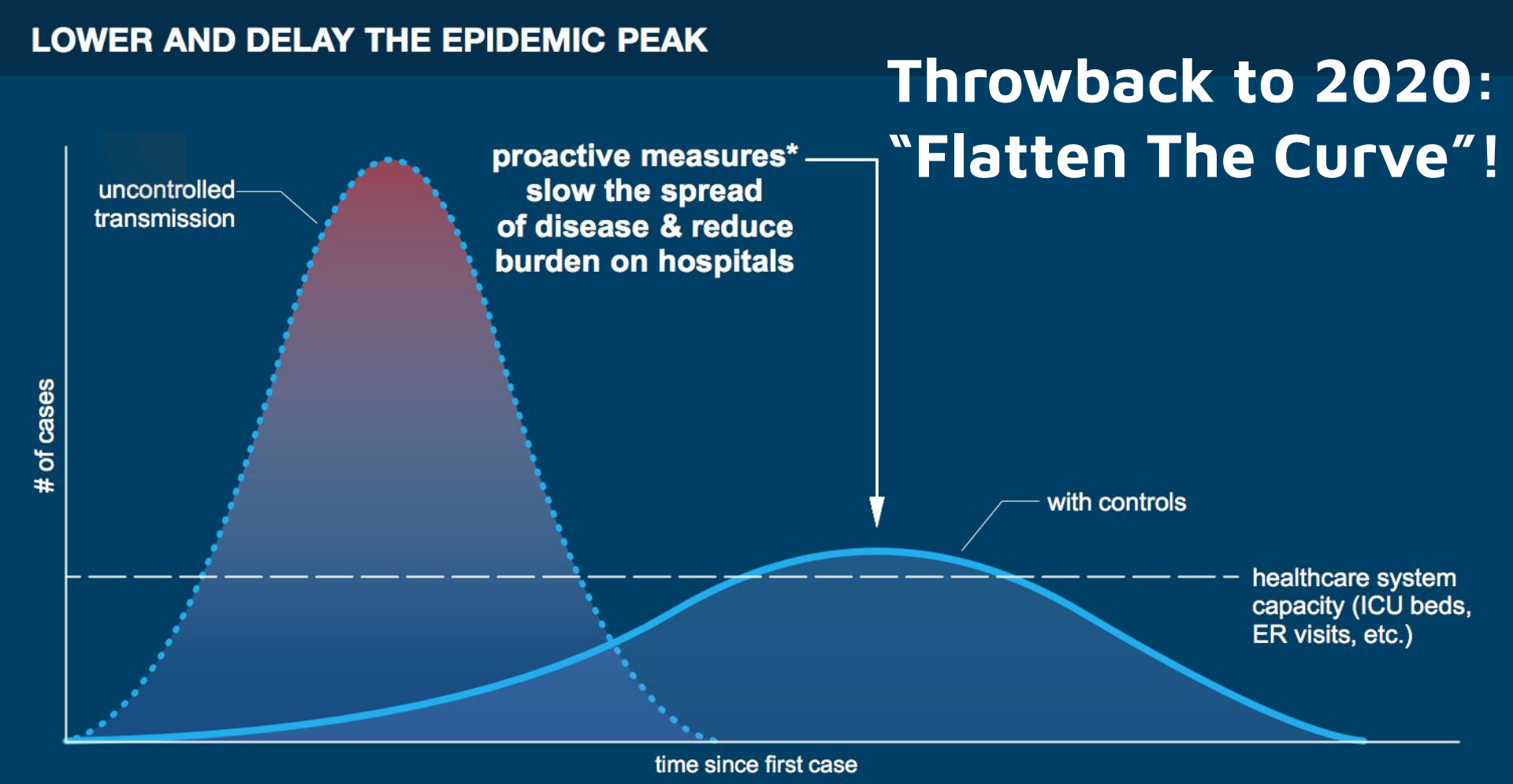
Covid Vaccines and their Effect on the World

By Christopher Levine, Matt Soriano, and Sarah Devenney

Throwback to 2020: "Flatten The Curve"!

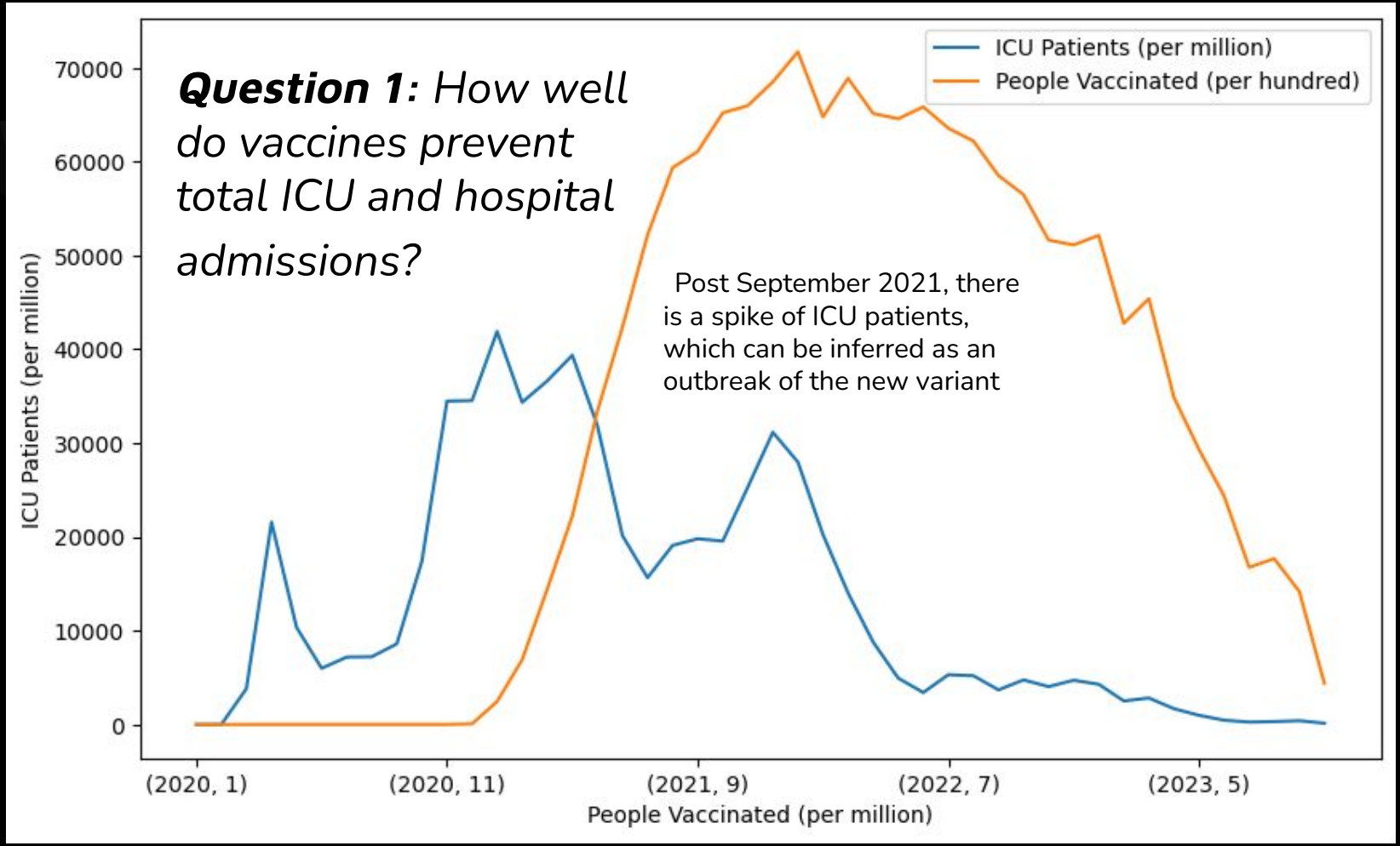


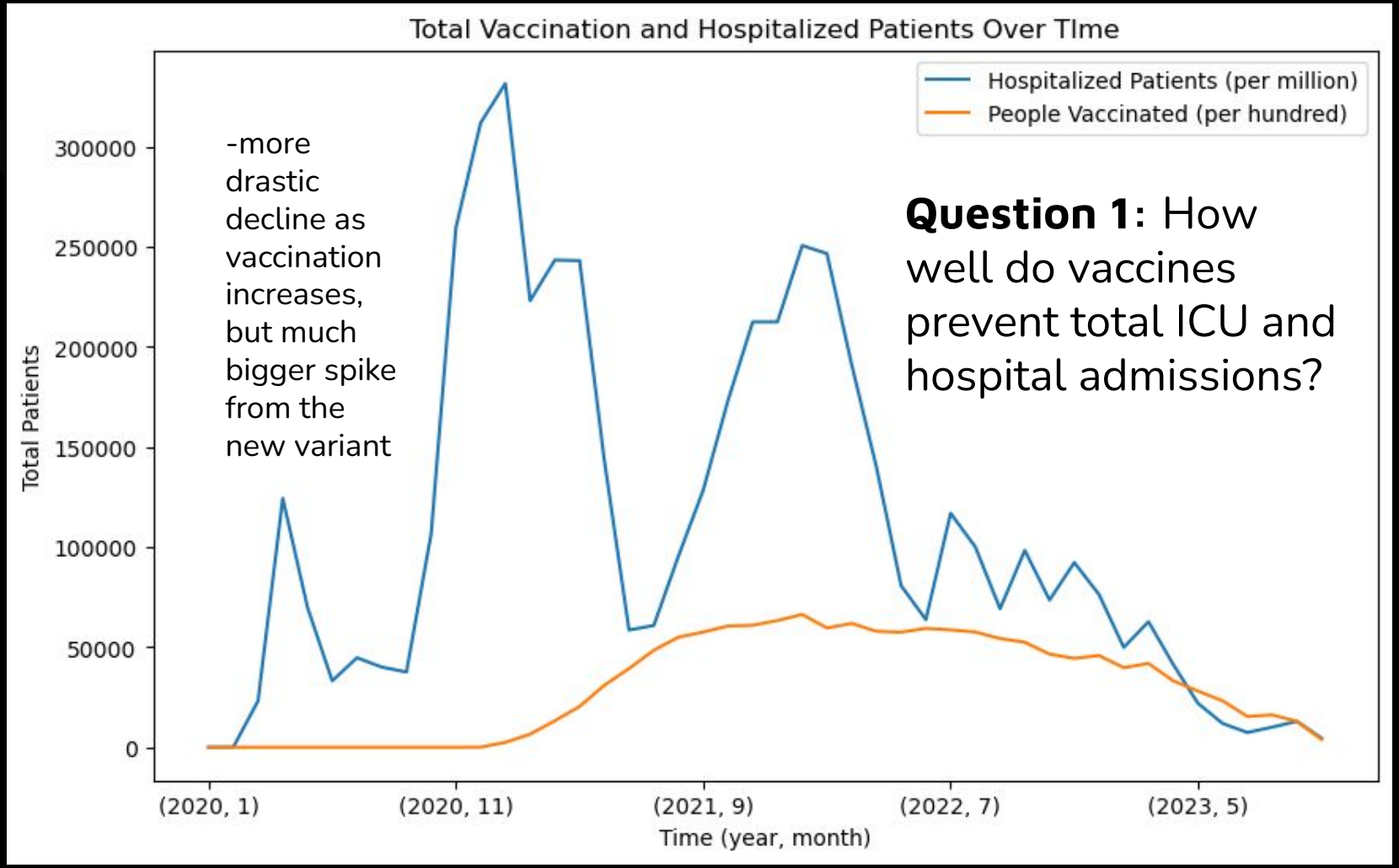
*social distancing such as teleworking, limiting large gatherings, reducing travel or more assertive approaches.

Vaccines work of course, but how well?

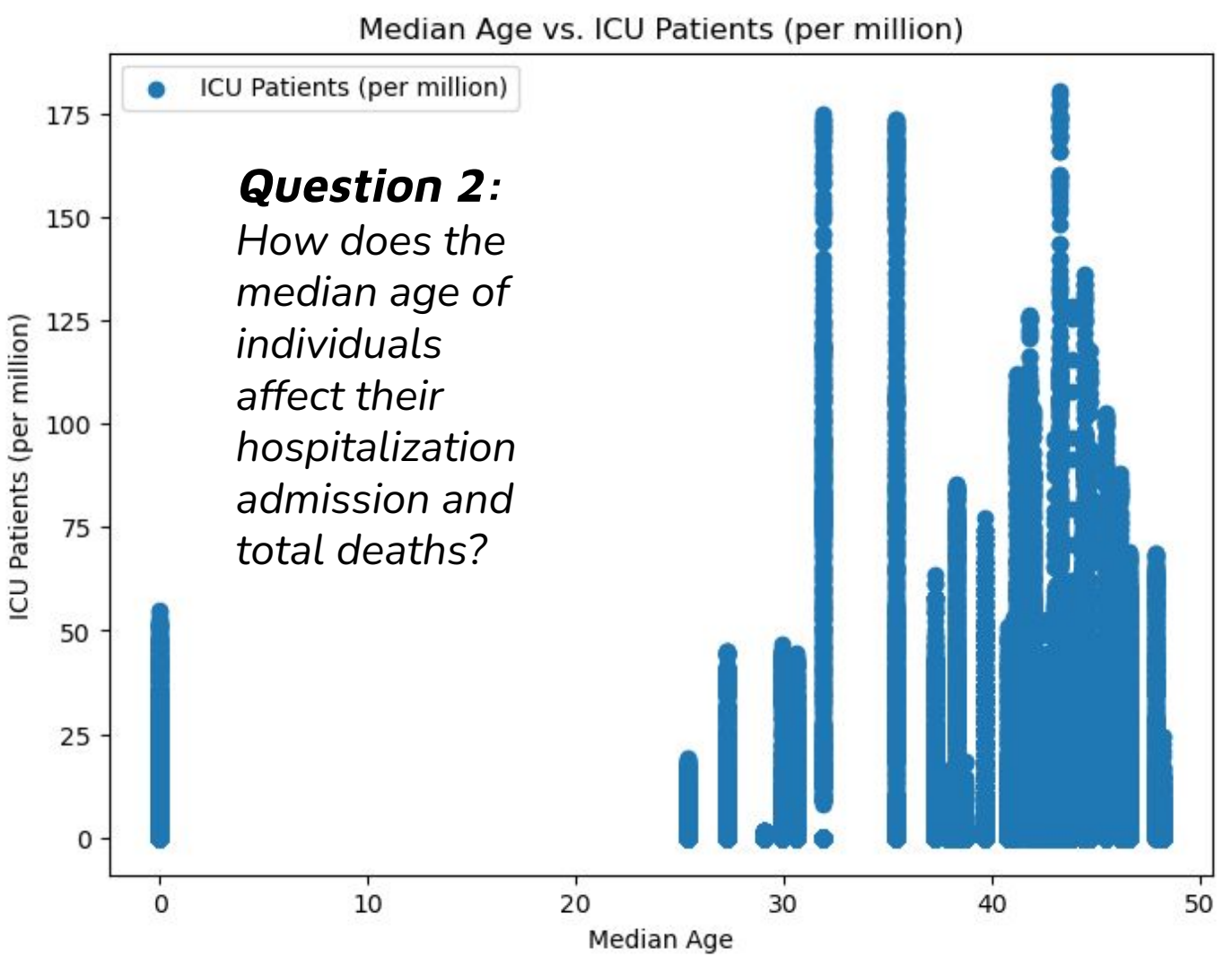
Questions:

1. How well do vaccines prevent total ICU and hospital admissions?
2. How does median age of individuals affect their hospitalization admission and total deaths?
3. How do smoking habits affect hospitalization and ICU numbers?


Question 1: *How well do vaccines prevent total ICU and hospital admissions?*
Post September 2021, there is a spike of ICU patients, which can be inferred as an outbreak of the new variant
ICU Patients (per million)
People Vaccinated (per hundred)
ICU Patients (per million)
70000
60000
50000
40000
30000
20000
10000
0
(2020, 1)
(2020, 11)
(2021, 9)
(2022, 7)
(2023, 5)
People Vaccinated (per million)


Total Vaccination and Hospitalized Patients Over TIme
Hospitalized Patients (per million)
People Vaccinated (per hundred)
-more drastic decline as vaccination increases, but much bigger spike from the new variant
Question 1: How well do vaccines prevent total ICU and hospital admissions?
Total Patients
300000
250000
200000
150000
100000
50000
0
(2020, 1)
(2020, 11)
(2021, 9)
(2022, 7)
(2023, 5)
Time (year, month)

Question 2: How does median age of individuals affect their hospitalization admission and total deaths?


Median Age vs. ICU Patients (per million)
ICU Patients (per million)
Question 2:
How does the median age of individuals affect their hospitalization admission and total deaths?
ICU Patients (per million)
0
25
50
75
100
125
150
175
0
10
20
30
40
50
Median Age

Standard Deviation:

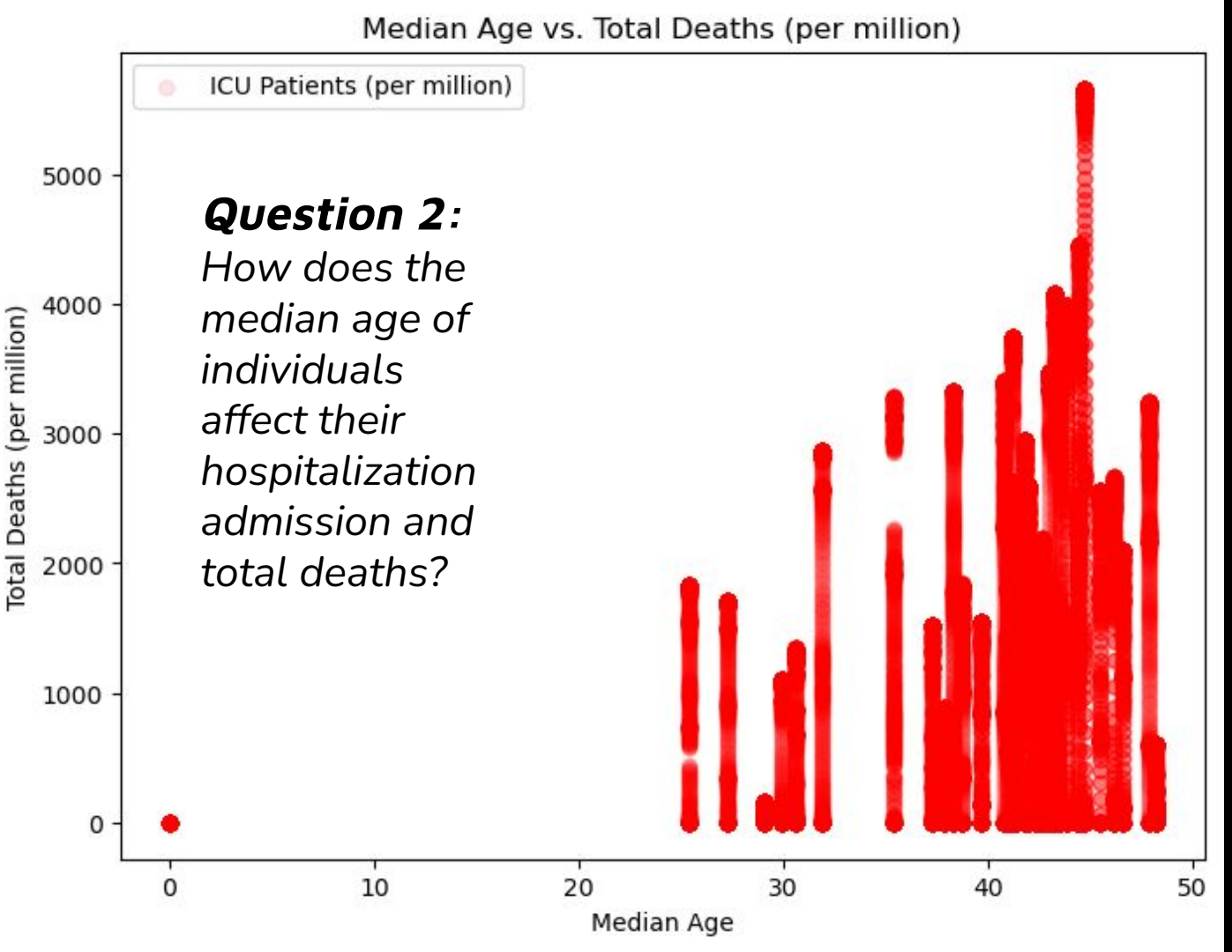
ICU Patients (per million) 20.135231

Median Age 12.667968

Standard Deviation Error:

ICU Patients (per million) 0.083947

Median Age 0.052815


Median Age vs. Total Deaths (per million)
ICU Patients (per million)
Question 2:
How does the median age of individuals affect their hospitalization admission and total deaths?
Total Deaths (per million)
0
1000
2000
3000
4000
5000
0
10
20
30
40
50
Median Age

Standard Deviation:

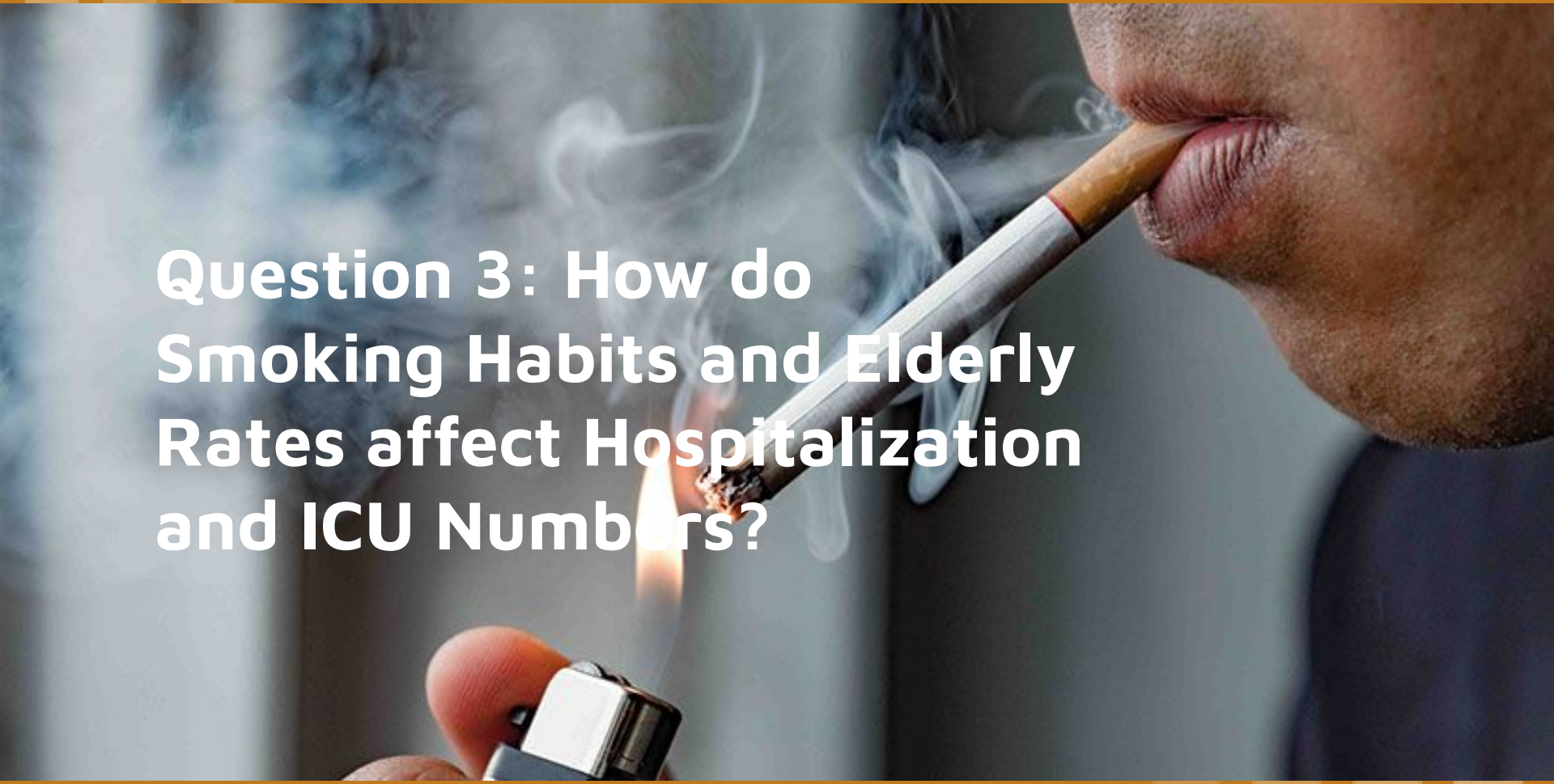
Total Deaths (per million) 1239.813693

Median Age 12.667968

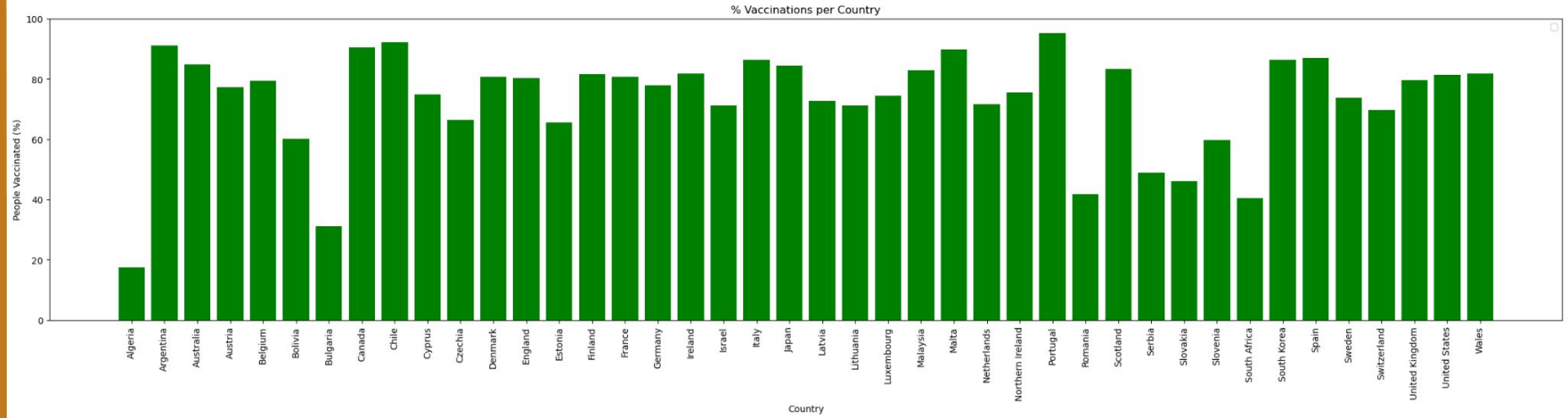
Standard Deviation Error:

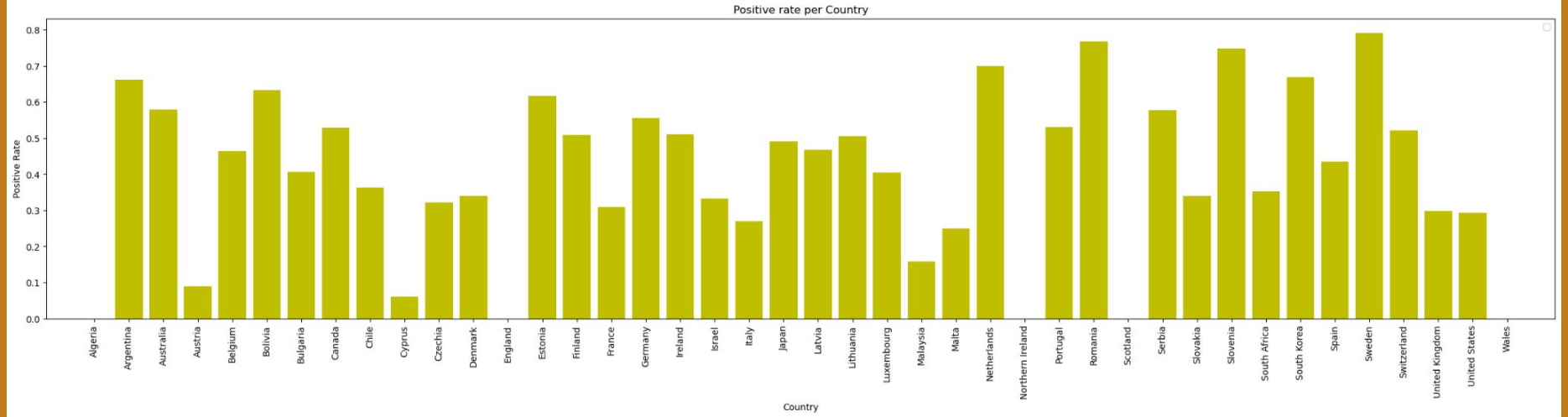
Total Deaths (per million) 5.168987

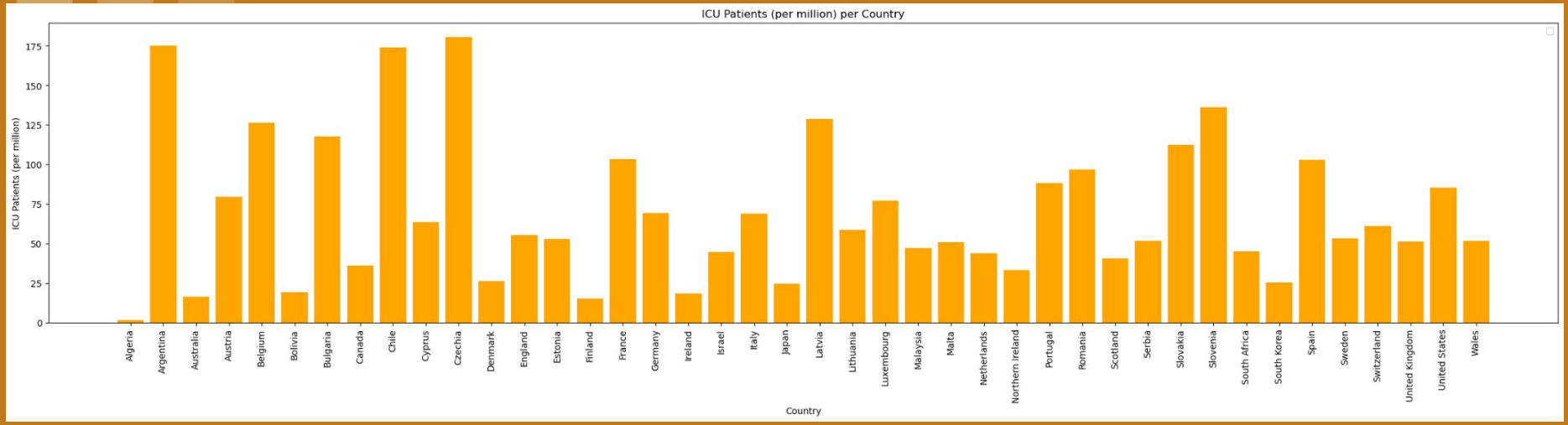
Median Age 0.052815

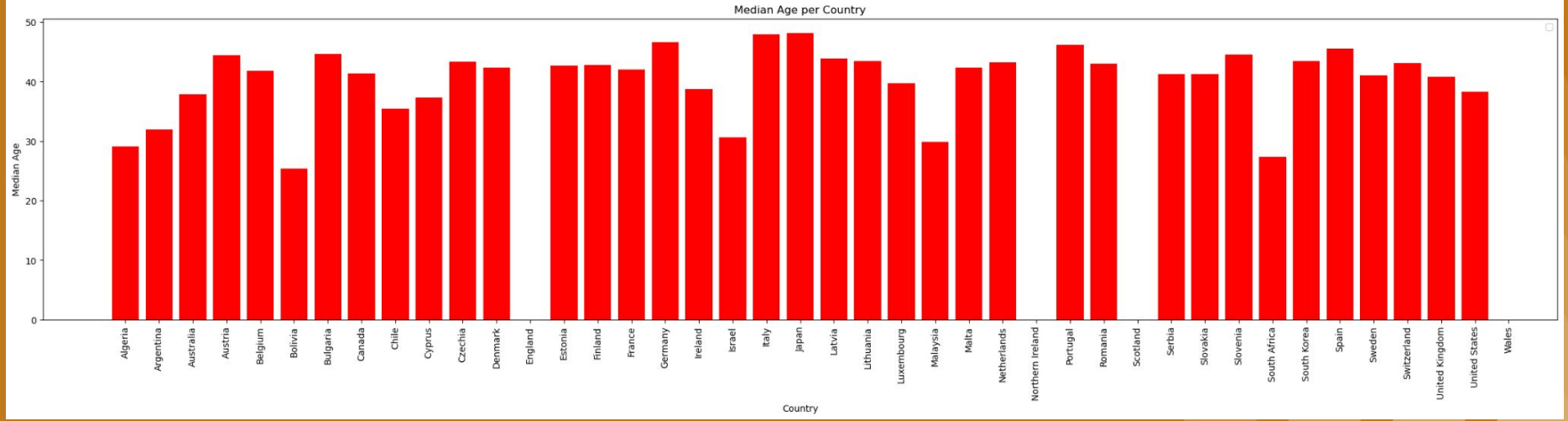

Question 3: How do
Smoking Habits and Elderly
Rates affect Hospitalization
and ICU Numbers?

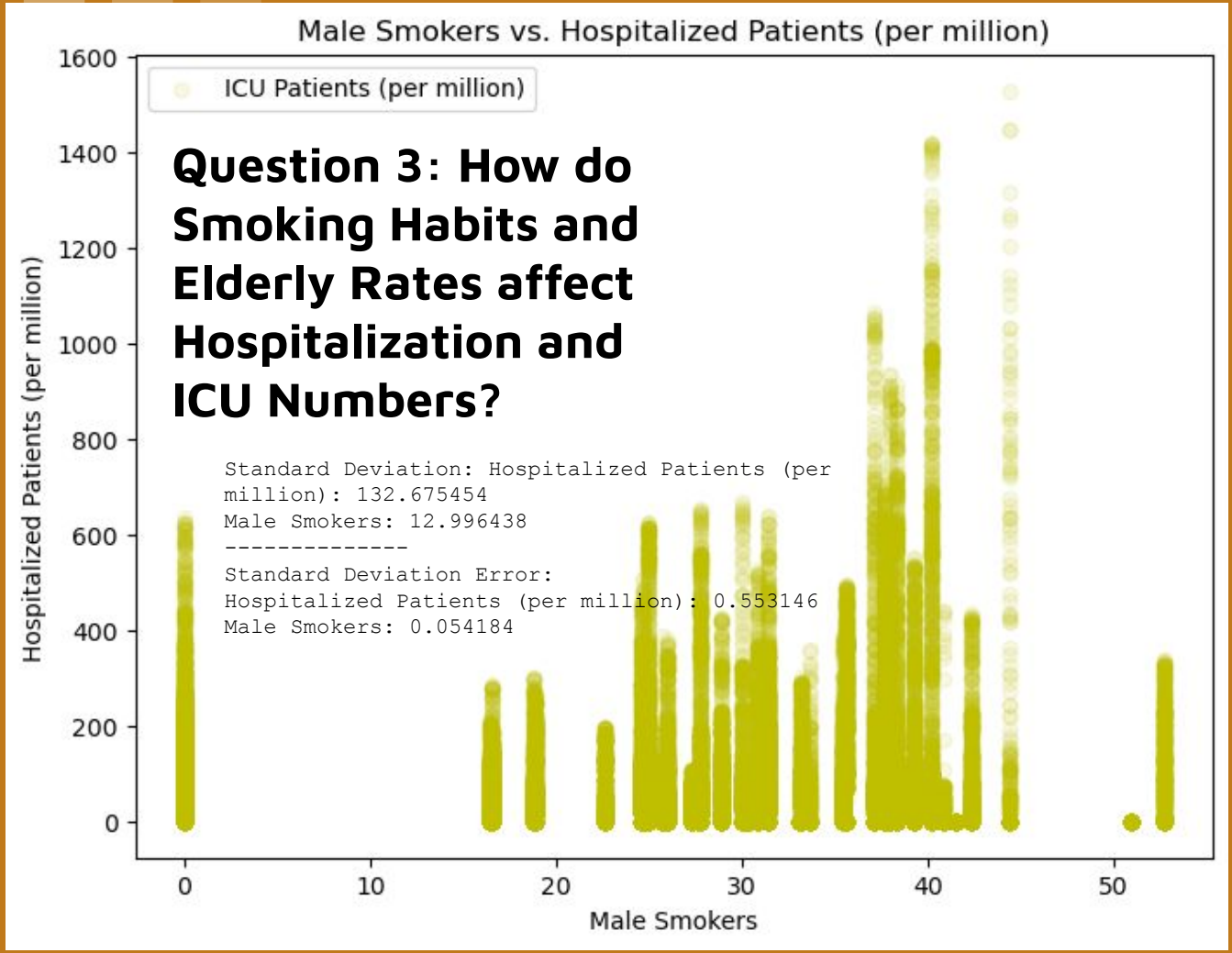
Referential Nation Data:


% Vaccinations per Country
People Vaccinated (%)
0
20
40
60
80
100
Algeria
Argentina
Australia
Austria
Belgium
Bolivia
Bulgaria
Canada
Chile
Cyprus
Czechia
Denmark
England
Estonia
Finland
France
Germany
Ireland
Israel
Italy
Japan
Latvia
Lithuania
Luxembourg
Malaysia
Malta
Netherlands
Northern Ireland
Portugal
Romania
Scotland
Serbia
Slovakia
Slovenia
South Africa
South Korea
Spain
Sweden
Switzerland
United Kingdom
United States
Wales
Country

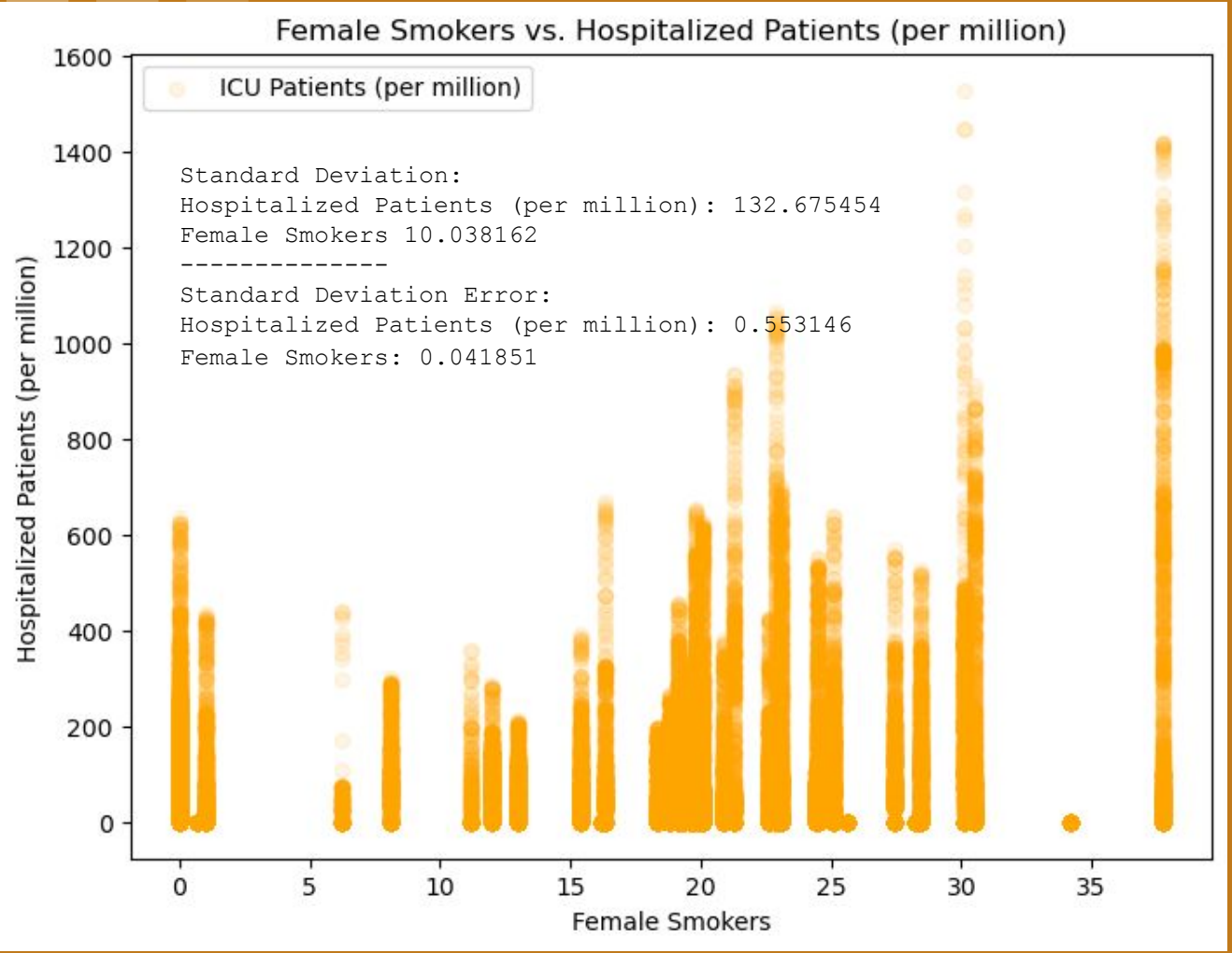

Positive rate per Country
Positive Rate
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
Algeria
Argentina
Australia
Austria
Belgium
Bolivia
Bulgaria
Canada
Chile
Cyprus
Czechia
Denmark
England
Estonia
Finland
France
Germany
Ireland
Israel
Italy
Japan
Latvia
Lithuania
Luxembourg
Malaysia
Malta
Netherlands
Northern Ireland
Portugal
Romania
Scotland
Serbia
Slovakia
Slovenia
South Africa
South Korea
Spain
Sweden
Switzerland
United Kingdom
United States
Wales
Country


ICU Patients (per million) per Country
ICU Patients (per million)
0
25
50
75
100
125
150
175
Algeria
Argentina
Australia
Austria
Belgium
Bolivia
Bulgaria
Canada
Chile
Cyprus
Czechia
Denmark
England
Estonia
Finland
France
Germany
Ireland
Israel
Italy
Japan
Latvia
Lithuania
Luxembourg
Malaysia
Malta
Netherlands
Northern Ireland
Portugal
Romania
Scotland
Serbia
Slovakia
Slovenia
South Africa
South Korea
Spain
Sweden
Switzerland
United Kingdom
United States
Wales
Country

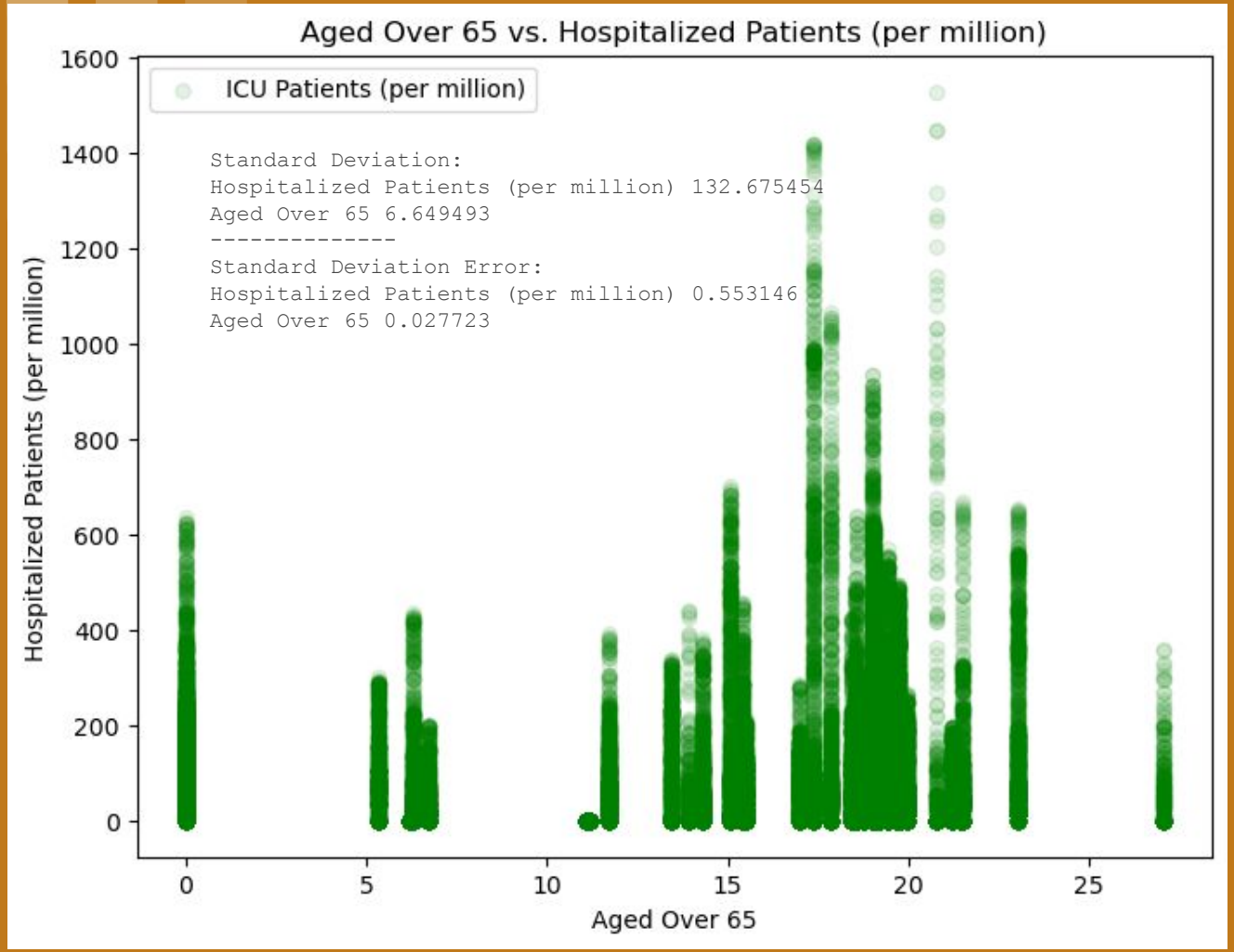

Median Age per Country
Median Age
0
10
20
30
40
50
Algeria
Argentina
Australia
Austria
Belgium
Bolivia
Bulgaria
Canada
Chile
Cyprus
Czechia
Denmark
England
Estonia
Finland
France
Germany
Ireland
Israel
Italy
Japan
Latvia
Lithuania
Luxembourg
Malaysia
Malta
Netherlands
Northern Ireland
Portugal
Romania
Scotland
Serbia
Slovakia
Slovenia
South Africa
South Korea
Spain
Sweden
Switzerland
United Kingdom
United States
Wales
Country



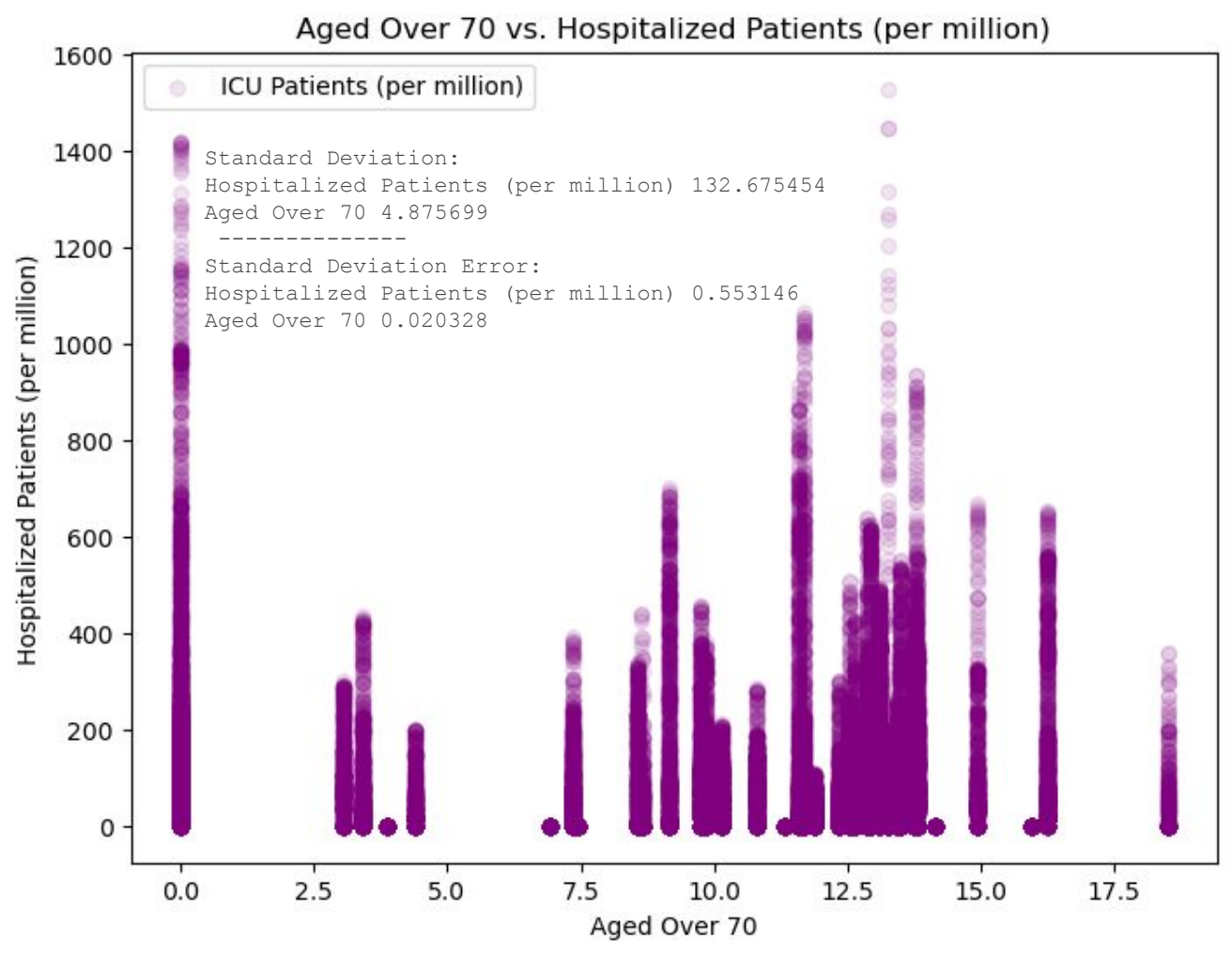
The X-Axis is assumed to be Per Hundred, since no units were given in the CSV file.



As the amount of Male and female smokers increase, the greater potential for a greater amount of hospitalization. However, female smokers of any amount seem to be more likely to have higher hospitalization rates. It can be inferred that pregnancy and breast-cancer could be potential hypotheses. This wide potential for hospitalization can explain the high Standard Deviation for both male and female smokers.


Aged Over 65 vs. Hospitalized Patients (per million)
ICU Patients (per million)
Standard Deviation:
Hospitalized Patients (per million) 132.675454
Aged Over 65 6.649493

Standard Deviation Error:
Hospitalized Patients (per million) 0.553146
Aged Over 65 0.027723
Hospitalized Patients (per million)
Aged Over 65
0
200
400
600
800
1000
1200
1400
1600
0
5
10
15
20
25



As the amount of people aged over 65 and 70 increase, the greater potential for a greater amount of hospitalization. However, when Aged Over 70 is 0, that shows the highest concentration of the various amount of Hospitalized patients, possibly due to age-related sickness.