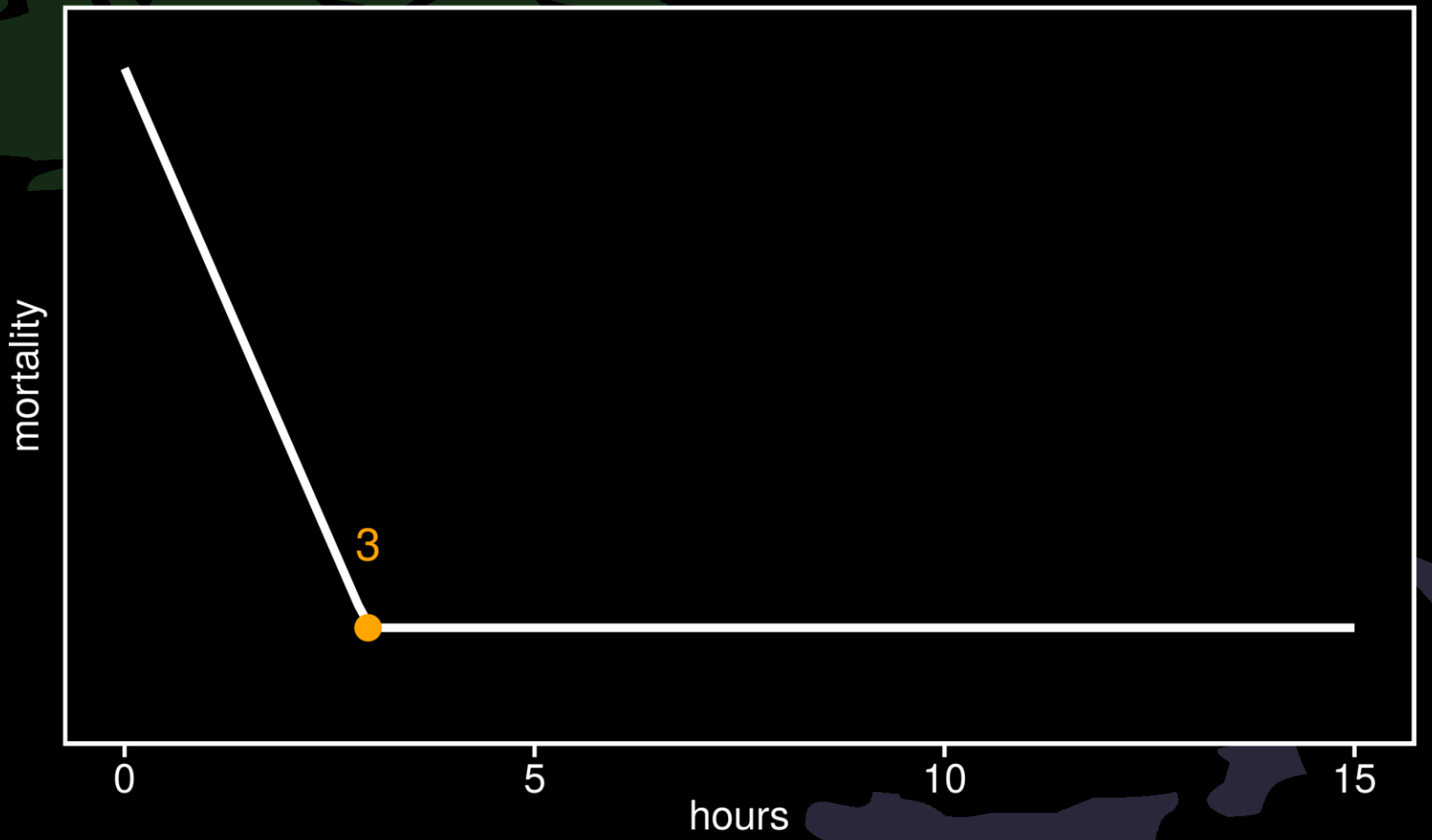
Hours conceeded for relatives' visit



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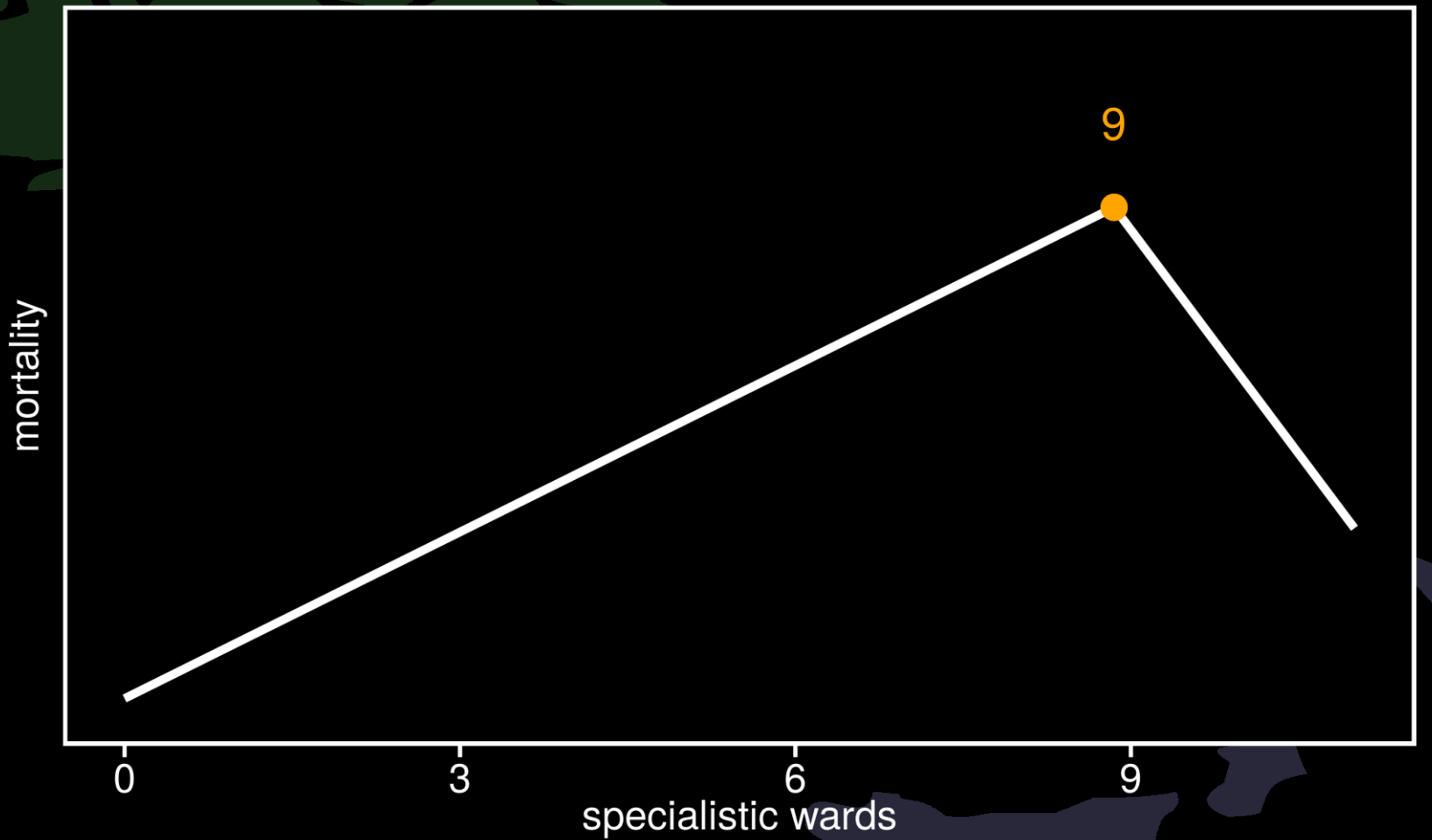
Number of specialistic wards



Included variables

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  - number of important surgical specialties
- ICU
  - Non human resources
    - number of pumps
    - **rotation index**
  - Human resources
    - severe patients per physician (per year)
  - Management
    - physicians dedicated to ICU only or on a rotation basis
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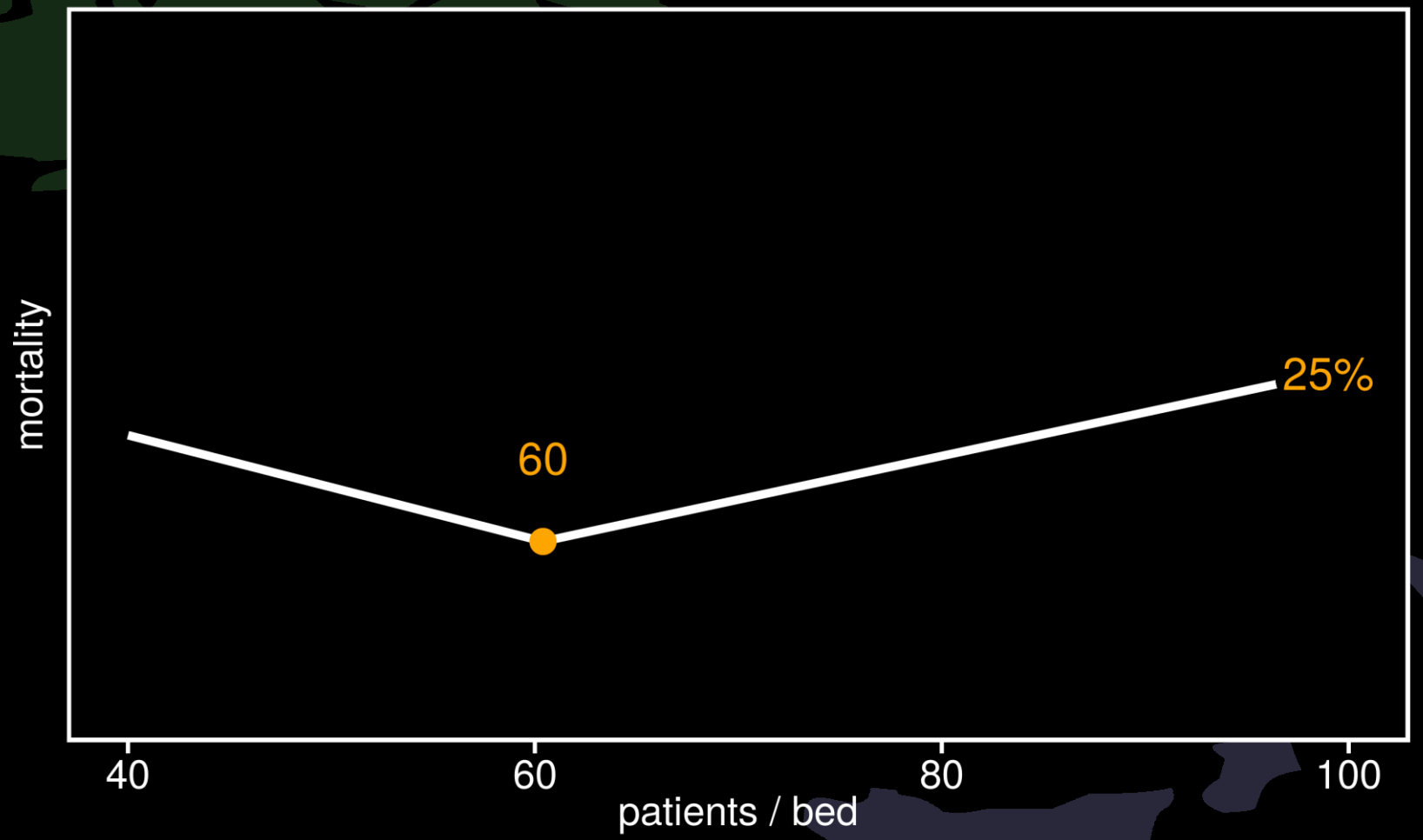
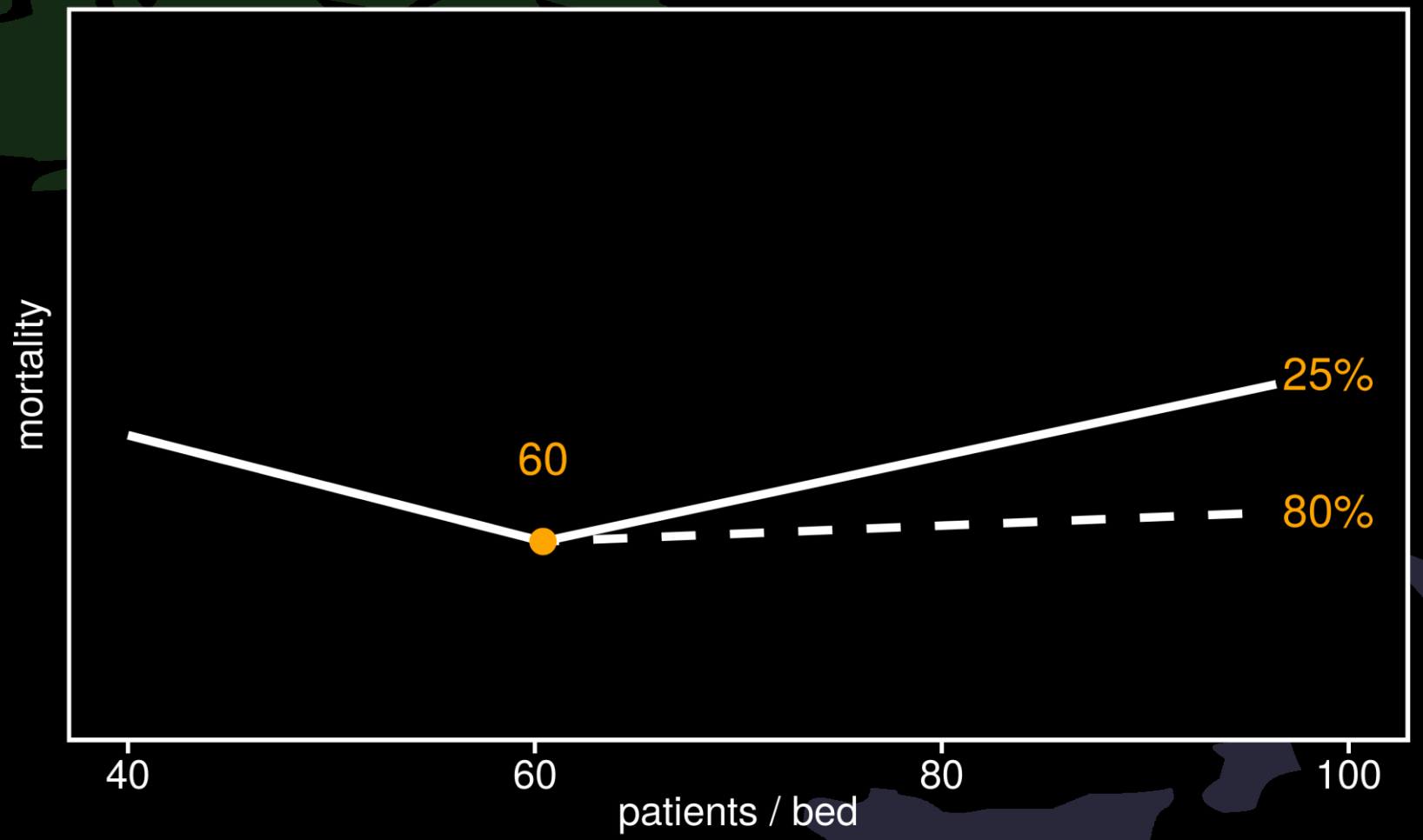
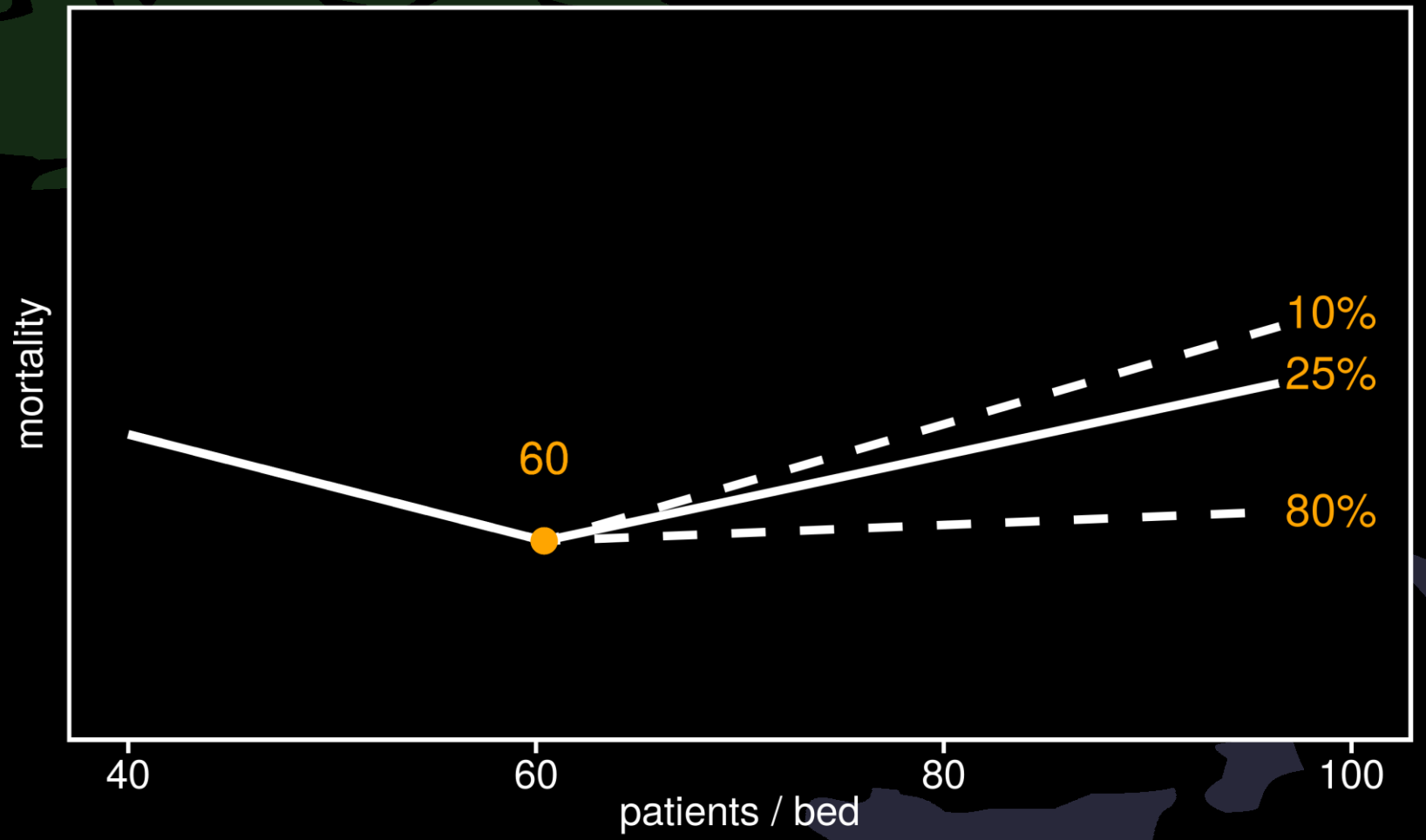
Rotation index



Rotation index



Rotation index



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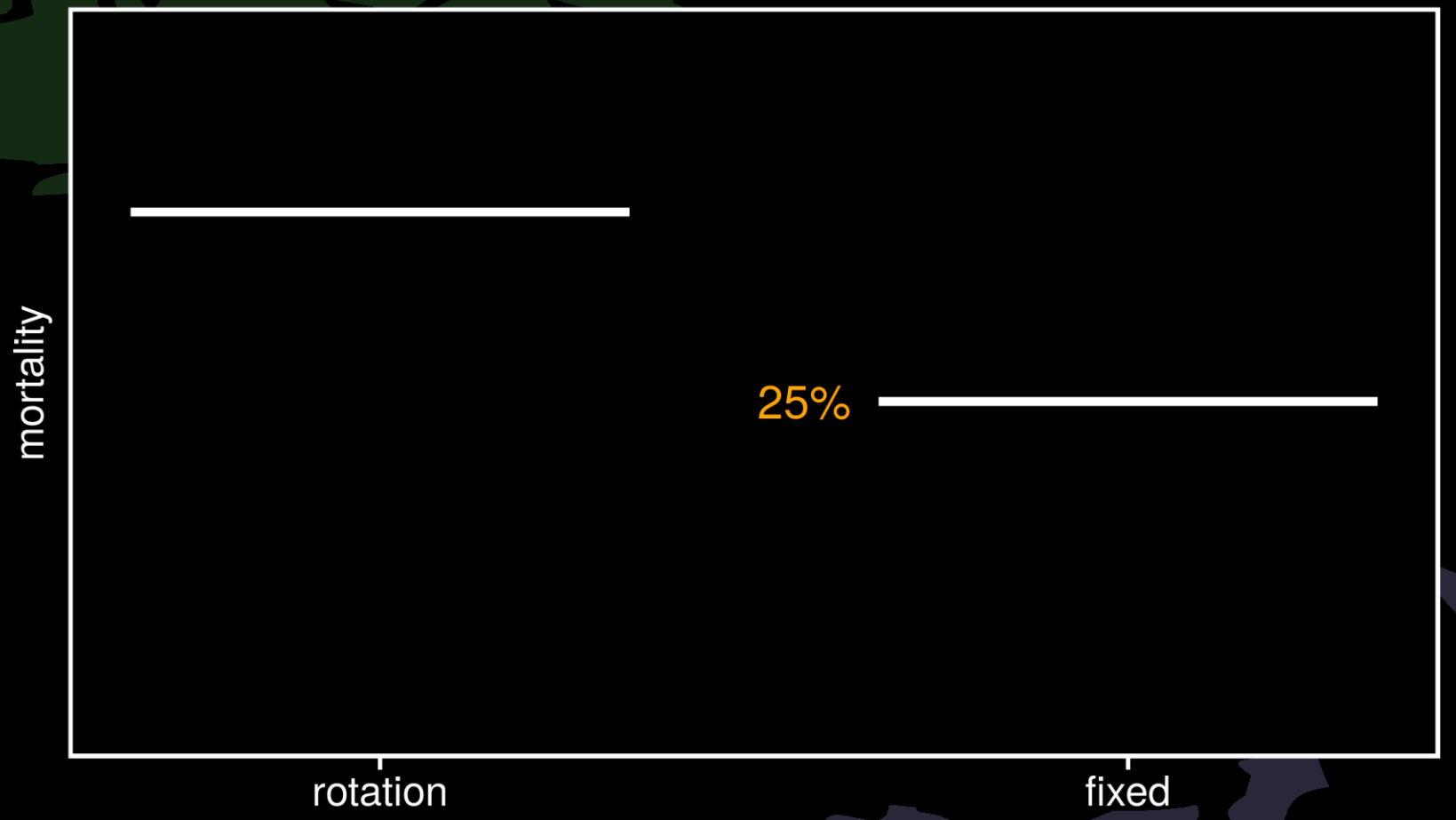
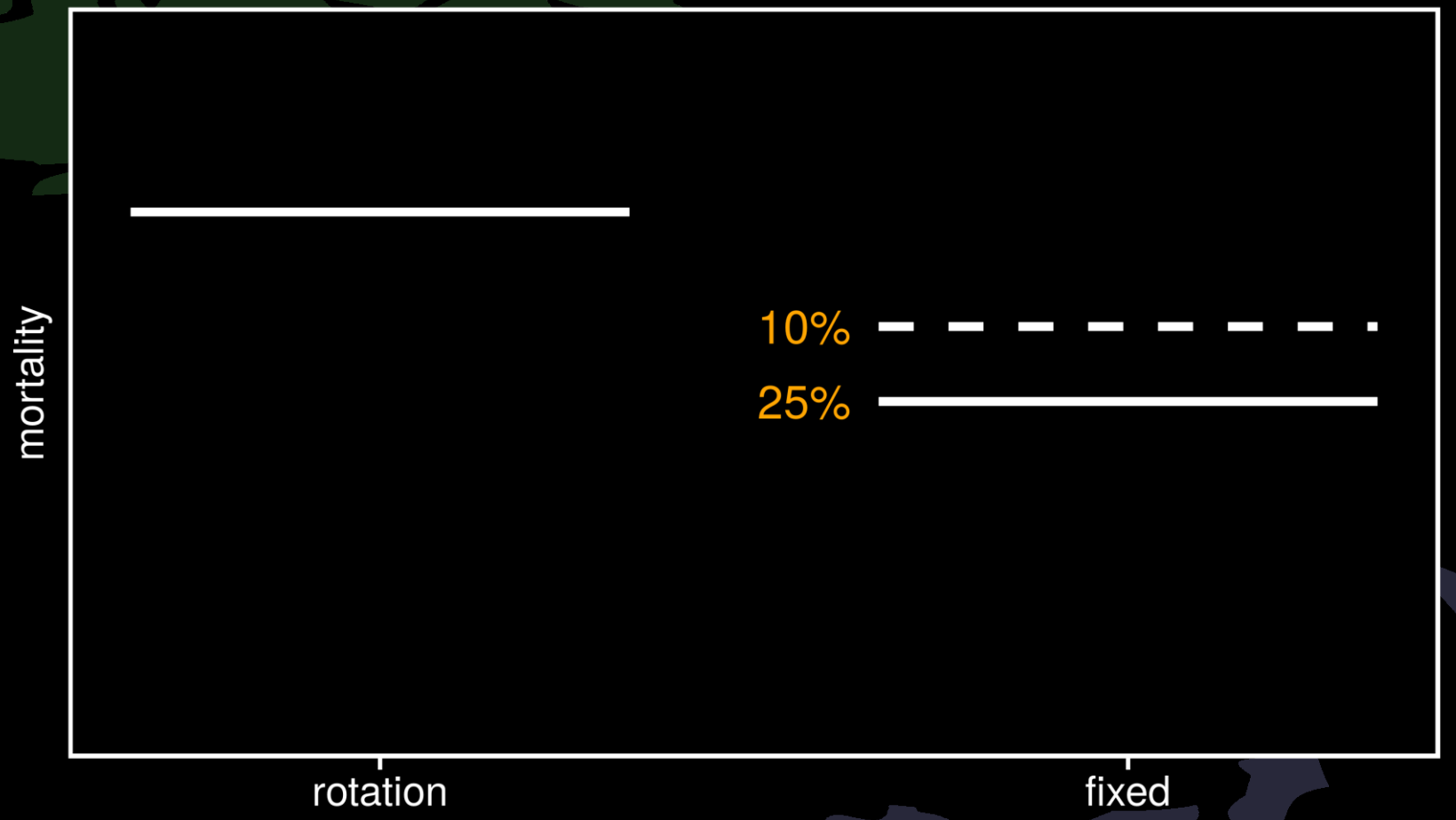
    - severe patients per physician (per year)
  - Management
    - **physicians dedicated to ICU only or on a rotation basis**
    - number of hours conceeded for relatives' visit

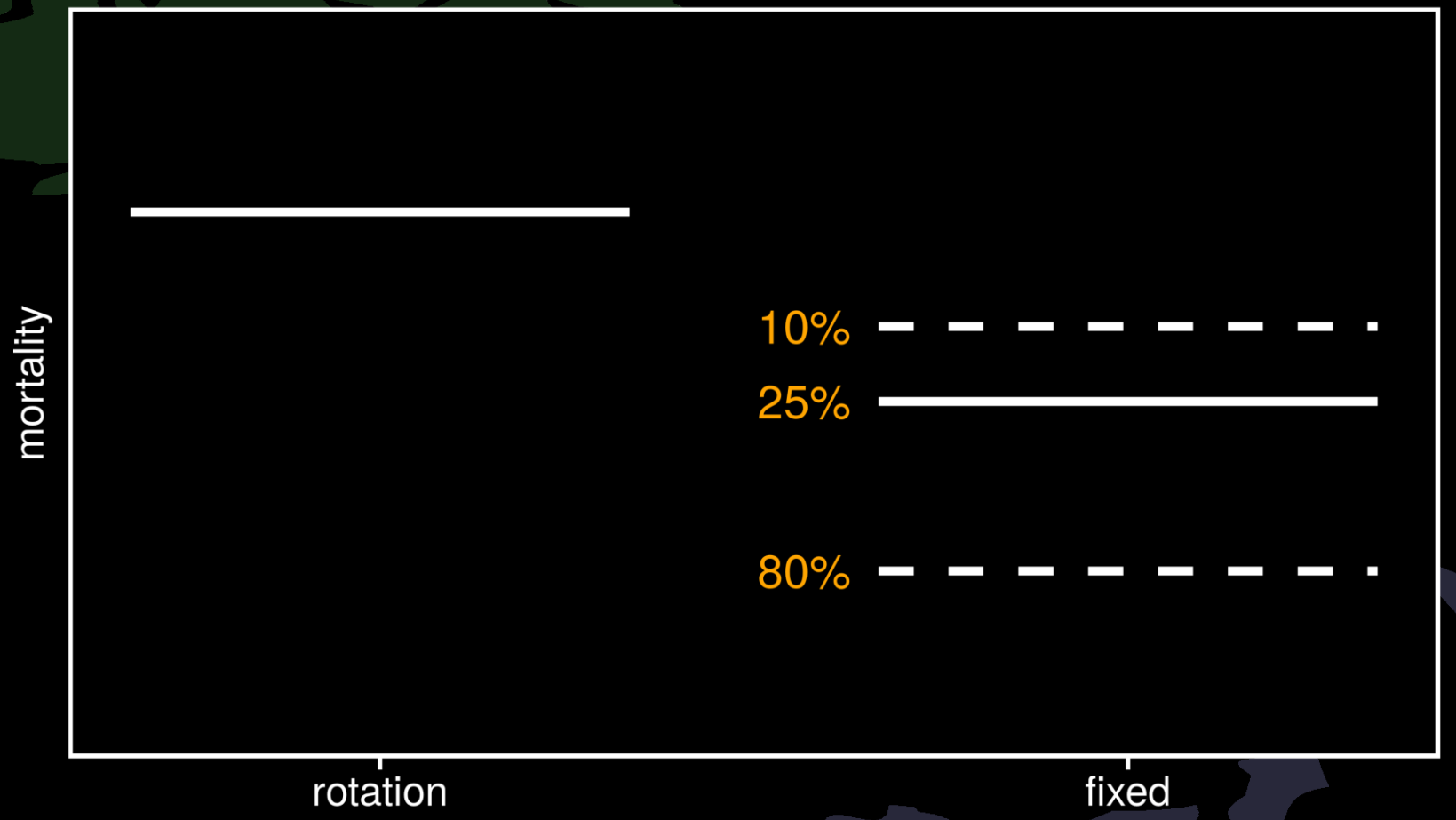
Physicians dedicated to ICU only or on a rotation basis



Physicians dedicated to ICU only or on a rotation basis



Physicians dedicated to ICU only or on a rotation basis



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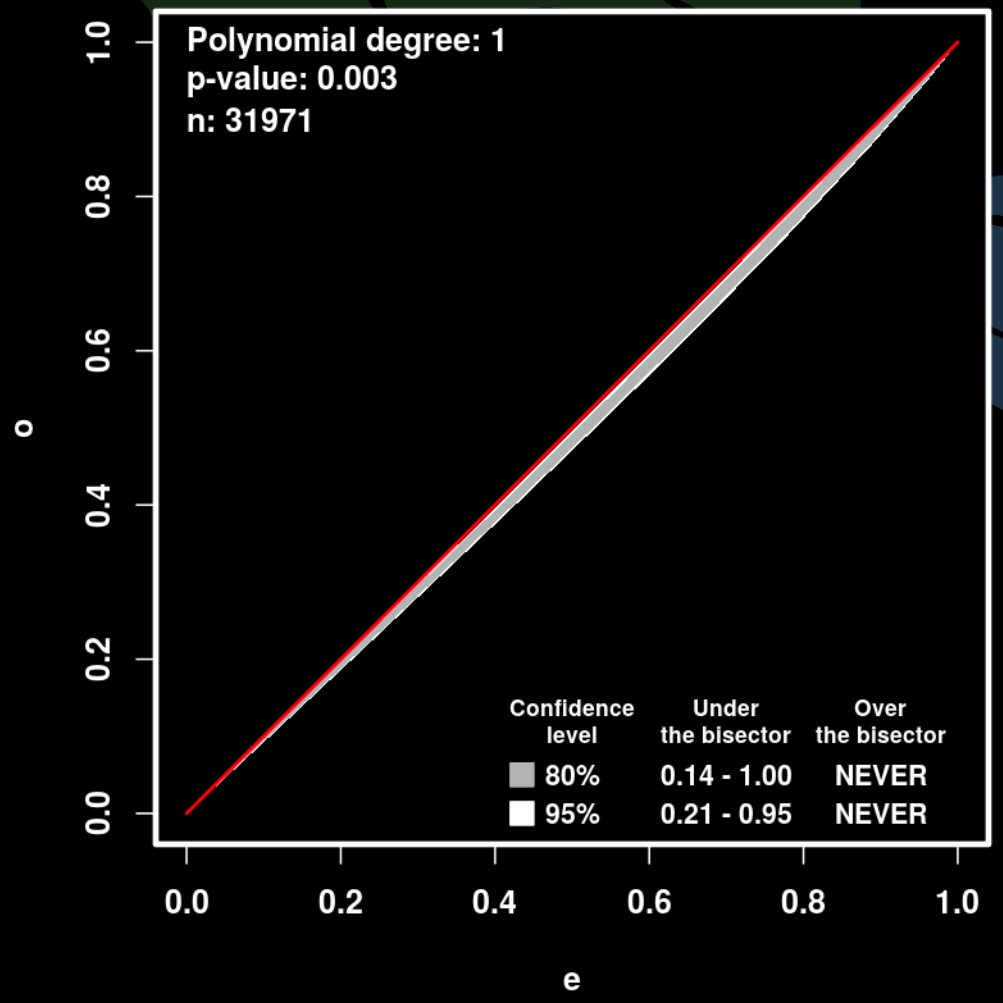
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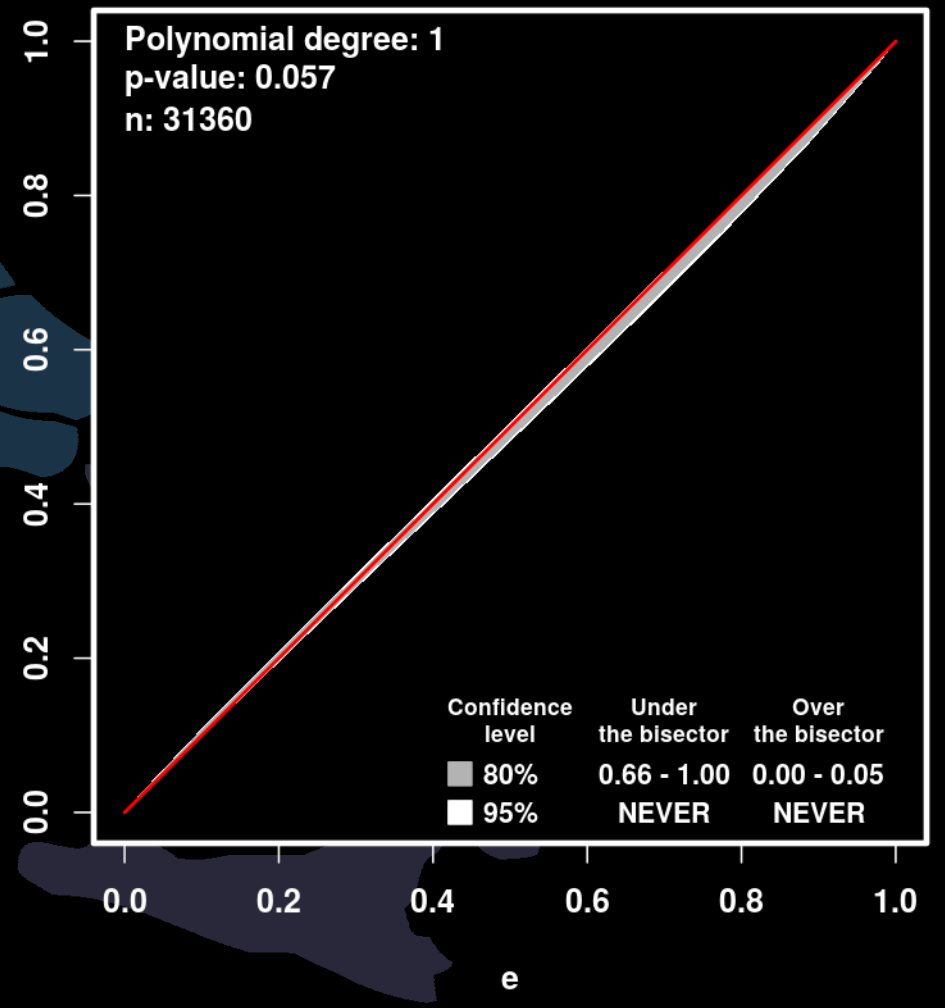
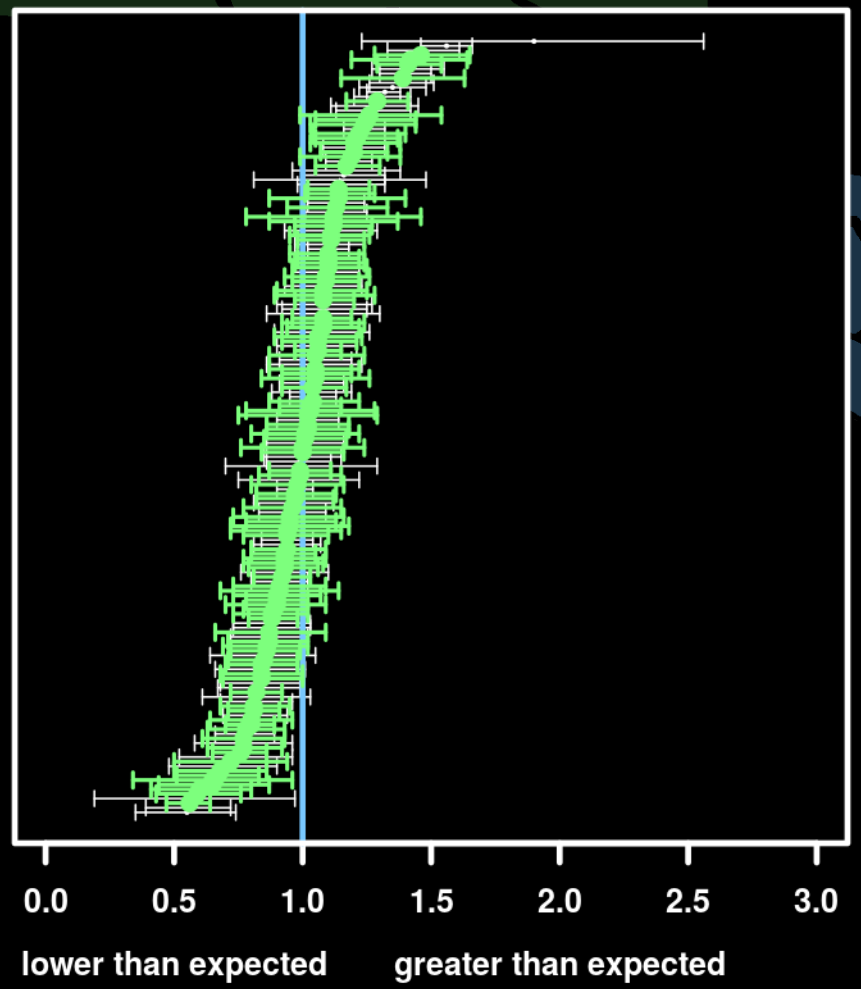
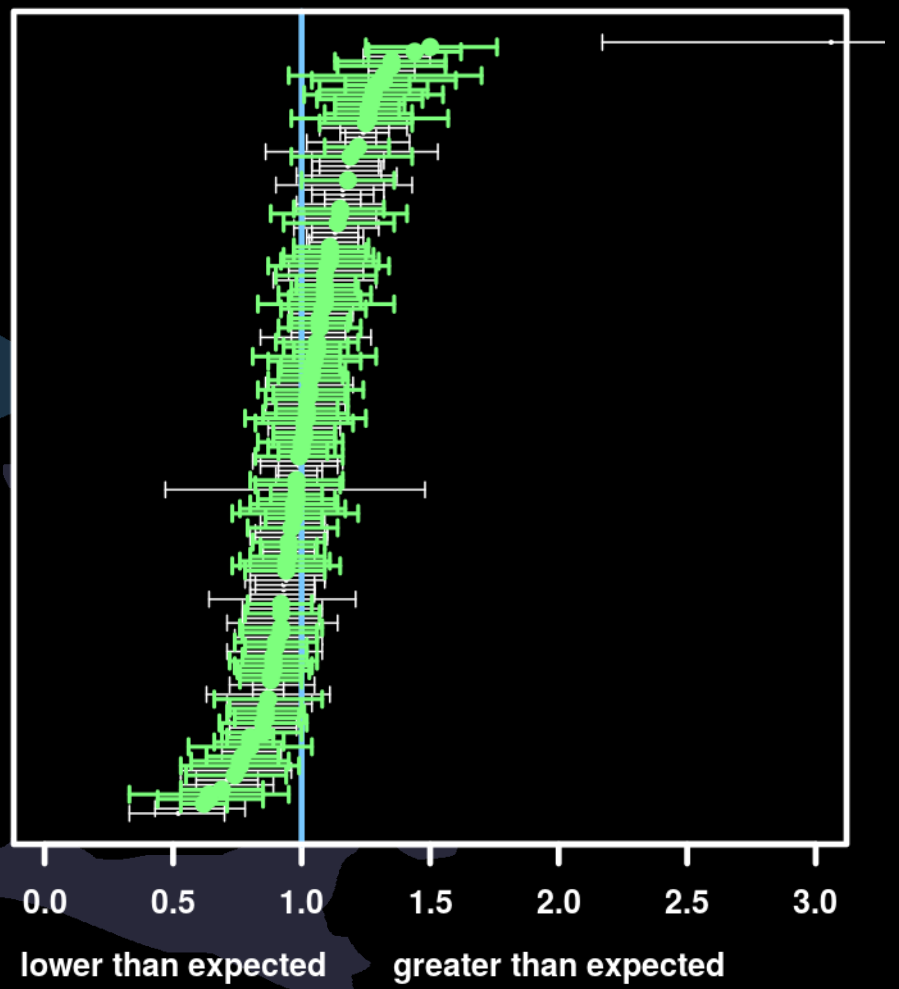
p-value: 0.003
n: 31971
Confidence level
Under the bisector
Over the bisector
80%
0.14 - 1.00
NEVER
95%
0.21 - 0.95
NEVER
o
e
0.0
0.2
0.4
0.6
0.8
1.0

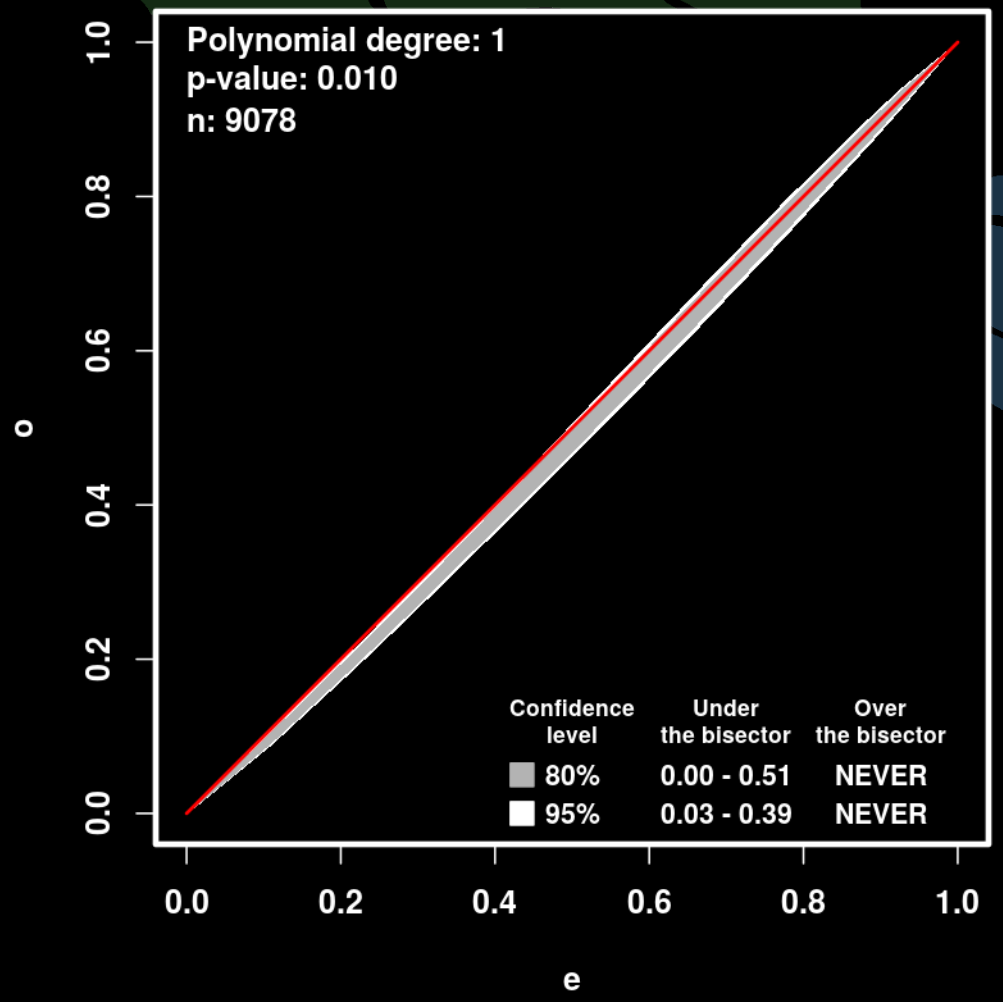

Polynomial degree: 1
p-value: 0.057
n: 31360
Confidence level
Under the bisector
Over the bisector
80%
0.66 - 1.00
0.00 - 0.05
95%
NEVER
NEVER
o
e
0.0
0.2
0.4
0.6
0.8
1.0

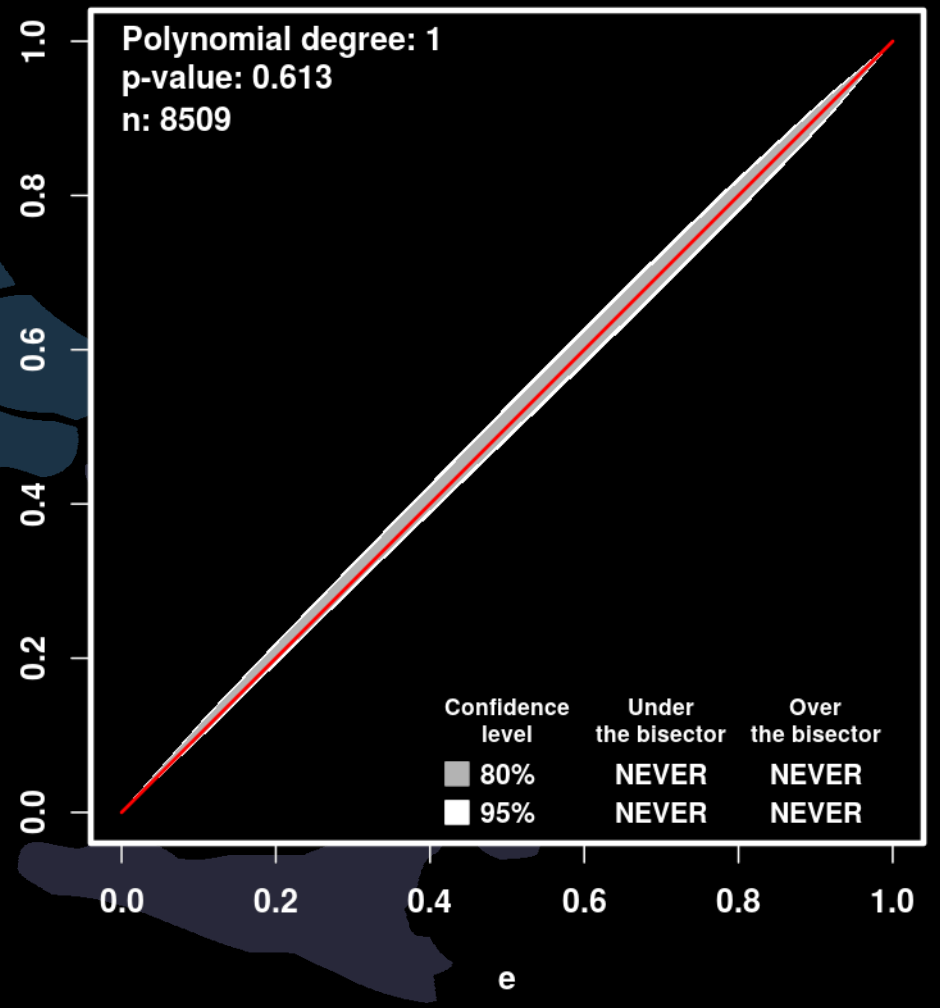
N


0.0
0.5
1.0
1.5
2.0
2.5
3.0
lower than expected
greater than expected

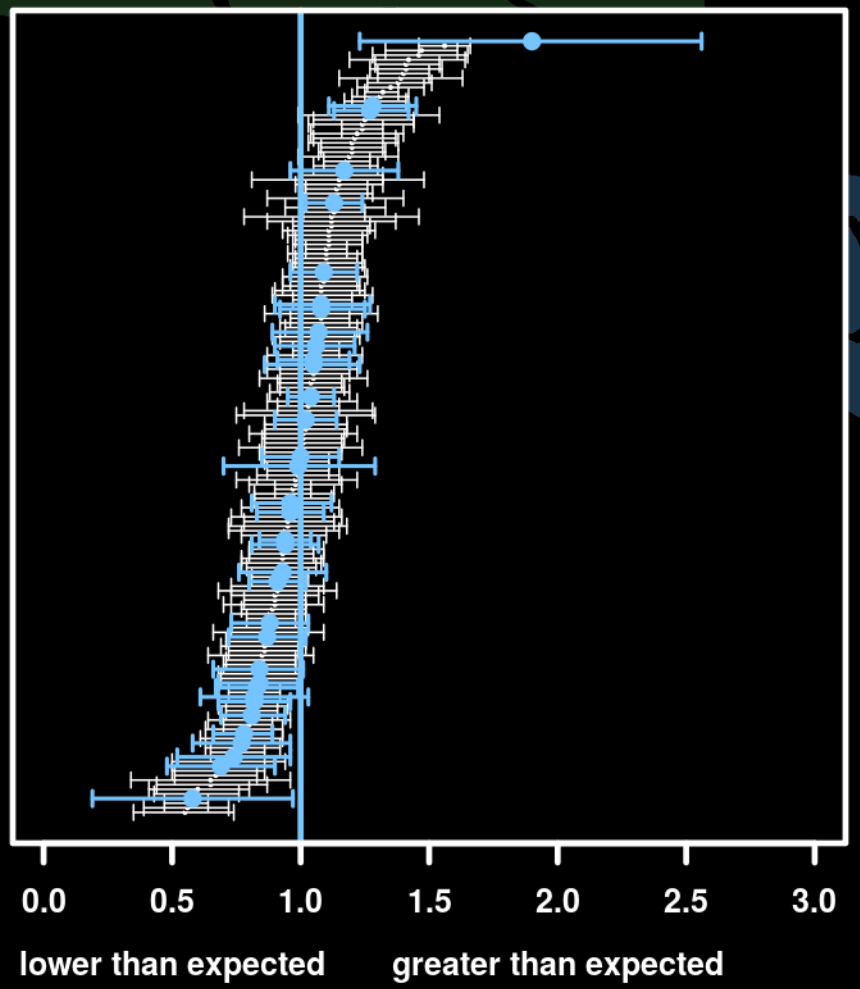

0.0
0.5
1.0
1.5
2.0
2.5
3.0
lower than expected
greater than expected

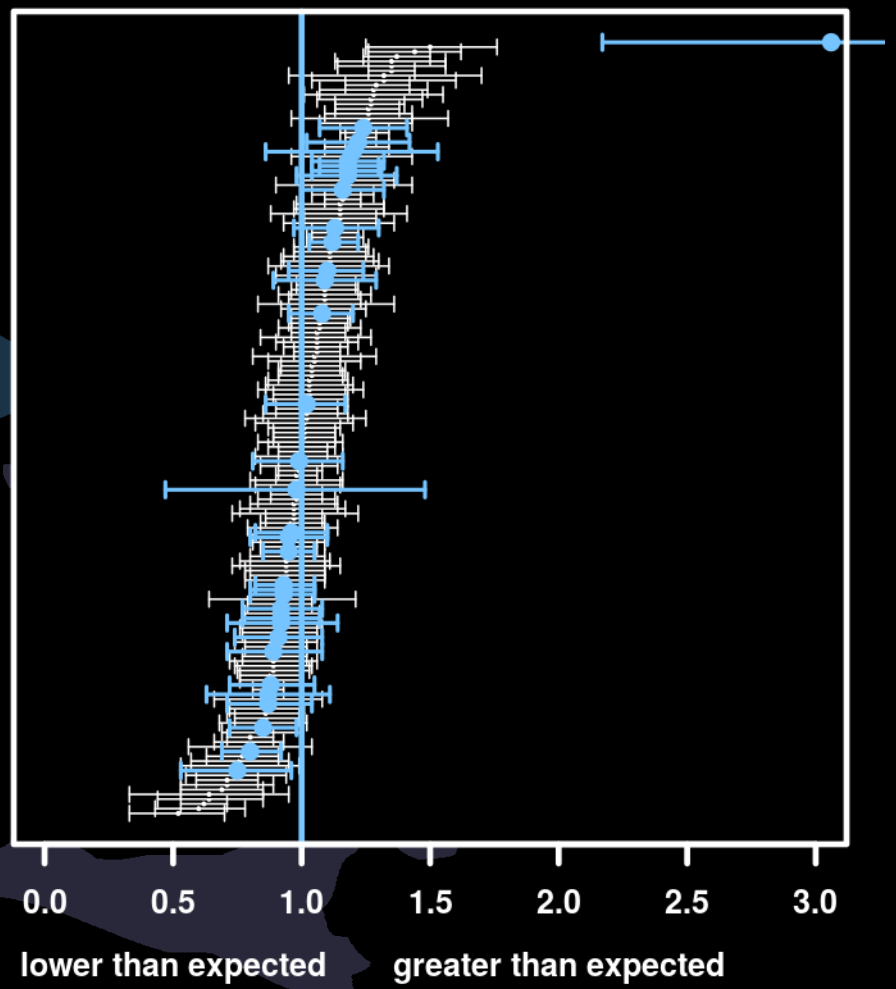
C


Polynomial degree: 1
p-value: 0.010
n: 9078
Confidence level
Under the bisector
Over the bisector
80%
0.00 - 0.51
NEVER
95%
0.03 - 0.39
NEVER
o
e
0.0
0.2
0.4
0.6
0.8
1.0

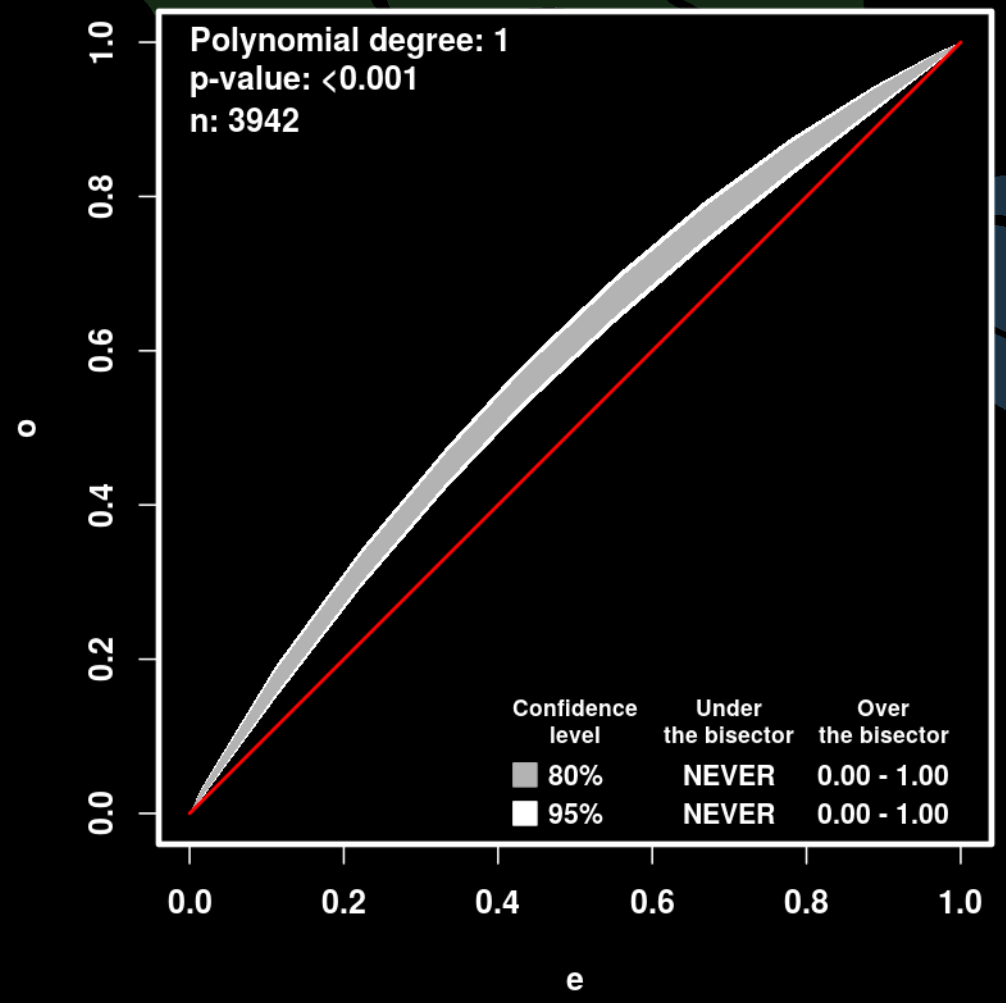

Polynomial degree: 1
p-value: 0.613
n: 8509
Confidence level
Under the bisector
Over the bisector
80%
NEVER
NEVER
95%
NEVER
NEVER
o
e
0.0
0.2
0.4
0.6
0.8
1.0

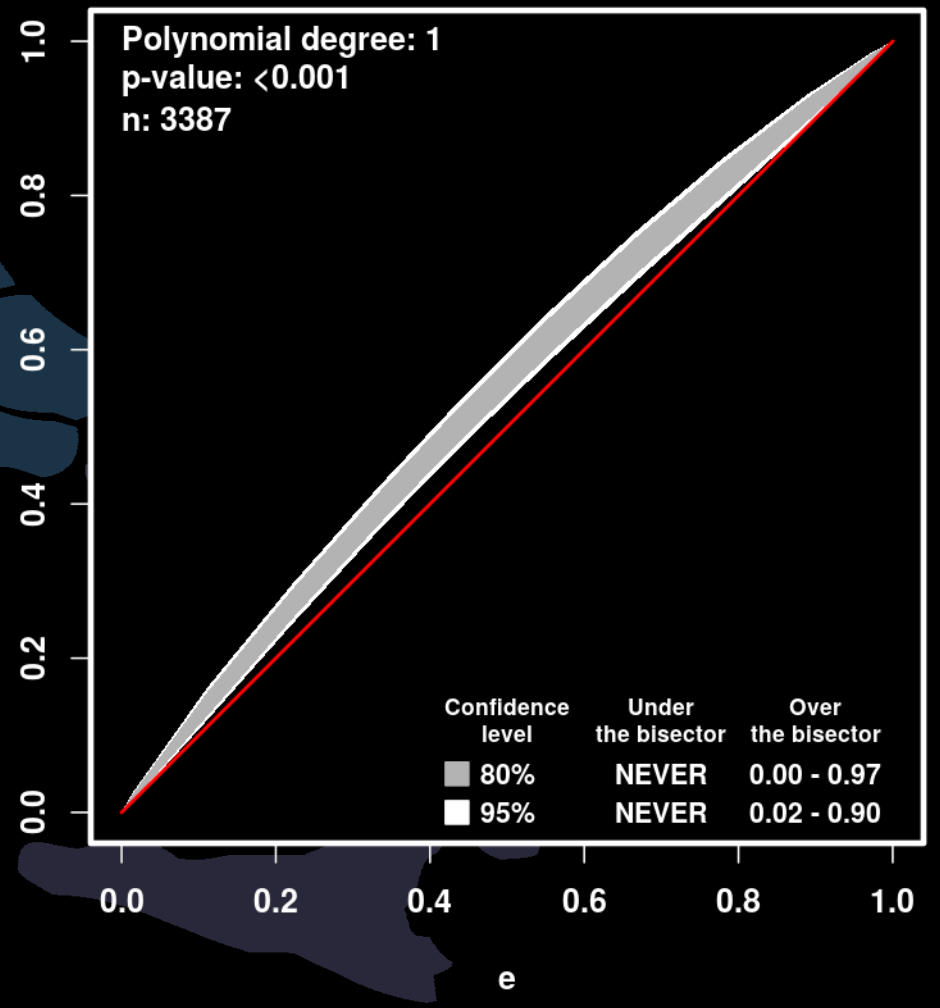
C


0.0
0.5
1.0
1.5
2.0
2.5
3.0
lower than expected
greater than expected

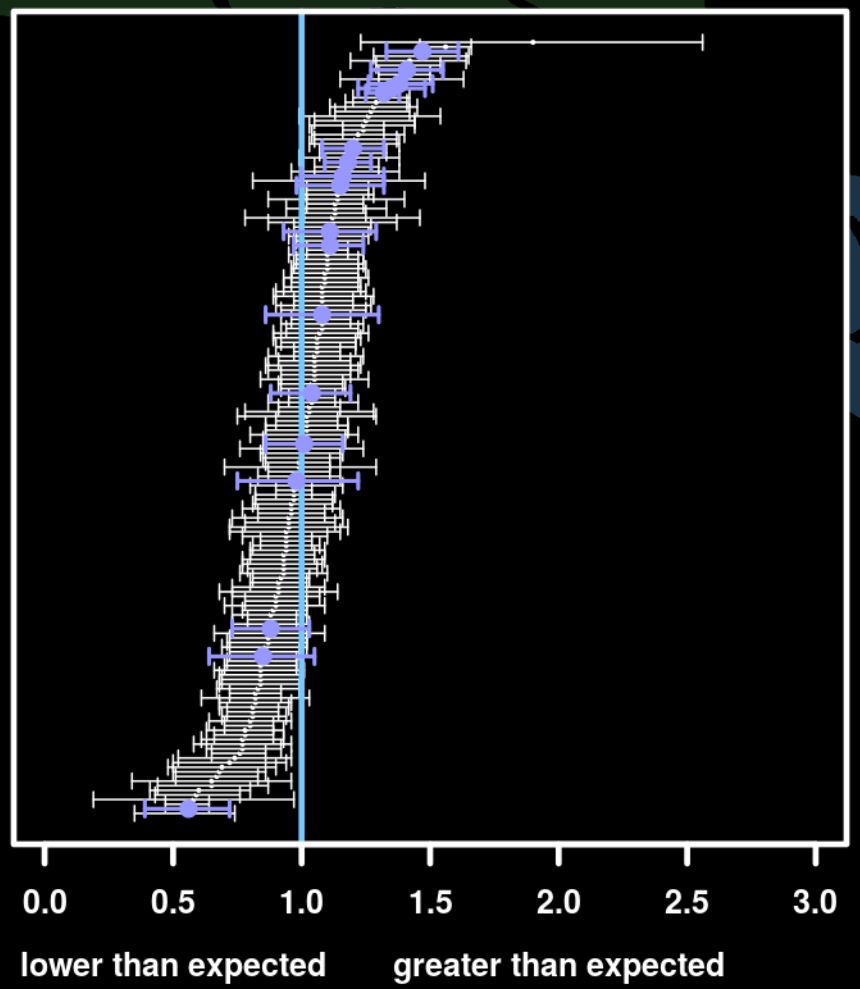

0.0
0.5
1.0
1.5
2.0
2.5
3.0
lower than expected
greater than expected

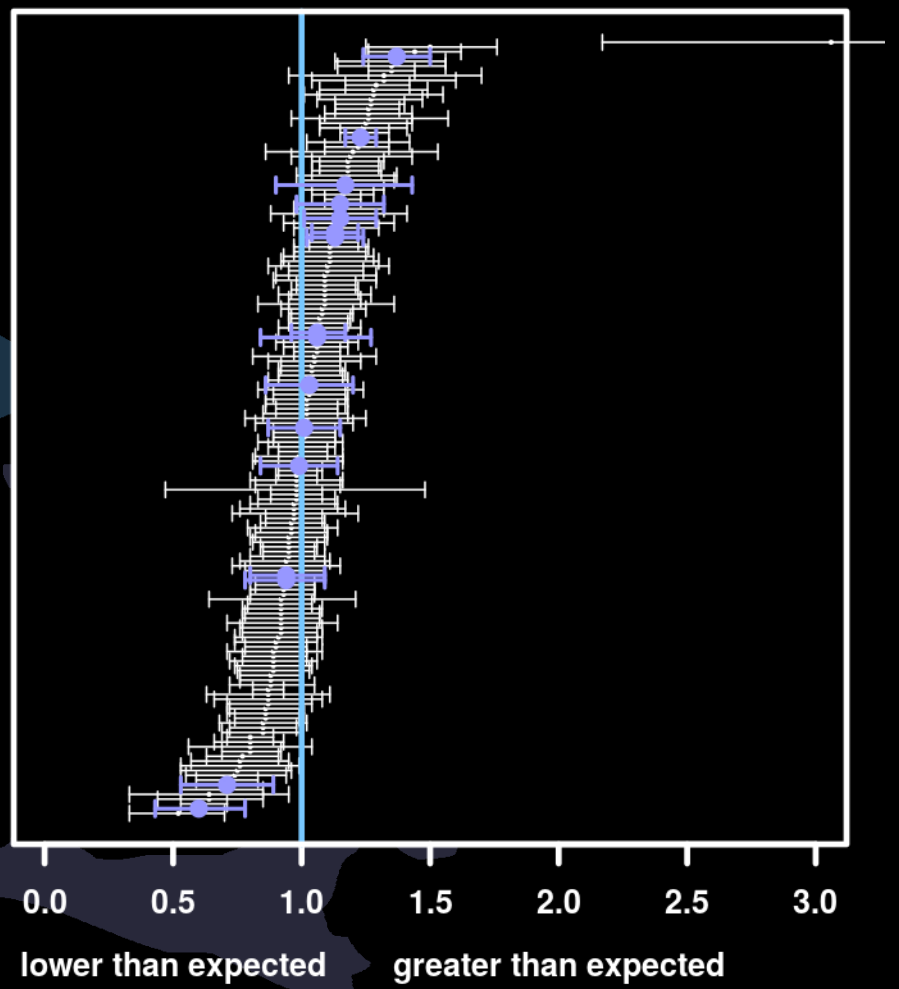
S


Polynomial degree: 1
p-value: <0.001
n: 3942
Confidence level
Under the bisector
Over the bisector
80%
NEVER
0.00 - 1.00
95%
NEVER
0.00 - 1.00
o
e
0.0
0.2
0.4
0.6
0.8
1.0


Polynomial degree: 1
p-value: <0.001
n: 3387
Confidence level
Under the bisector
Over the bisector
80%
NEVER
0.00 - 0.97
95%
NEVER
0.02 - 0.90
o
e
0.0
0.2
0.4
0.6
0.8
1.0

S


0.0
0.5
1.0
1.5
2.0
2.5
3.0
lower than expected
greater than expected


0.0
0.5
1.0
1.5
2.0
2.5
3.0
lower than expected
greater than expected