

# COVID-19 Explored Using SAS<sup>®</sup> and ODS Graphics: InfoGeographic and Data Graphic Analysis & Pictures

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LeRoy Bessler PhD is a data artist, the world's longest serving and most frequent advisor to SAS<sup>®</sup> users on best practices for graphic design and use of color, and the author of *Visual Data Insights Using SAS<sup>®</sup> ODS Graphics: A Guide to Communication-Effective Data Visualization*.

He also has specialized in Software-Intelligent Application Development for reliability, reusability, maintainability, flexibility, and extendibility, as well as ODS tools (Excel, PDF, HTML5, LAYOUT) to deliver SAS output and reports, tabular and/graphic. LeRoy is a data analyst and SAS programmer, who has supported SAS servers, SAS software, SAS analytic data, and hundreds of SAS users at employers and client sites.

He is a quarterly contributor to the *VIEWS News* online newsletter. He has presented at SAS users conferences in the USA, Canada, Ireland, England, and Germany, and has provided pre- and post-conference training. An advocate for, and provider of, SAS user mutual education opportunities, LeRoy was event organizer for the Wisconsin Illinois SAS Users Group for most years from 1989 to 2016. For the MidWest SAS Users Group he served as Conference Chair in 1991, Assistant to Co-chairs in 1993, and Program Chair in 2010.

## Acknowledgements

This project benefited from the help of SAS Technical Support, in particular, Marcia Surratt, Martin Mincey, and Kathryn McLawhorn.

My apology for omitting anyone else involved, but not mentioned here.

Thanks to All of You.

## Why this presentation?

- ▶ This project was inspired by an underinforming Tableau dashboard at the LinkedIn Data Visualization Group
- ▶ The alternatives shown here use SAS<sup>®</sup> ODS Graphics (The Graphics SuperPower Tool) and my software-independent principles\* for communication-effective graphic design and for communication-effective use of color.

\*Find them, e.g., in Chapters 1 and 2 of my book

**The Most Fundamental of My Many Principles ▶ ▶**

# Provide Image AND Precise Numbers

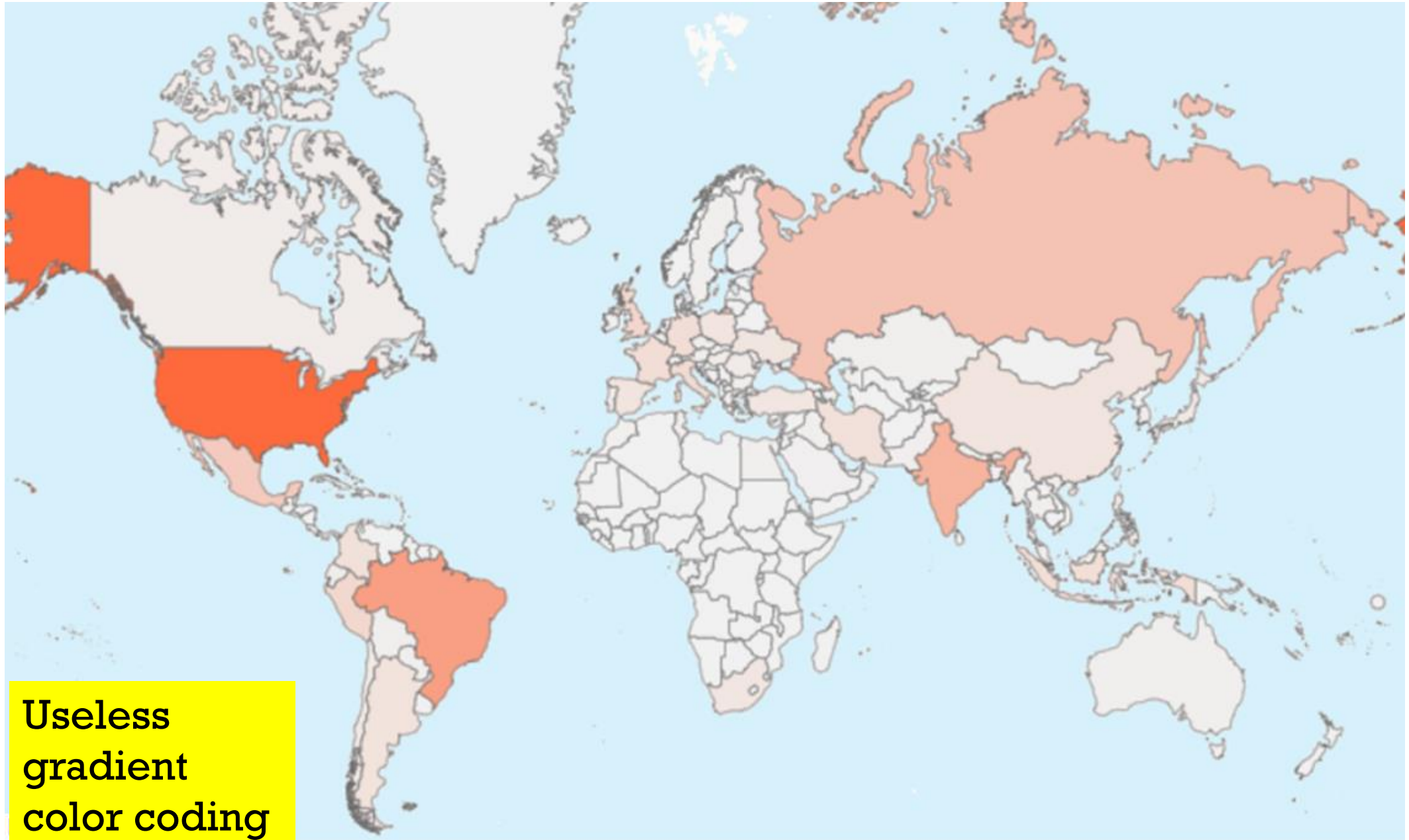
## Image – For Impression

- Immediate
- Easy
- Memorable (“Sticky”)

## Precise Numbers – For Knowledge

- Clear
- Certain
- Correct (“The Right Answer”)

# Typical Color Gradient Map (unhelpful legend omitted)



Useless  
gradient  
color coding

**A gradient legend and color-coding are unsatisfactory.**

▶ Impossible to match with certainty each color on the map with that precise color in the legend.

▶ Impossible to match with certainty the colors of two distinct areas on the map or to know exactly how much their colors might differ.

▶ Impossible to label each color in the legend.

**The Popularity of Gradient Legends Always Mystifies Me**

# My By-Country Maps

Use **Rationale-Based Ranges** and **Discrete Color-Coding**

Five ranges for the response variable:

- Top N
- Above Median
- Median
- Below Median
- Bottom N

N is typically not more than one-fifth of the country count

# Ranges with a Rationale and a Usable Legend

Country : Rank : Case Rate

In Alphabetical Order:

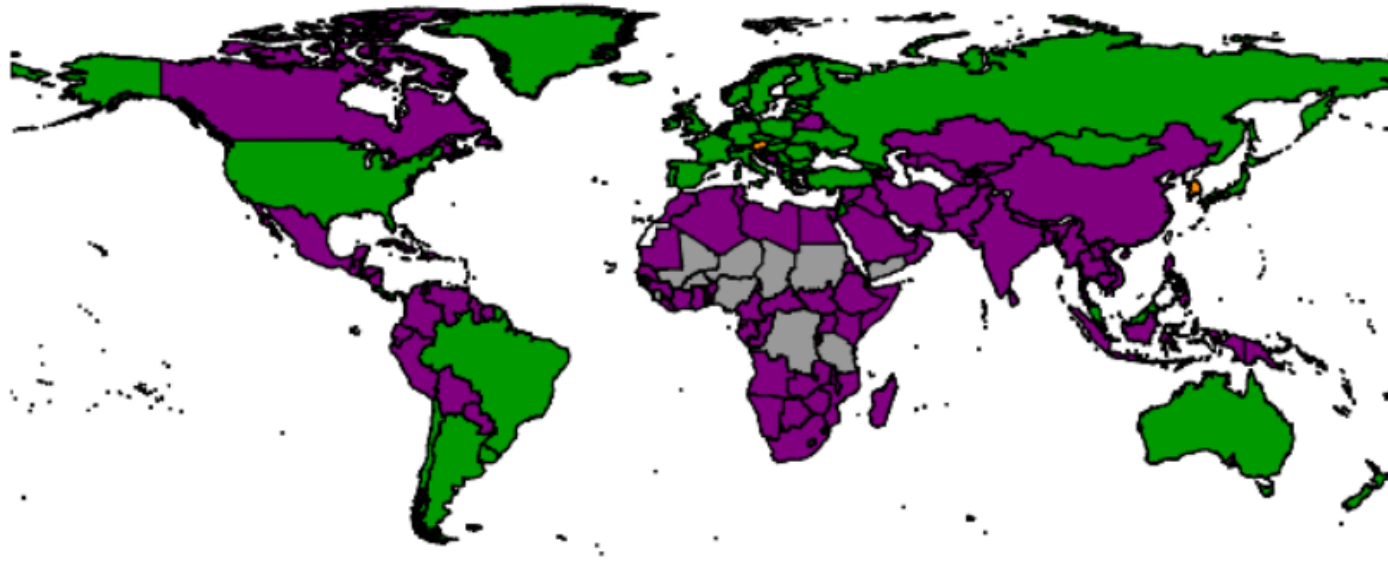
Afghanistan : 194 : 0.5599  
 Albania : 127 : 11.7705  
 Algeria : 193 : 0.6058  
 American Samoa : 99 : 18.8712  
 Andorra : 10 : 60.1368  
 Angola : 210 : 0.2999  
 Anguilla : 83 : 24.5890  
 Antigua and Barbuda : 134 : 9.7108  
 Argentina : 92 : 22.1384  
 Armenia : 107 : 16.2330  
 Aruba : 47 : 41.5409  
 Australia : 43 : 44.7341  
 Austria : 4 : 68.0263  
 Azerbaijan : 142 : 8.0535  
 Bahamas : 137 : 9.2890  
 Bahrain : 34 : 47.3167  
 Bangladesh : 184 : 1.1953  
 Barbados : 51 : 39.1104  
 Belarus : 131 : 10.4252  
 Belgium : 48 : 41.5405  
 Belize : 101 : 17.6106  
 Benin : 218 : 0.2100  
 Bermuda : 70 : 29.3737  
 Bhutan : 143 : 8.0128  
 Bolivia : 133 : 9.9125  
 Bonaire and Sint Eustatius and Saba : 44 : 44.0707  
 Bosnia and Herzegovina : 123 : 12.4776  
 Botswana : 121 : 12.5620  
 Brazil : 102 : 17.4257  
 British Virgin Islands : 87 : 23.5925  
 Brunei : 3 : 73.6692  
 Bulgaria : 96 : 19.4799  
 Burkina Faso : 227 : 0.0975  
 Burundi : 205 : 0.4225

Case Rate In World For 232 Countries

Countries With No Data (have Empty Area Fill): North Korea | Taiwan | Turkmenistan | Western Sahara  
 ■ 0.0354 - 0.1468 (10 lowest) ■ 0.1526 - 13.3495 (below median) ■ 13.3946 - 13.8567 (median)  
 ■ 13.9049 - 60.0686 (above median) ■ 60.1368 - 75.0727 (10 highest) □ No Data

[No Annotation](#) [Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [BarChart](#) [SpreadSheet](#) [Index](#)  
[World Map of Case Rate By Continent and Region](#) (linked to world maps of other four COVID-19 variables)

HERE: Use the mouse for more information for any country. For a too small country, find its Rank in the alphabetic list, and click that Rank button in the map.



Rank : Country : Case Rate

In Rank Order Within Range:

■ Top 10 Countries:  
 1 : San Marino : 75.0727  
 2 : Cyprus : 73.9907  
 3 : Brunei : 73.6692  
 4 : Austria : 68.0263  
 5 : South Korea : 66.7207  
 6 : Faroe Islands : 65.2484  
 7 : Slovenia : 63.8156  
 8 : Gibraltar : 62.8883  
 9 : Martinique : 62.6793  
 10 : Andorra : 60.1368  
 ■ Above Median Countries:  
 11 : Luxembourg : 60.0686  
 12 : Jersey : 59.9218  
 13 : Denmark : 58.2498  
 14 : Saint Pierre and Miquelon : 58.2158  
 15 : France : 57.5074  
 16 : Iceland : 56.2211  
 17 : Guernsey : 55.7817  
 18 : Portugal : 54.8846  
 19 : Liechtenstein : 54.7783  
 20 : Greece : 53.2882  
 21 : Latvia : 52.8300  
 22 : Singapore : 51.8805  
 23 : Guadeloupe : 51.3528  
 24 : Israel : 51.2388  
 25 : Switzerland : 50.8184  
 26 : Reunion : 50.7765  
 27 : Falkland Islands : 50.5919  
 28 : Saint Barthelemy : 50.0910  
 29 : Georgia : 49.5486  
 30 : Lithuania : 49.4255  
 31 : Netherlands : 49.1214

# a Rationale and a Usable Legend

**The ranges are trimmed.**

Case Rate In World For 232 Countries

Countries With No Data (have Empty Area Fill): North Korea | Taiwan | Turkmenistan | Western Sahara

■ 0.0354 - 0.1468 (10 lowest)   ■ 0.1526 - 13.3495 (below median)   ■ 13.3946 - 13.8567 (median)  
■ 13.9049 - 60.0686 (above median)   ■ 60.1368 - 75.0727 (10 highest)   □ No Data

**Supplementing the Legend**

**To Tell the Whole Story**

**with lists of Country, Rank, and Case Rate**

**both in alphabetic order, and by Rank within Range**

# Alphabetic Country List

Country : Rank : Case Rate  
In Alphabetical Order:  
Afghanistan : 194 : 0.5599  
Albania : 127 : 11.7705  
Algeria : 193 : 0.6058  
American Samoa : 99 : 18.8712  
Andorra : 10 : 60.1368  
Angola : 210 : 0.2999  
Anguilla : 83 : 24.5890  
Antigua and Barbuda : 134 : 9.7108  
Argentina : 92 : 22.1384  
Armenia : 107 : 16.2330  
Aruba : 47 : 41.5409  
Australia : 43 : 44.7341  
Austria : 4 : 68.0263  
Azerbaijan : 142 : 8.0535  
Bahamas : 137 : 9.2890  
Bahrain : 34 : 47.3167  
Bangladesh : 184 : 1.1953  
Barbados : 51 : 39.1104  
Belarus : 131 : 10.4252  
Belgium : 48 : 41.5405  
Belize : 101 : 17.6106  
Benin : 218 : 0.2100  
Bermuda : 70 : 29.3737  
Bhutan : 143 : 8.0128  
Bolivia : 133 : 9.9125

# Range/Rank Order List

Rank : Country : Case Rate  
In Rank Order Within Range:  
■ Top 10 Countries:  
1 : San Marino : 75.0727  
2 : Cyprus : 73.9907  
3 : Brunei : 73.6692  
4 : Austria : 68.0263  
5 : South Korea : 66.7207  
6 : Faroe Islands : 65.2484  
7 : Slovenia : 63.8156  
8 : Gibraltar : 62.8883  
9 : Martinique : 62.6793  
10 : Andorra : 60.1368  
■ Above Median Countries:  
11 : Luxembourg : 60.0686  
12 : Jersey : 59.9218  
13 : Denmark : 58.2498  
14 : Saint Pierre and Miquelon : 58.2158  
15 : France : 57.5074  
16 : Iceland : 56.2211  
17 : Guernsey : 55.7817  
18 : Portugal : 54.8846  
19 : Liechtenstein : 54.7783  
20 : Greece : 53.2882  
21 : Latvia : 52.8300  
22 : Singapore : 51.8805

# How to map the COVID-19 data?

For 236 countries in the COVID-19 data set

- ▶ Five World Maps By Continent and By Region
- ▶ Five By-Country Maps for each Continent/Region
- ▶ Five By-Country Maps for The World

## Five COVID-19 Data Measures:

- (1) Population . . . the context for the epidemic
- (2) Total Cases
- (3) Total Deaths
- (4) Case Rate
- (5) Mortality Rate

## Maps for Five Response Variables:

Population, Total Cases, Total Deaths, Case Rate, and Mortality Rate—**Five Maps Interlinked**

The Index links only to Population Maps  
Every map has a link to the Index

Case Rate = Total Cases / Population

Mortality Rate = Total Deaths / Total Cases

► All maps have data tips (mouseover text) for supplemental data elements (discussed on other slides)

# Map Usability Obstacle

- ▶ countries too small for viewer to see the color-coding
- ▶ identity, location, mouseover text are undiscoverable

# Maps Made Usable!

Annotated two ways:

- ▶ Rank Numbers on Top N & Bottom N Countries
- ▶ Rank Numbers on Every Country  
(infeasible for the World Map)

**Rank Numbers are keys to lists of countries.**

Lists are at each side of the map image:

- (a) alphabetic order by country at left
- (b) response value rank order at right

# Oceania is a Discontiguous Continent, Unlike the Others

## 24 Countries: But How Many of Their Color Fills Can You See?

Country : Rank : Case Rate  
In Alphabetical Order:  
American Samoa : 15 : 18.8712  
Australia : 3 : 44.7341  
Cook Islands : 5 : 42.2910  
Federated States of Micronesia : 14 : 23.2505  
Fiji : 19 : 7.4263  
French Polynesia : 13 : 25.8665  
Guam : 9 : 30.4291  
Kiribati : 21 : 3.8747  
Marshall Islands : 6 : 38.7998  
Nauru : 4 : 42.4947  
New Caledonia : 11 : 27.6122  
New Zealand : 2 : 47.0634  
Niue : 1 : 48.0020  
Northern Mariana Islands : 10 : 28.9204  
Palau : 7 : 34.6439  
Papua New Guinea : 24 : 0.4621  
Pitcairn : 17 : 8.5106  
Samoa : 18 : 7.5453  
Solomon Islands : 23 : 3.5835  
Tokelau : 20 : 4.2261  
Tonga : 16 : 15.8028  
Tuvalu : 12 : 25.9638  
Vanuatu : 22 : 3.6784  
Wallis and Futuna : 8 : 30.6140

Case Rate In Oceania For 24 Countries  
■ 0.4621 - 4.2261 (5 lowest) ■ 7.4263 - 23.2505 (below median) ■ 25.8665 - 25.9638 (median)  
■ 27.6122 - 38.7998 (above median) ■ 42.2910 - 48.0020 (5 highest)

[Annotate This Population Total Cases Total Deaths Mortality Rate BarChart SpreadSheet Index](#)  
[World Map of Case Rate By Continent and Region](#) (linked to world maps of other four COVID-19 variables)  
**HERE:** Use the mouse for more information for any country.  
For a too small country, find its Rank in the alphabetic list, and click that Rank button in the map.



Rank : Country : Case Rate  
In Rank Order Within Range:  
■ Top 5 Countries:  
1 : Niue : 48.0020  
2 : New Zealand : 47.0634  
3 : Australia : 44.7341  
4 : Nauru : 42.4947  
5 : Cook Islands : 42.2910  
■ Above Median Countries:  
6 : Marshall Islands : 38.7998  
7 : Palau : 34.6439  
8 : Wallis and Futuna : 30.6140  
9 : Guam : 30.4291  
10 : Northern Mariana Islands : 28.9204  
11 : New Caledonia : 27.6122  
■ Median Countries:  
12 : Tuvalu : 25.9638  
13 : French Polynesia : 25.8665  
■ Below Median Countries:  
14 : Federated States of Micronesia : 23.2505  
15 : American Samoa : 18.8712  
16 : Tonga : 15.8028  
17 : Pitcairn : 8.5106  
18 : Samoa : 7.5453  
19 : Fiji : 7.4263  
■ Bottom 5 Countries:  
20 : Tokelau : 4.2261  
21 : Kiribati : 3.8747  
22 : Vanuatu : 3.6784  
23 : Solomon Islands : 3.5835  
24 : Papua New Guinea : 0.4621

# Annotation Makes Every Tiny Country in Oceania Discoverable!

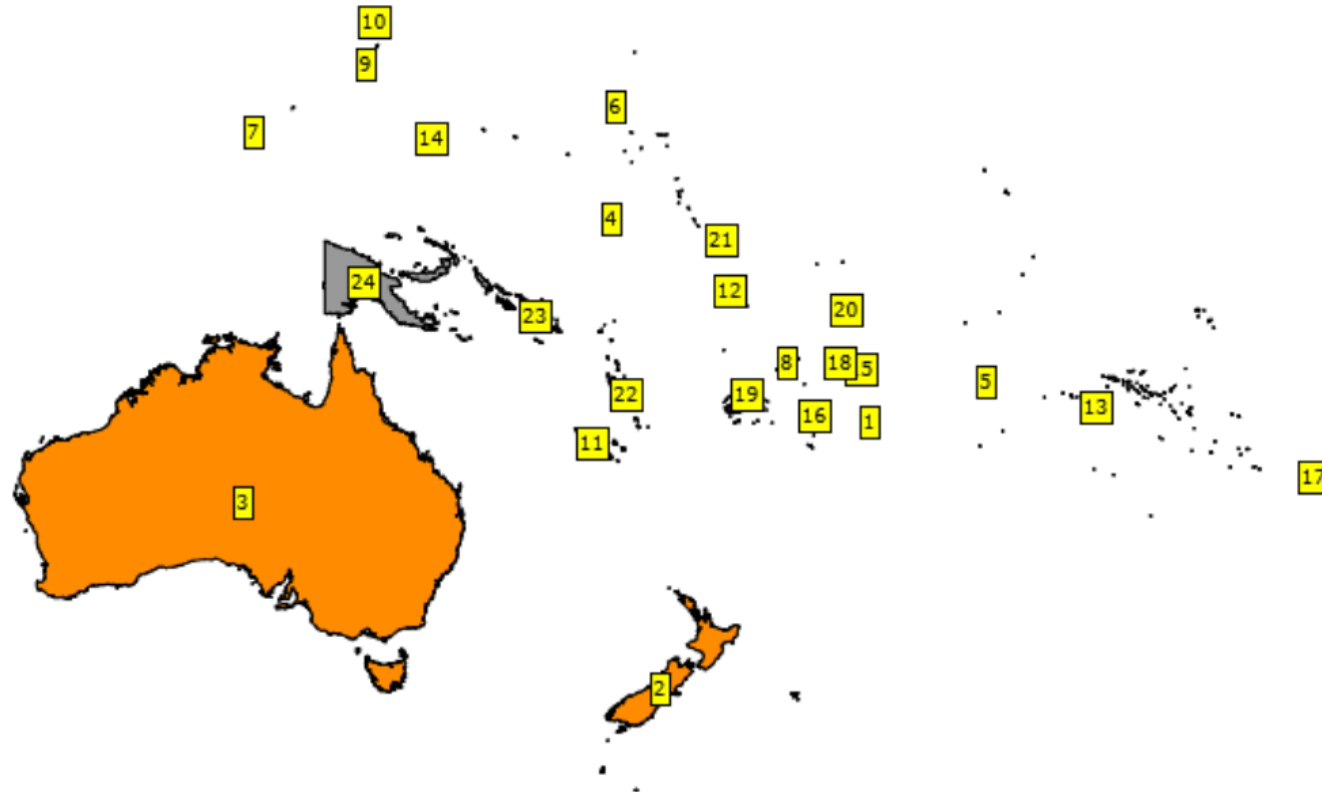
Country : Rank : Case Rate  
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Cook Islands : 5 : 42.2910  
Federated States of Micronesia : 14 : 23.2505  
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Marshall Islands : 6 : 38.7998  
Nauru : 4 : 42.4947  
New Caledonia : 11 : 27.6122  
New Zealand : 2 : 47.0634  
Niue : 1 : 48.0020  
Northern Mariana Islands : 10 : 28.9204  
Palau : 7 : 34.6439  
Papua New Guinea : 24 : 0.4621  
Pitcairn : 17 : 8.5106  
Samoa : 18 : 7.5453  
Solomon Islands : 23 : 3.5835  
Tokelau : 20 : 4.2261  
Tonga : 16 : 15.8028  
Tuvalu : 12 : 25.9638  
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Case Rate In Oceania For 24 Countries  
■ 0.4621 - 4.2261 (5 lowest) ■ 7.4263 - 23.2505 (below median) ■ 25.8665 - 25.9638 (median)  
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[No Annotation](#) [Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [BarChart](#) [SpreadSheet](#) [Index](#)  
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**HERE:** Use the mouse for more information for any country.

For a too small country, find its Rank in the alphabetic list, and click that Rank button in the map.



Rank : Country : Case Rate  
In Rank Order Within Range:

■ Top 5 Countries:  
1 : Niue : 48.0020  
2 : New Zealand : 47.0634  
3 : Australia : 44.7341  
4 : Nauru : 42.4947  
5 : Cook Islands : 42.2910  
■ Above Median Countries:  
6 : Marshall Islands : 38.7998  
7 : Palau : 34.6439  
8 : Wallis and Futuna : 30.6140  
9 : Guam : 30.4291  
10 : Northern Mariana Islands : 28.9204  
11 : New Caledonia : 27.6122  
■ Median Countries:  
12 : Tuvalu : 25.9638  
13 : French Polynesia : 25.8665  
■ Below Median Countries:  
14 : Federated States of Micronesia : 23.2505  
15 : American Samoa : 18.8712  
16 : Tonga : 15.8028  
17 : Pitcairn : 8.5106  
18 : Samoa : 7.5453  
19 : Fiji : 7.4263  
■ Bottom 5 Countries:  
20 : Tokelau : 4.2261  
21 : Kiribati : 3.8747  
22 : Vanuatu : 3.6784  
23 : Solomon Islands : 3.5835  
24 : Papua New Guinea : 0.4621

## Alphabetic Order By Country With Rank

Country : Rank : Case Rate  
In Alphabetical Order:  
American Samoa : 15 : 18.8712  
Australia : 3 : 44.7341  
Cook Islands : 5 : 42.2910  
Federated States of Micronesia : 14 : 23.2505  
Fiji : 19 : 7.4263  
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Tonga : 16 : 15.8028  
Tuvalu : 12 : 25.9638  
Vanuatu : 22 : 3.6784  
Wallis and Futuna : 8 : 30.6140

## Five Ranges with Rank Ordered Countries

Rank : Country : Case Rate  
In Rank Order Within Range:

- Top 5 Countries:  
1 : Niue : 48.0020  
2 : New Zealand : 47.0634  
3 : Australia : 44.7341  
4 : Nauru : 42.4947  
5 : Cook Islands : 42.2910
- Above Median Countries:  
6 : Marshall Islands : 38.7998  
7 : Palau : 34.6439  
8 : Wallis and Futuna : 30.6140  
9 : Guam : 30.4291  
10 : Northern Mariana Islands : 28.9204  
11 : New Caledonia : 27.6122
- Median Countries:  
12 : Tuvalu : 25.9638  
13 : French Polynesia : 25.8665
- Below Median Countries:  
14 : Federated States of Micronesia : 23.250  
15 : American Samoa : 18.8712  
16 : Tonga : 15.8028  
17 : Pitcairn : 8.5106  
18 : Samoa : 7.5453  
19 : Fiji : 7.4263
- Bottom 5 Countries:  
20 : Tokelau : 4.2261  
21 : Kiribati : 3.8747  
22 : Vanuatu : 3.6784  
23 : Solomon Islands : 3.5835  
24 : Papua New Guinea : 0.4621

Two SideNote Alternatives Provide Country, Rank, and Value

# MouseOver Text ("data tips" in ODS Graphics) can be as informative as you are willing to make them

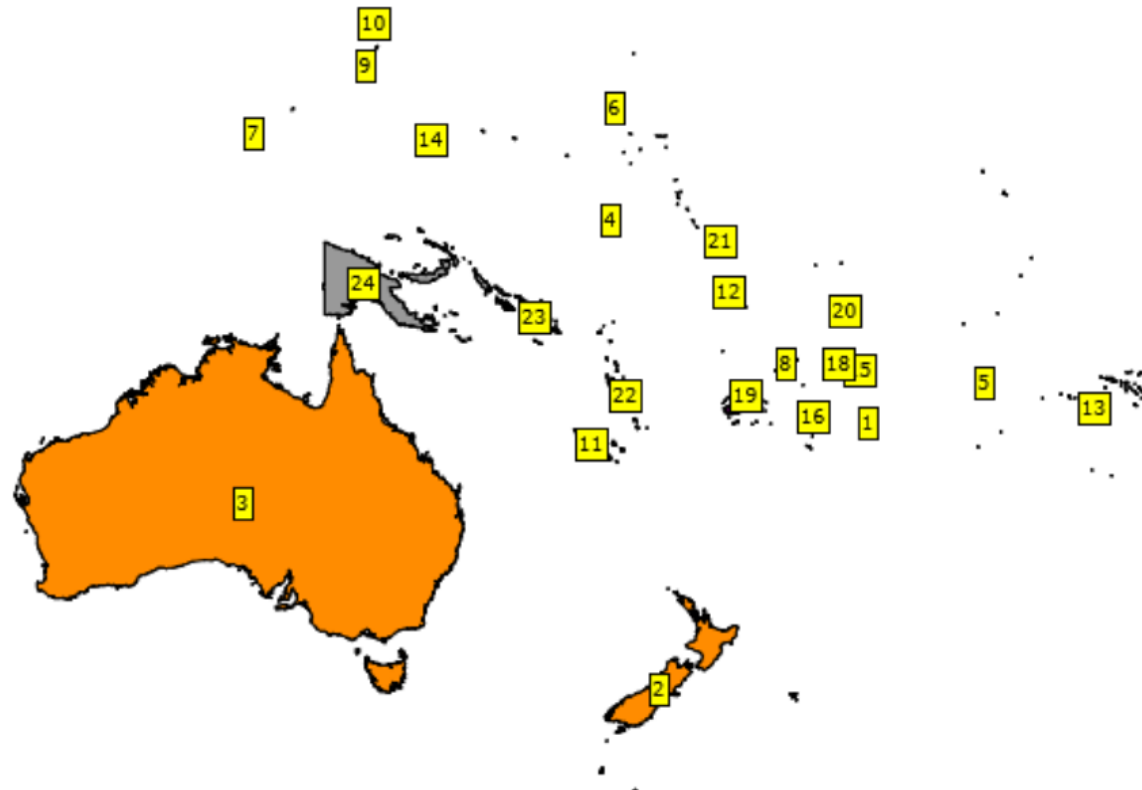
Country : Rank : Case Rate  
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**HERE:** Use the mouse for more information for any country.  
 For a too small country, find its Rank in the alphabetic list, and click that Rank button in the map.

Rank : Country : Case Rate  
 In Rank Order Within Range:  
 ■ Top 5 Countries:  
 1 : Niue : 48.0020  
 2 : New Zealand : 47.0634  
 3 : Australia : 44.7341  
 4 : Nauru : 42.4947  
 5 : Cook Islands : 42.2910



Is this box of mouseover text from resting the mouse on the Rank button? = YES  
 Country = Pitcairn  
 Continent = Oceania  
 Population = 47  
 Total Cases = 4  
 Total Deaths =  
 Case Rate (Cases As Percent of Population) = 8.5106  
 Mortality Rate (Deaths As Percent of Cases) =  
 Percent of Population in Continent = 0.000104354%  
 Percent of Cases in Continent = 0.000027310%  
 Percent of Deaths in Continent =  
 Rank of Population in Continent = 24 of 24  
 Rank of Total Cases in Continent = 24 of 24  
 Rank of Total Deaths in Continent =  
 Rank of Case Rate in Continent = 17 of 24  
 Rank of Mortality Rate in Continent =  
 Percent of Population in World = 0.000000590%  
 Percent of Cases in World = 0.000000517%  
 Percent of Deaths in World =  
 Rank of Population in World = 236 of 236  
 Rank of Cases in World = 232 of 232  
 Rank of Deaths in World =  
 Rank of Case Rate in World = 141 of 232  
 Rank of Mortality Rate in World =

# Mouse on Case Rate Rank 17 Button for the World's Least Populous Country

Is this box of mouseover text from resting the mouse on the Rank button? = YES

Country = Pitcairn

Continent = Oceania

Population = 47

Total Cases = 4

Total Deaths =

Case Rate (Cases As Percent of Population) = 8.5106

Mortality Rate (Deaths As Percent of Cases) =

Percent of Population in Continent = 0.000104354%

Percent of Cases in Continent = 0.000027310%

Percent of Deaths in Continent =

Rank of Population in Continent = 24 of 24

Rank of Total Cases in Continent = 24 of 24

Rank of Total Deaths in Continent =

Rank of Case Rate in Continent = 17 of 24

Rank of Mortality Rate in Continent =

Percent of Population in World = 0.000000590%

Percent of Cases in World = 0.000000517%

Percent of Deaths in World =

Rank of Population in World = 236 of 236

Rank of Cases in World = 232 of 232

Rank of Deaths in World =

Rank of Case Rate in World = 141 of 232

Rank of Mortality Rate in World =

## Atlas Key to Discovery of The Tiny

Annotation enables the computer mouse to find The Pitcairn Islands:

Pitcairn, Henderson, Ducie, and

Oeno, with a total area of 47 sq km

(18.5 sq mi). Only Pitcairn is

inhabited. Some of its residents are

descendants of men from the Mutiny

on the Bounty.

# Countries and Their Information – Two Essential Ways

- ▶ For **Immediate Inspection**,  
Mouseover Text (aka Data Tips)  
**DIRECTLY connects information** to each country
- ▶ For **Non-Vanishing Inspection and Comparison**,  
each map links to:
  - (1) a bar chart of the mapped data  
and much of its mouseover data
  - (2) a spreadsheet for all of that data

# After Clicking on “Bar Chart”

Ranked Bar Chart For Map Of Case Rate In Oceania

[Go Back To The Annotated Map Of Case Rate In Oceania](#)

[Go To Alphabetic Order Bar Chart Of Case Rate In Oceania](#)

[SpreadSheet For More COVID-19 Information For Oceania](#)

	Rank	% of Continent Population	% of Continent Cases	% of Continent Deaths	Population	Total Cases	Total Deaths	Mortality Rate	Case Rate	
Niue	1	0.004334031%	0.006397412%		1,952	937	.	.	48.0020	
New Zealand	2	11.51291038%	16.66177700%	11.647645%	5,185,289	2,440,375	3,623	0.1485	47.0634	
Australia	3	58.12177014%	79.95205969%	77.437711%	26,177,410	11,710,216	24,087	0.2057	44.7341	
Nauru	4	0.028177860%	0.036820965%	0.0032149%	12,691	5,393	1	0.0185	42.4947	
Cook Islands	5	0.037816193%	0.049178827%	0.0064298%	17,032	7,203	2	0.0278	42.2910	
Marshall Islands	6	0.092349044%	0.110182967%	0.0546536%	41,593	16,138	17	0.1053	38.7998	
Palau	7	0.040151951%	0.042774587%	0.0289343%	18,084	6,265	9	0.1437	34.6439	
Wallis and Futuna	8	0.025746628%	0.024237795%	0.0257193%	11,596	3,550	8	0.2254	30.6140	
Guam	9	0.381410233%	0.356889580%	1.3470503%	171,783	52,272	419	0.8016	30.4291	
Northern Mariana Islands	10	0.110069279%	0.097886553%	0.1318116%	49,574	14,337	41	0.2860	28.9204	
New Caledonia	11	0.643796707%	0.546640788%	1.0094840%	289,959	80,064	314	0.3922	27.6122	
Tuvalu	12	0.025167129%	0.020093473%	0.0032149%	11,335	2,943	1	0.0340	25.9638	
French Polynesia	13	0.680060908%	0.540926131%	2.0864813%	306,292	79,227	649	0.8192	25.8665	
Federated States of Micronesia	14	0.253509704%	0.181250912%	0.2089696%	114,178	26,547	65	0.2448	23.2505	
American Samoa	15	0.098348301%	0.057071472%	0.1093072%	44,295	8,359	34	0.4067	18.8712	
Tonga	16	0.237277072%	0.115303628%	0.0385790%	106,867	16,888	12	0.0711	15.8028	
Pitcairn	17	0.000104354%	0.000027310%		47	4	.	.	8.5106	
Samoa	18	0.493773084%	0.114566252%	0.0996624%	222,390	16,780	31	0.1847	7.5453	
Fiji	19	2.064368480%	0.471421694%	2.8452017%	929,769	69,047	885	1.2817	7.4263	
Tokelau	20	0.004203033%	0.000546204%		1,893	80	.	.	4.2261	
Kiribati	21	0.291385846%	0.034718081%	0.0771580%	131,237	5,085	24	0.4720	3.8747	
Vanuatu	22	0.725470536%	0.082060297%	0.0450088%	326,744	12,019	14	0.1165	3.6784	
Solomon Islands	23	1.608102968%	0.177202176%	0.6397685%	724,272	25,954	199	0.7667	3.5835	
Papua New Guinea	24	22.51969614%	0.319966201%	2.1539945%	10,142,625	46,864	670	1.4297	0.4621	

**Ranked Bar Chart Shows Them What's Important  
But Needs a Quick Easy By-Country LookUp Companion**

# The Alphabetic Order Bar Chart

Ranked Bar Chart For Map Of Case Rate In Oceania

[Go Back To The Annotated Map Of Case Rate In Oceania](#)

[Go To Ranked Bar Chart Of Case Rate In Oceania](#)

[SpreadSheet For More COVID-19 Information For Oceania](#)

	Rank	% of Continent Population	% of Continent Cases	% of Continent Deaths	Population	Total Cases	Total Deaths	Mortality Rate	Case Rate	
American Samoa	15	0.098348301%	0.057071472%	0.1093072%	44,295	8,359	34	0.4067	18.8712	
Australia	3	58.12177014%	79.95205969%	77.437711%	26,177,410	11,710,216	24,087	0.2057	44.7341	
Cook Islands	5	0.037816193%	0.049178827%	0.0064298%	17,032	7,203	2	0.0278	42.2910	
Federated States of Micronesia	14	0.253509704%	0.181250912%	0.2089696%	114,178	26,547	65	0.2448	23.2505	
Fiji	19	2.064368480%	0.471421694%	2.8452017%	929,769	69,047	885	1.2817	7.4263	
French Polynesia	13	0.680060908%	0.540926131%	2.0864813%	306,292	79,227	649	0.8192	25.8665	
Guam	9	0.381410233%	0.356889580%	1.3470503%	171,783	52,272	419	0.8016	30.4291	
Kiribati	21	0.291385846%	0.034718081%	0.0771580%	131,237	5,085	24	0.4720	3.8747	
Marshall Islands	6	0.092349044%	0.110182967%	0.0546536%	41,593	16,138	17	0.1053	38.7998	
Nauru	4	0.028177860%	0.036820965%	0.0032149%	12,691	5,393	1	0.0185	42.4947	
New Caledonia	11	0.643796707%	0.546640788%	1.0094840%	289,959	80,064	314	0.3922	27.6122	
New Zealand	2	11.51291038%	16.66177700%	11.647645%	5,185,289	2,440,375	3,623	0.1485	47.0634	
Niue	1	0.004334031%	0.006397412%		1,952	937	.	.	48.0020	
Northern Mariana Islands	10	0.110069279%	0.097886553%	0.1318116%	49,574	14,337	41	0.2860	28.9204	
Palau	7	0.040151951%	0.042774587%	0.0289343%	18,084	6,265	9	0.1437	34.6439	
Papua New Guinea	24	22.51969614%	0.319966201%	2.1539945%	10,142,625	46,864	670	1.4297	0.4621	
Pitcairn	17	0.000104354%	0.000027310%		47	4	.	.	8.5106	
Samoa	18	0.493773084%	0.114566252%	0.0996624%	222,390	16,780	31	0.1847	7.5453	
Solomon Islands	23	1.608102968%	0.177202176%	0.6397685%	724,272	25,954	199	0.7667	3.5835	
Tokelau	20	0.004203033%	0.000546204%		1,893	80	.	.	4.2261	
Tonga	16	0.237277072%	0.115303628%	0.0385790%	106,867	16,888	12	0.0711	15.8028	
Tuvalu	12	0.025167129%	0.020093473%	0.0032149%	11,335	2,943	1	0.0340	25.9638	
Vanuatu	22	0.725470536%	0.082060297%	0.0450088%	326,744	12,019	14	0.1165	3.6784	
Wallis and Futuna	8	0.025746628%	0.024237795%	0.0257193%	11,596	3,550	8	0.2254	30.6140	

# After Clicking on "SpreadSheet" on the Map or Selecting "Spreadsheet" on Either Bar Chart

SpreadSheet For Maps Of Oceania (2).xlsx - Microsoft Excel

File Home Insert Page Layout Formulas Data Review View

Clipboard Font Alignment Number Styles Cells Editing

A1 Data For All Five Maps Of Oceania

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	<b>Data For All Five Maps Of Oceania</b>														
2	<a href="#">Go To The Annotated Map Of Population In Oceania</a>														
3															
4	<b>Country</b>	<b>Continent</b>	<b>Population</b>	<b>Total Cases</b>	<b>Total Deaths</b>	<b>Case Rate</b>	<b>Mortality Rate</b>	<b>Percent of Continent Population</b>	<b>Percent of Continent Total Cases</b>	<b>Percent of Continent Total Deaths</b>	<b>Rank Population in Continent</b>	<b>Rank Total Cases in Continent</b>	<b>Rank Total Deaths in Continent</b>	<b>Rank Case Rate in Continent</b>	<b>Rank Mortality Rate in Continent</b>
5	American Samoa	Oceania	44,295	8,359	34	18.8712	0.4067	0.098348301%	0.057071472%	0.1093072%	15 of 24	15 of 24	11 of 21	15 of 24	7 of 21
6	Australia	Oceania	26,177,410	11,710,216	24,087	44.7341	0.2057	58.12177014%	79.95205969%	77.437711%	1 of 24	1 of 24	1 of 21	3 of 24	12 of 21
7	Cook Islands	Oceania	17,032	7,203	2	42.2910	0.0278	0.037816193%	0.049178827%	0.0064298%	18 of 24	16 of 24	19 of 21	5 of 24	20 of 21
8	Federated States of Micronesia	Oceania	114,178	26,547	65	23.2505	0.2448	0.253509704%	0.181250912%	0.2089696%	12 of 24	8 of 24	9 of 21	14 of 24	10 of 21
9	Fiji	Oceania	929,769	69,047	885	7.4263	1.2817	2.064368480%	0.471421694%	2.8452017%	4 of 24	5 of 24	3 of 21	19 of 24	2 of 21
10	French Polynesia	Oceania	306,292	79,227	649	25.8665	0.8192	0.680060908%	0.540926131%	2.0864813%	7 of 24	4 of 24	5 of 21	13 of 24	3 of 21
11	Guam	Oceania	171,783	52,272	419	30.4291	0.8016	0.381410233%	0.356889580%	1.3470503%	10 of 24	6 of 24	6 of 21	9 of 24	4 of 21
12	Kiribati	Oceania	131,237	5,085	24	3.8747	0.4720	0.291385846%	0.034718081%	0.0771580%	11 of 24	19 of 24	13 of 21	21 of 24	6 of 21
13	Marshall Islands	Oceania	41,593	16,138	17	38.7998	0.1053	0.092349044%	0.110182967%	0.0546536%	16 of 24	12 of 24	14 of 21	6 of 24	17 of 21

Ready

# Bar Charts for The World, But Different

# Show Them What's Important with Bar Charts By Using

- ▶ Ranking . . . Always

- ▶ Subsetting . . .

Sometimes Incompleteness Can Be Beneficial:

**Enough Is A Cure For Information Overload!**

# Top 30 Countries By Total Cases AND Top 30 By Total Deaths

Go To [Alphabetic Order by Country Table of All COVID-19 Information WorldWide](#)

Top 30 Countries Ranked by COVID-19 Total Cases - 2020 to 2023					Top 30 Countries Ranked by COVID-19 Total Deaths - 2020 to 2023				
This SubTotal of 657,229,080 Cases Is 85.0% of the World Total					This SubTotal of 5,906,988 Mortalities Is 84.5% of the World Total				
All 232 Countries had a Total of 773,490,126 Cases					All 226 Countries had a Total of 6,994,144 Deaths				
	Rank	Cases	% of World Cases	Case Rate		Rank	Deaths	% of World Deaths	Mortality Rate
United States of America	1	103,436,829	13.3727	30.5764	United States of America	1	1,144,877	16.3691	1.1068
China	2	99,322,525	12.8408	6.9657	Brazil	2	702,116	10.0386	1.8713
India	3	45,010,891	5.8192	3.1761	India	3	533,346	7.6256	1.1849
France	4	38,997,490	5.0418	57.5074	Russia	4	400,967	5.7329	1.6984
Germany	5	38,437,756	4.9694	46.1051	Mexico	5	334,958	4.7891	4.3485
Brazil	6	37,519,960	4.8507	17.4257	United Kingdom	6	232,112	3.3187	0.9343
South Korea	7	34,571,873	4.4696	66.7207	Peru	7	221,583	3.1681	4.8842
Japan	8	33,803,572	4.3703	27.2716	Italy	8	193,886	2.7721	0.7312
Italy	9	26,517,706	3.4283	44.9167	Germany	9	174,979	2.5018	0.4552
United Kingdom	10	24,843,591	3.2119	36.8004	France	10	167,985	2.4018	0.4308
Russia	11	23,608,723	3.0522	16.3141	Indonesia	11	161,965	2.3157	2.3745
Turkey	12	17,004,677	2.1984	19.9255	Iran	12	146,757	2.0983	1.9246
Spain	13	13,980,340	1.8074	29.3960	Colombia	13	142,727	2.0407	2.2352
Australia	14	11,710,216	1.5139	44.7341	Argentina	14	130,687	1.8685	1.2971
Viet Nam	15	11,624,000	1.5028	11.8387	China	15	121,889	1.7427	0.1227
Argentina	16	10,075,242	1.3026	22.1384	Spain	16	121,852	1.7422	0.8716
Netherlands	17	8,627,693	1.1154	49.1214	Poland	17	120,018	1.7160	1.8160
Mexico	18	7,702,809	0.9959	6.0412	Ukraine	18	109,918	1.5716	1.9911
Iran	19	7,625,463	0.9859	8.6114	South Africa	19	102,595	1.4669	2.5191
Indonesia	20	6,820,926	0.8818	2.4758	Turkey	20	101,419	1.4501	0.5964
Poland	21	6,609,092	0.8545	16.5820	Japan	21	74,694	1.0680	0.2210
Colombia	22	6,385,539	0.8255	12.3097	Romania	22	68,601	0.9808	1.9559
Austria	23	6,081,287	0.7862	68.0263	Philippines	23	66,795	0.9550	1.6004
Portugal	24	5,637,114	0.7288	54.8846	Chile	24	64,482	0.9219	1.2100
Greece	25	5,533,964	0.7155	53.2882	Canada	25	53,595	0.7663	1.1281
Ukraine	26	5,520,483	0.7137	13.9049	Hungary	26	48,917	0.6994	2.1997
Chile	27	5,329,103	0.6890	27.1841	Czechia	27	43,225	0.6180	0.9139
Malaysia	28	5,206,724	0.6731	15.3418	Viet Nam	28	43,206	0.6177	0.3717
Belgium	29	4,841,934	0.6260	41.5405	Bulgaria	29	38,613	0.5521	2.9227
Israel	30	4,841,558	0.6259	51.2388	Greece	30	38,224	0.5465	0.6907

- ▶ **The countries in these Top 30 charts account for 85% of total cases & 85% of total deaths.**
- ▶ **Subsetted Ranking Reports CAN suffice to deliver the most significant information.**

Let's take a world tour . . .

But Not With Response-Range-Oriented Maps

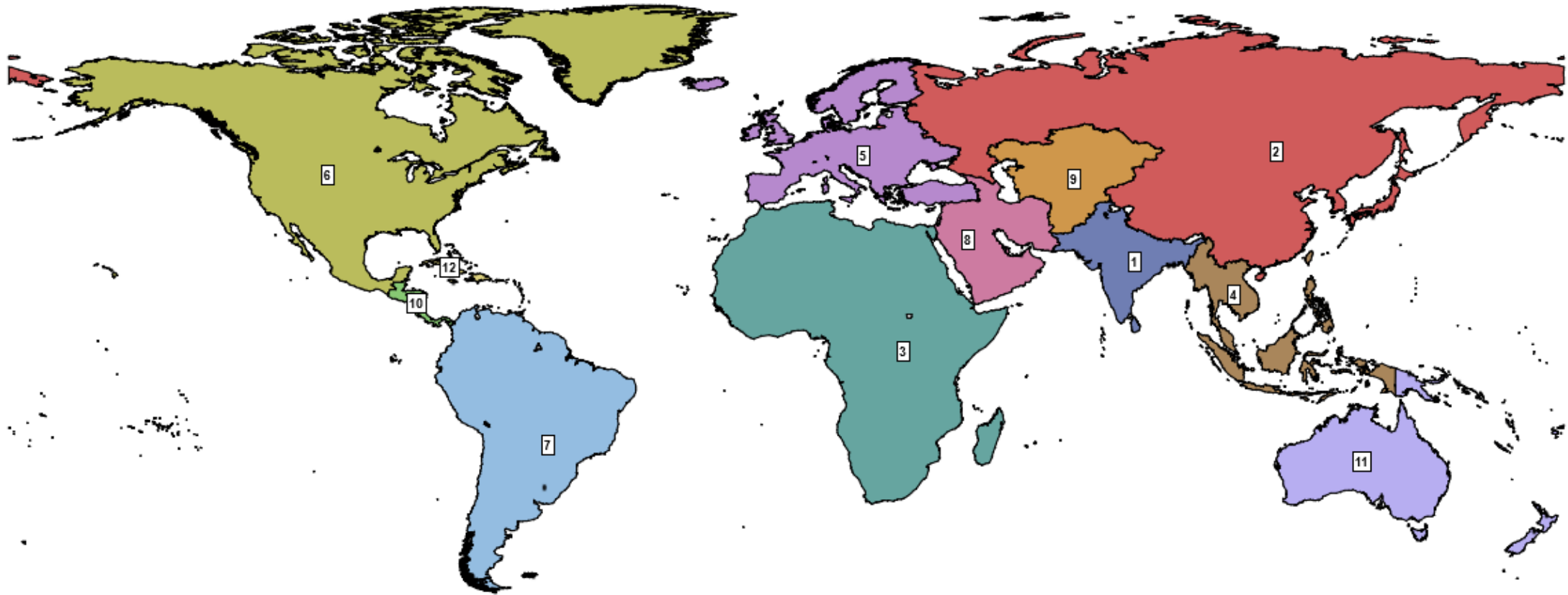
Let's "Summarize" the 12 Sectors of the World by  
Response Variable, and Rank Annotate Each of Them

# The World View Of Population By Continent And By Region

Map Of Population By Continent And Region - Grand Total = 7,969,598,474 | For the Five Regions of Asia, Total Population = 4,772,643,411

[Total Cases](#) [Total Deaths](#) [Case Rate](#) [Mortality Rate](#) [SpreadSheet Of Data For All Five Maps](#) [Index To By-Country Population Maps For Each Continent And Region And The World](#)

Click on the Rank Button to get to the By-Country map of Population in the Continent/Region. Rest the mouse on the button to see Continent/Region name, five COVID-19 values, & the Continent/Region count of countries.



1 : Indian SubContinent : 1,877,870,343	2 : North Asia And East Asia : 1,775,835,965	3 : Africa : 1,426,736,614	4 : SouthEast Asia : 704,679,806
5 : Europe : 688,039,206	6 : North America : 507,627,302	7 : South America : 436,816,679	8 : Middle East And TransCaucasia : 296,088,692
9 : Central Asia : 118,168,605	10 : Central America : 51,556,263	11 : Oceania : 45,038,907	12 : Caribbean Islands : 41,140,092

# CloseUp of Title Lines 1 and 2

Map Of Population By Continent And Region - Grand Total = 7,969,598,474 | For the Five Regions of Asia, Total Population = 4,772,643,411

[Total Cases](#) [Total Deaths](#) [Case Rate](#) [Mortality Rate](#) [Spread Sheet Of Data For All Five Maps](#) [Index To By-Country Population Maps For](#)

Asia is presented only as Five Regions

No COVID-19 response value is in the legend

Deliver it at the end of TITLE1

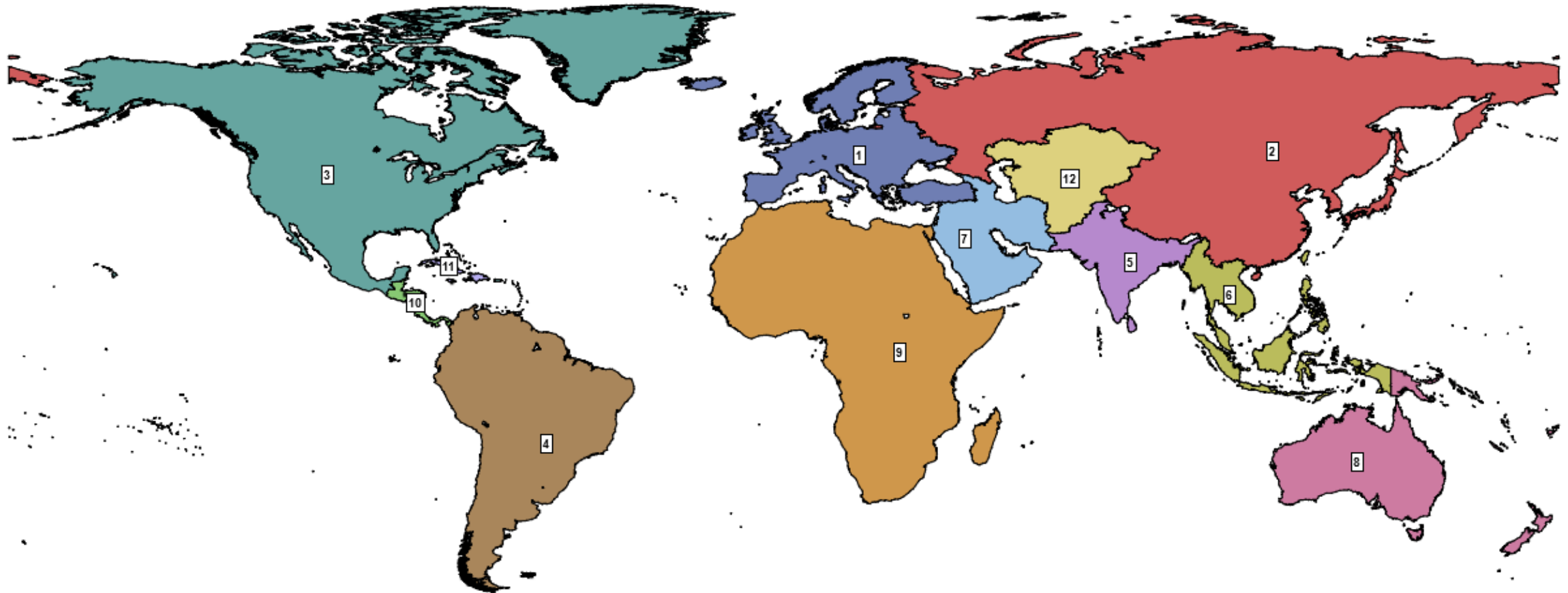
**For the Five Regions of Asia, Total Population = 4,772,643,411**

# Total Cases

Map Of Total Cases By Continent And Region - Grand Total = 773,490,126 | For the Five Regions of Asia, Total Total Cases = 307,780,080

[Population](#) [Total Deaths](#) [Case Rate](#) [Mortality Rate](#) [SpreadSheet Of Data For All Five Maps](#) [Index To By-Country Population Maps For Each Continent And Region And The World](#)

Click on the Rank Button to get to the By-Country map of Total Cases in the Continent/Region. Rest the mouse on the button to see Continent/Region name, five COVID-19 values, & the Continent/Region count of countries.



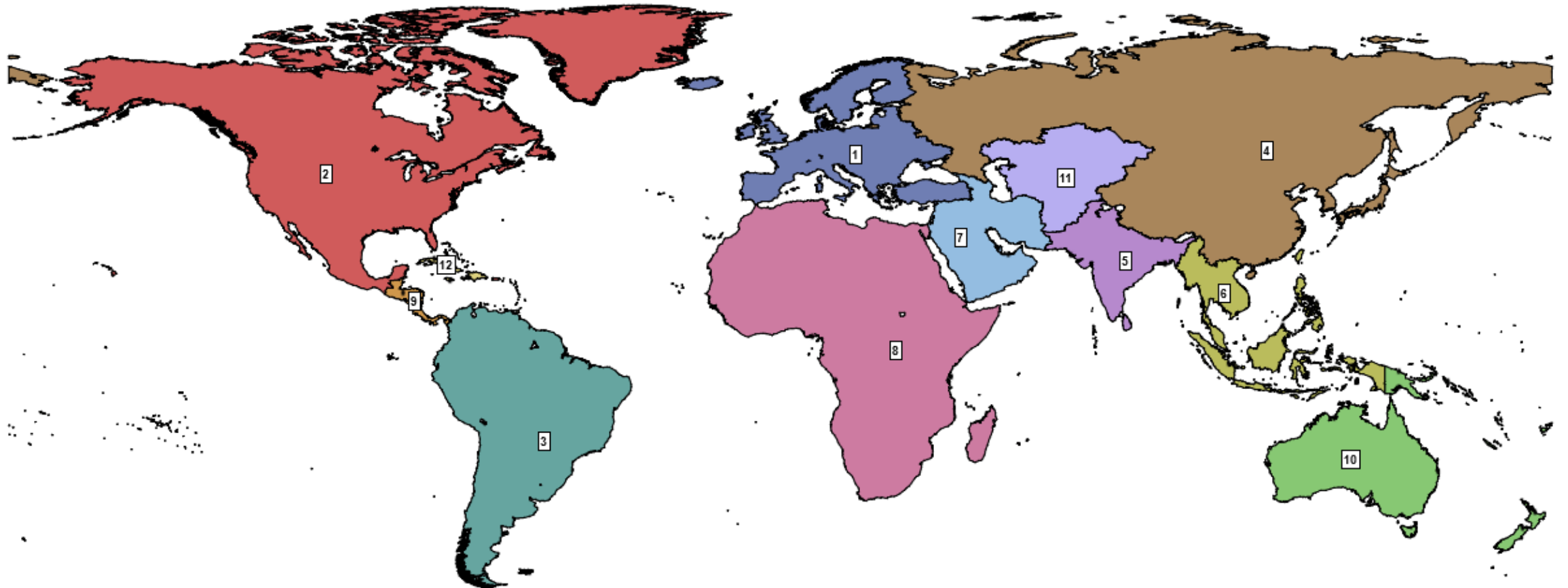
1 : Europe : 244,720,216	2 : North Asia And East Asia : 192,318,113	3 : North America : 117,177,376	4 : South America : 68,710,841
5 : Indian SubContinent : 50,563,304	6 : SouthEast Asia : 36,865,155	7 : Middle East And TransCaucasia : 26,018,560	8 : Oceania : 14,646,547
9 : Africa : 13,130,999	10 : Central America : 4,284,920	11 : Caribbean Islands : 3,039,147	12 : Central Asia : 2,014,948

# Total Deaths

Map Of Total Deaths By Continent And Region - Grand Total = 6,994,144 | For the Five Regions of Asia, Total Total Deaths = 1,935,537

[Population](#) [Total Cases](#) [Case Rate](#) [Mortality Rate](#) [SpreadSheet Of Data For All Five Maps](#) [Index To By-Country Population Maps For Each Continent And Region And The World](#)

Click on the Rank Button to get to the By-Country map of Total Deaths in the Continent/Region. Rest the mouse on the button to see Continent/Region name, five COVID-19 values, & the Continent/Region count of countries.



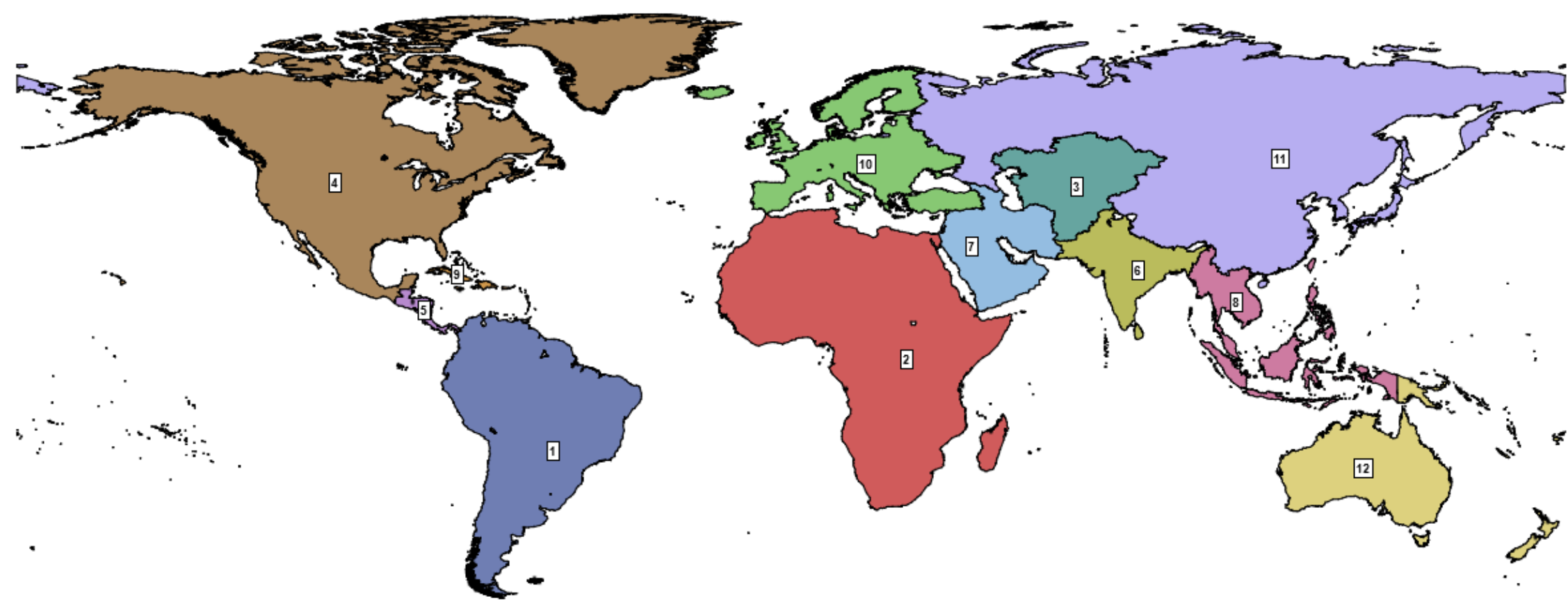
1 : Europe : 1,790,363	2 : North America : 1,539,556	3 : South America : 1,356,593	4 : North Asia And East Asia : 635,768
5 : Indian SubContinent : 622,735	6 : SouthEast Asia : 369,211	7 : Middle East And TransCaucasia : 278,613	8 : Africa : 259,064
9 : Central America : 54,498	10 : Oceania : 31,105	11 : Central Asia : 29,210	12 : Caribbean Islands : 27,428

# Mortality Rate (Total Deaths as Percent of Total Cases)

Map Of Mortality Rate By Continent And Region

[Population](#) [Total Cases](#) [Total Deaths](#) [Case Rate](#) [SpreadSheet Of Data For All Five Maps](#) [Index To By-Country Population Maps For Each Continent And Region And The World](#)

Click on the Rank Button to get to the By-Country map of Mortality Rate in the Continent/Region. Rest the mouse on the button to see Continent/Region name, five COVID-19 values, & the Continent/Region count of countries.



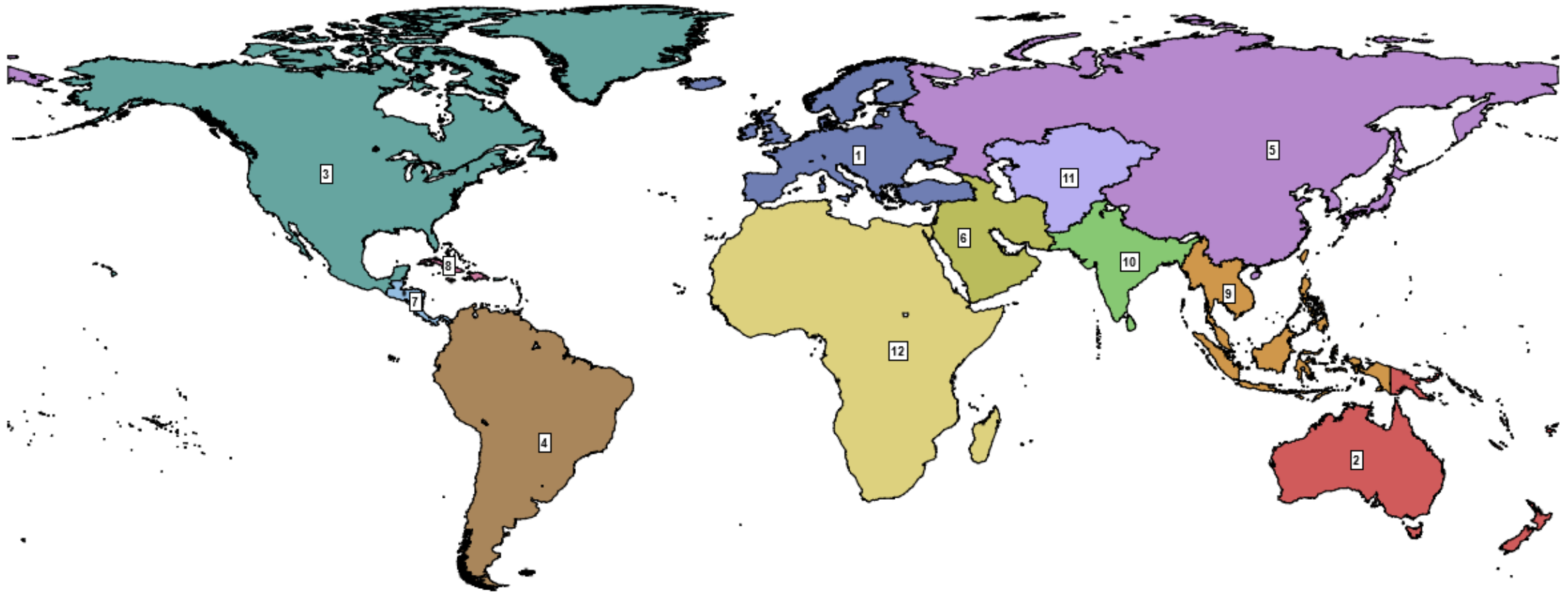
1 : South America : 1.9744	2 : Africa : 1.9732	3 : Central Asia : 1.4497	4 : North America : 1.3139	5 : Central America : 1.2719	6 : Indian SubContinent : 1.2316
7 : Middle East And TransCaucasia : 1.0708	8 : SouthEast Asia : 1.0015	9 : Caribbean Islands : 0.9025	10 : Europe : 0.7316	11 : North Asia And East Asia : 0.3306	12 : Oceania : 0.2124

# Case Rate (Total Cases As Percent of Population)

Map Of Case Rate By Continent And Region

[Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [SpreadSheet Of Data For All Five Maps](#) [Index To By-Country Population Maps For Each Continent And Region And The World](#)

Click on the Rank Button to get to the By-Country map of Case Rate in the Continent/Region. Rest the mouse on the button to see Continent/Region name, five COVID-19 values, & the Continent/Region count of countries.



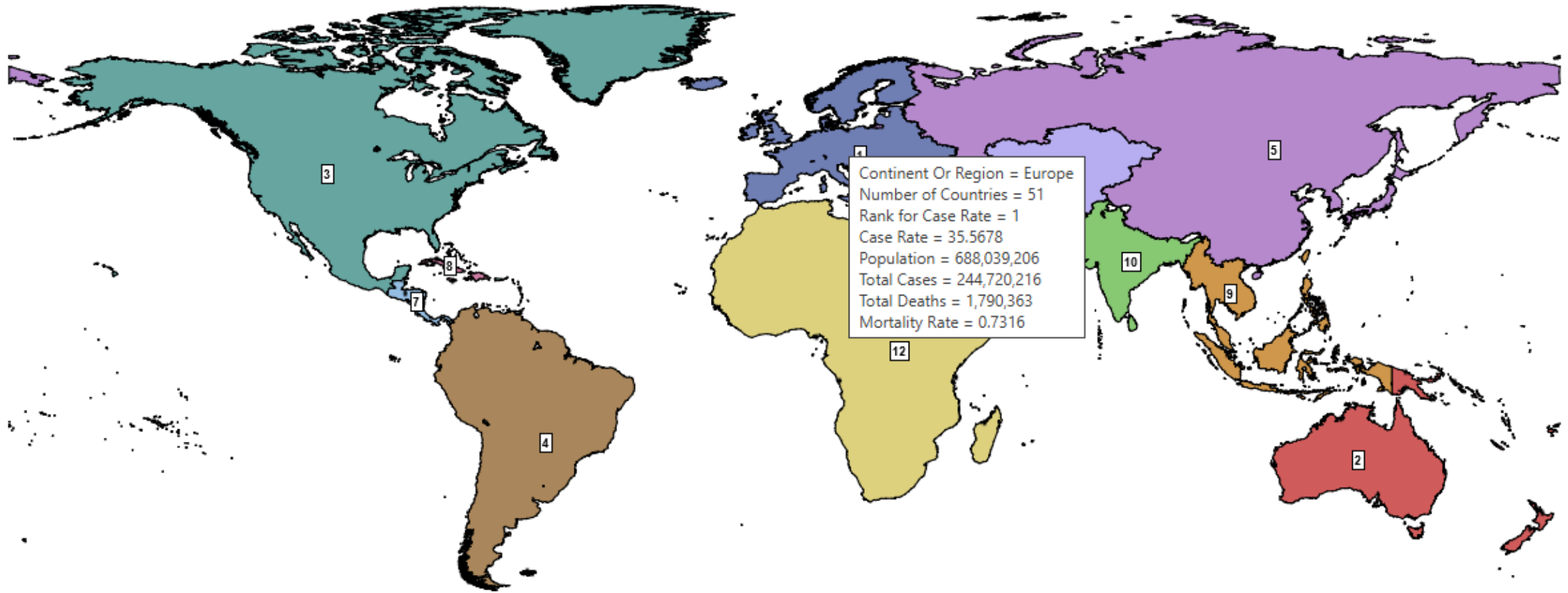
1 : Europe : 35.5678	2 : Oceania : 32.5198	3 : North America : 23.0833	4 : South America : 15.7299	5 : North Asia And East Asia : 10.9911	6 : Middle East And TransCaucasia : 8.7874
7 : Central America : 8.3112	8 : Caribbean Islands : 7.3873	9 : SouthEast Asia : 5.4151	10 : Indian SubContinent : 2.6926	11 : Central Asia : 1.8033	12 : Africa : 0.9207

# At this level, mouseover text is limited, but the linkable SpreadSheet is informative.

Map Of Case Rate By Continent And Region

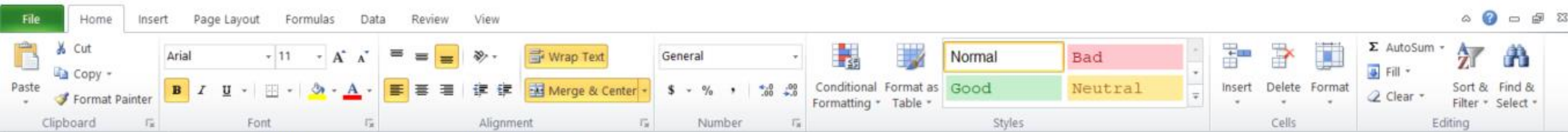
[Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [SpreadSheet Of Data For All Five Maps](#) [Index To By-Country Population Maps For Each Continent And Region And The World](#)

Click on the Rank Button to get to the By-Country map of Case Rate in the Continent/Region. Rest the mouse on the button to see Continent/Region name, five COVID-19 values, & the Continent/Region count of countries.



1 : Europe : 35.5678    2 : Oceania : 32.5198    3 : North America : 23.0833    4 : South America : 15.7299    5 : North Asia And East Asia : 10.9911    6 : Middle East And TransCaucasia : 8.7874  
7 : Central America : 8.3112    8 : Caribbean Islands : 7.3873    9 : SouthEast Asia : 5.4151    10 : Indian SubContinent : 2.6926    11 : Central Asia : 1.8033    12 : Africa : 0.9207

# Using the mouse to instead take the link to the SpreadSheet



A1 Data For All Five Maps By Continent And Region

A B C D E F G H I J K L

1 [Data For All Five Maps By Continent And Region](#)

2 [Go To The Map Of Population By Continent And Region](#)

3

Continent or Region	Number of Countries	Rank of Population	Population	Rank of Total Cases	Total Cases	Rank of Total Deaths	Total Deaths	Rank of Case Rate	Case Rate	Rank of Mortality Rate	Mortality Rate
Caribbean Islands	27	12	41,140,092	11	3,039,147	12	27,428	8	7.3873	9	0.9025
Central America	7	10	51,556,263	10	4,284,920	9	54,498	7	8.3112	5	1.2719
Middle East And TransCaucasia	17	8	296,088,692	7	26,018,560	7	278,613	6	8.7874	7	1.0708
Central Asia	6	9	118,168,605	12	2,014,948	11	29,210	11	1.7051	3	1.4497
Indian SubContinent	7	1	1,877,870,343	5	50,563,304	5	622,735	10	2.6926	6	1.2316
SouthEast Asia	12	4	704,679,806	6	36,865,155	6	369,211	9	5.2315	8	1.0015
North Asia And East Asia	6	2	1,775,835,965	2	192,318,113	4	635,768	5	10.8297	11	0.3306
Oceania	24	11	45,038,907	8	14,646,547	10	31,105	2	32.5198	12	0.2124
Africa	58	3	1,426,736,614	9	13,130,999	8	259,064	12	0.9204	2	1.9729
Europe	51	5	688,039,206	1	244,720,216	1	1,790,363	1	35.5678	10	0.7316
North America	7	6	507,627,302	3	117,177,376	2	1,539,556	3	23.0833	4	1.3139
South America	14	7	436,816,679	4	68,710,841	3	1,356,593	4	15.7299	1	1.9744

17

18

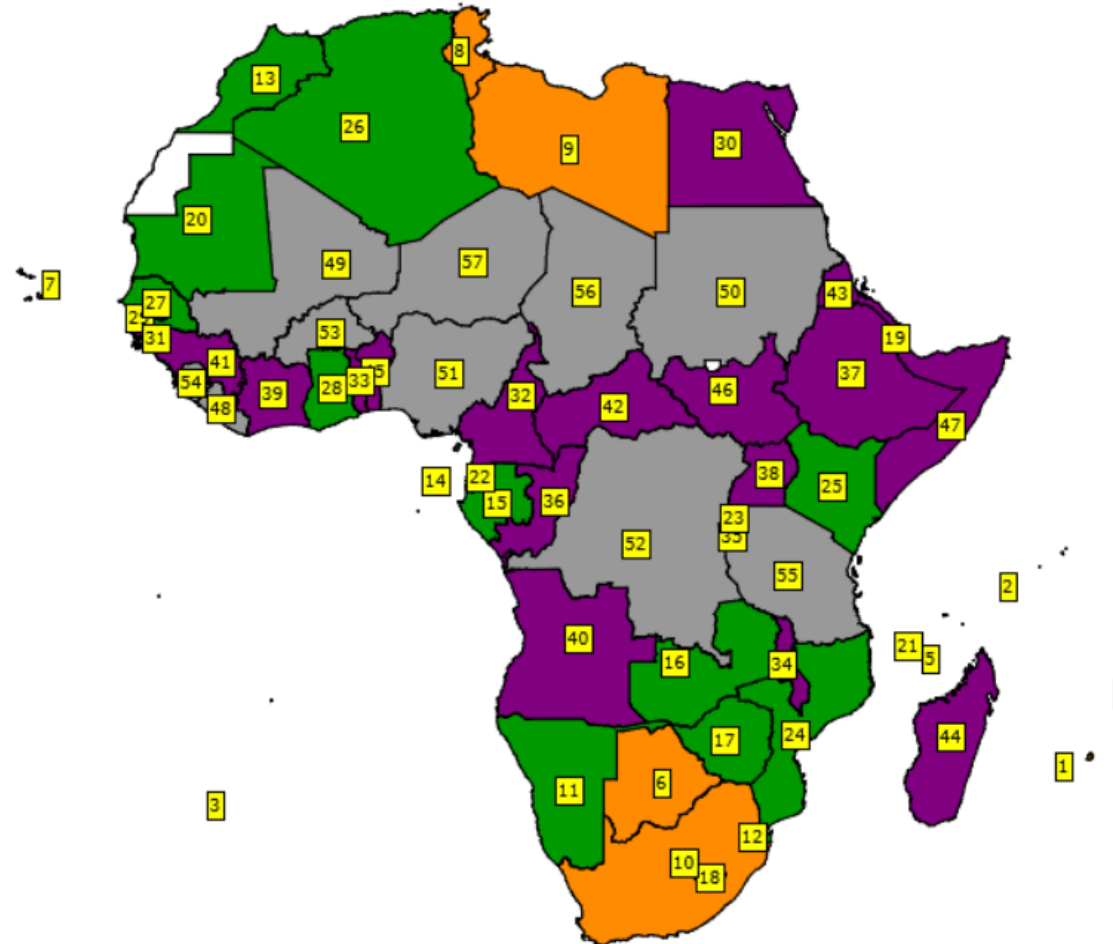
19

# After Clicking on Africa in the World Map for Case Rate

Country : Rank : Case Rate  
In Alphabetical Order:

Algeria : 26 : 0.6058  
Angola : 40 : 0.2999  
Benin : 45 : 0.2100  
Botswana : 6 : 12.5620  
Burkina Faso : 53 : 0.0975  
Burundi : 35 : 0.4225  
Cameroon : 32 : 0.4483  
Cape Verde : 7 : 10.8695  
Central African Republic : 42 : 0.2767  
Chad : 56 : 0.0434  
Comoros : 21 : 1.0886  
Congo : 36 : 0.4223  
Cote d'Ivoire : 39 : 0.3139  
Democratic Republic of the Congo : 52 : 0.1003  
Djibouti : 19 : 1.3998  
Egypt : 30 : 0.4649  
Equatorial Guinea : 22 : 1.0227  
Eritrea : 43 : 0.2766  
Eswatini : 12 : 6.2572  
Ethiopia : 37 : 0.4062  
Gabon : 15 : 2.0532  
Gambia : 29 : 0.4666  
Ghana : 28 : 0.5133  
Guinea : 41 : 0.2783  
Guinea-Bissau : 31 : 0.4566  
Kenya : 25 : 0.6369  
Lesotho : 18 : 1.5671  
Liberia : 48 : 0.1526  
Libya : 9 : 7.4463  
Madagascar : 44 : 0.2312  
Malawi : 34 : 0.4370  
Mali : 49 : 0.1468  
Mauritania : 20 : 1.3465  
Mauritius : 4 : 24.7345  
Mayotte : 5 : 12.8873  
Morocco : 13 : 3.4125  
Mozambique : 24 : 0.7089  
Namibia : 11 : 6.7097  
Niger : 57 : 0.0363  
Nigeria : 51 : 0.1223  
Reunion : 1 : 50.7765  
Rwanda : 23 : 0.9669  
Sao Tome and Principe : 14 : 2.9614  
Senegal : 27 : 0.5143  
Seychelles : 2 : 47.8088  
Sierra Leone : 54 : 0.0904  
Somalia : 47 : 0.1553  
South Africa : 10 : 6.7998  
South Sudan : 46 : 0.1724  
St Helena & Ascension & TristanDaCunha : 3 : 40.1037  
Sudan : 50 : 0.1365  
Tanzania : 55 : 0.0660  
Togo : 33 : 0.4467  
Tunisia : 8 : 9.3343  
Uganda : 38 : 0.3638  
Zambia : 16 : 1.7450  
Zimbabwe : 17 : 1.6301

Case Rate In Africa For 57 Countries  
Countries With No Data (have Empty Area Fill): Western Sahara  
■ 0.0363 - 0.1526 (10 lowest) ■ 0.1553 - 0.4649 (below median) ■ 0.4666 - 0.4666 (median)  
■ 0.5133 - 6.7097 (above median) ■ 6.7998 - 50.7765 (10 highest) □ No Data  
[No Annotation](#) [Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [BarChart](#) [SpreadSheet](#) [Index](#)  
[World Map of Case Rate By Continent and Region](#) (linked to world maps of other four COVID-19 variables)  
**HERE:** Use the mouse for more information for any country. For a too small country, find its Rank in the alphabetic list. and click that Rank button in the map.



Rank : Country : Case Rate  
In Rank Order Within Range:

■ Top 10 Countries:  
1 : Reunion : 50.7765  
2 : Seychelles : 47.8088  
3 : St Helena & Ascension & TristanDaCunha : 40.1037  
4 : Mauritius : 24.7345  
5 : Mayotte : 12.8873  
6 : Botswana : 12.5620  
7 : Cape Verde : 10.8695  
8 : Tunisia : 9.3343  
9 : Libya : 7.4463  
10 : South Africa : 6.7998  
■ Above Median Countries:  
11 : Namibia : 6.7097  
12 : Eswatini : 6.2572  
13 : Morocco : 3.4125  
14 : Sao Tome and Principe : 2.9614  
15 : Gabon : 2.0532  
16 : Zambia : 1.7450  
17 : Zimbabwe : 1.6301  
18 : Lesotho : 1.5671  
19 : Djibouti : 1.3998  
20 : Mauritania : 1.3465  
21 : Comoros : 1.0886  
22 : Equatorial Guinea : 1.0227  
23 : Rwanda : 0.9669  
24 : Mozambique : 0.7089  
25 : Kenya : 0.6369  
26 : Algeria : 0.6058  
27 : Senegal : 0.5143  
28 : Ghana : 0.5133  
■ Median Countries:  
29 : Gambia : 0.4666  
■ Below Median Countries:  
30 : Egypt : 0.4649  
31 : Guinea-Bissau : 0.4566  
32 : Cameroon : 0.4483  
33 : Togo : 0.4467  
34 : Malawi : 0.4370  
35 : Burundi : 0.4225  
36 : Congo : 0.4223  
37 : Ethiopia : 0.4062  
38 : Uganda : 0.3638  
39 : Cote d'Ivoire : 0.3139  
40 : Angola : 0.2999  
41 : Guinea : 0.2783  
42 : Central African Republic : 0.2767  
43 : Eritrea : 0.2766  
44 : Madagascar : 0.2312  
45 : Benin : 0.2100  
46 : South Sudan : 0.1724  
47 : Somalia : 0.1553  
■ Bottom 10 Countries:  
48 : Liberia : 0.1526  
49 : Mali : 0.1468  
50 : Sudan : 0.1365  
51 : Nigeria : 0.1223  
52 : Democratic Republic of the Congo : 0.1003  
53 : Burkina Faso : 0.0975  
54 : Sierra Leone : 0.0904  
55 : Tanzania : 0.0660  
56 : Chad : 0.0434  
57 : Niger : 0.0363

# Middle East and Transcaucasia

Transcaucasia is the West Asian Countries of Armenia, Azerbaijan, and Georgia

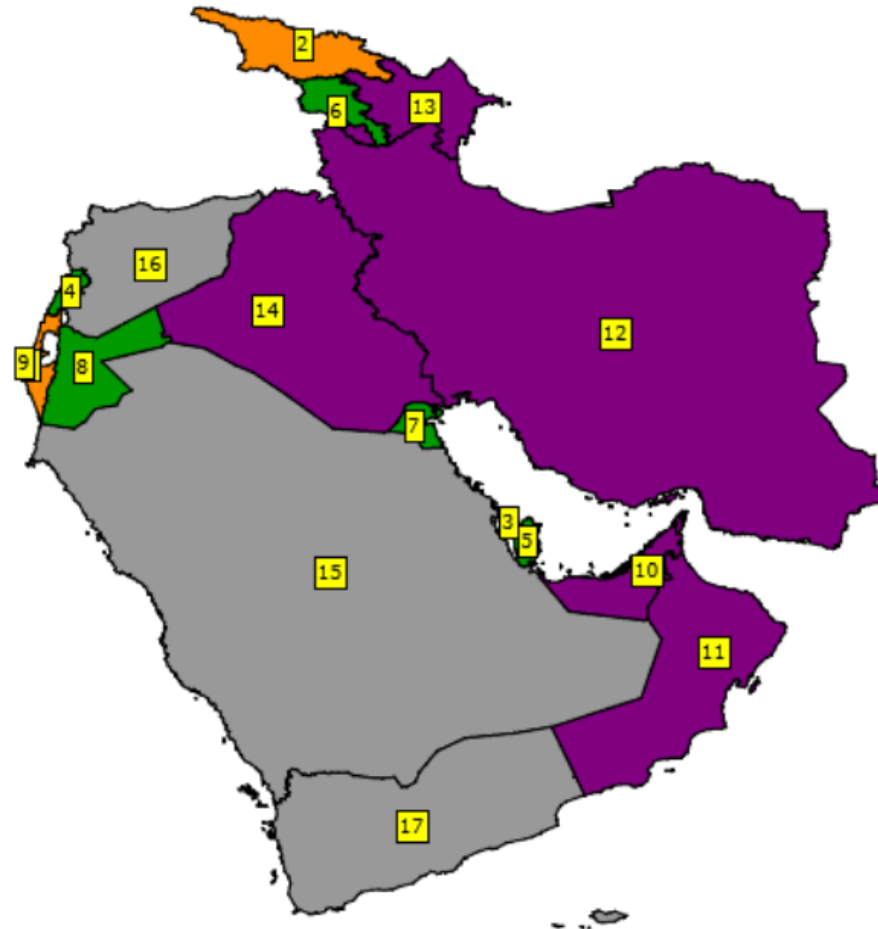
Country : Rank : Case Rate  
In Alphabetical Order:  
Armenia : 6 : 16.2330  
Azerbaijan : 13 : 8.0535  
Bahrain : 3 : 47.3167  
Georgia : 2 : 49.5486  
Iran : 12 : 8.6114  
Iraq : 14 : 5.5410  
Israel : 1 : 51.2388  
Jordan : 8 : 15.4795  
Kuwait : 7 : 15.6150  
Lebanon : 4 : 22.5858  
Oman : 11 : 8.7286  
Palestine : 9 : 13.3946  
Qatar : 5 : 19.0909  
Saudi Arabia : 15 : 2.3112  
Syria : 16 : 0.2595  
United Arab Emirates : 10 : 11.3019  
Yemen : 17 : 0.0354

Case Rate In Middle East And Transcaucasia For 17 Countries  
■ 0.0354 - 2.3112 (3 lowest) ■ 5.5410 - 11.3019 (below median) ■ 13.3946 - 13.3946 (median)  
■ 15.4795 - 22.5858 (above median) ■ 47.3167 - 51.2388 (3 highest)

[No Annotation](#) [Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [BarChart](#) [SpreadSheet](#) [Index](#)  
[World Map of Case Rate By Continent and Region](#) (linked to world maps of other four COVID-19 variables)

**HERE:** Use the mouse for more information for any country.  
For a too small country, find its Rank in the alphabetic list, and click that Rank button in the map.

Rank : Country : Case Rate  
In Rank Order Within Range:  
■ Top 3 Countries:  
1 : Israel : 51.2388  
2 : Georgia : 49.5486  
3 : Bahrain : 47.3167  
■ Above Median Countries:  
4 : Lebanon : 22.5858  
5 : Qatar : 19.0909  
6 : Armenia : 16.2330  
7 : Kuwait : 15.6150  
8 : Jordan : 15.4795  
■ Median Countries:  
9 : Palestine : 13.3946  
■ Below Median Countries:  
10 : United Arab Emirates : 11.3019  
11 : Oman : 8.7286  
12 : Iran : 8.6114  
13 : Azerbaijan : 8.0535  
14 : Iraq : 5.5410  
■ Bottom 3 Countries:  
15 : Saudi Arabia : 2.3112  
16 : Syria : 0.2595  
17 : Yemen : 0.0354



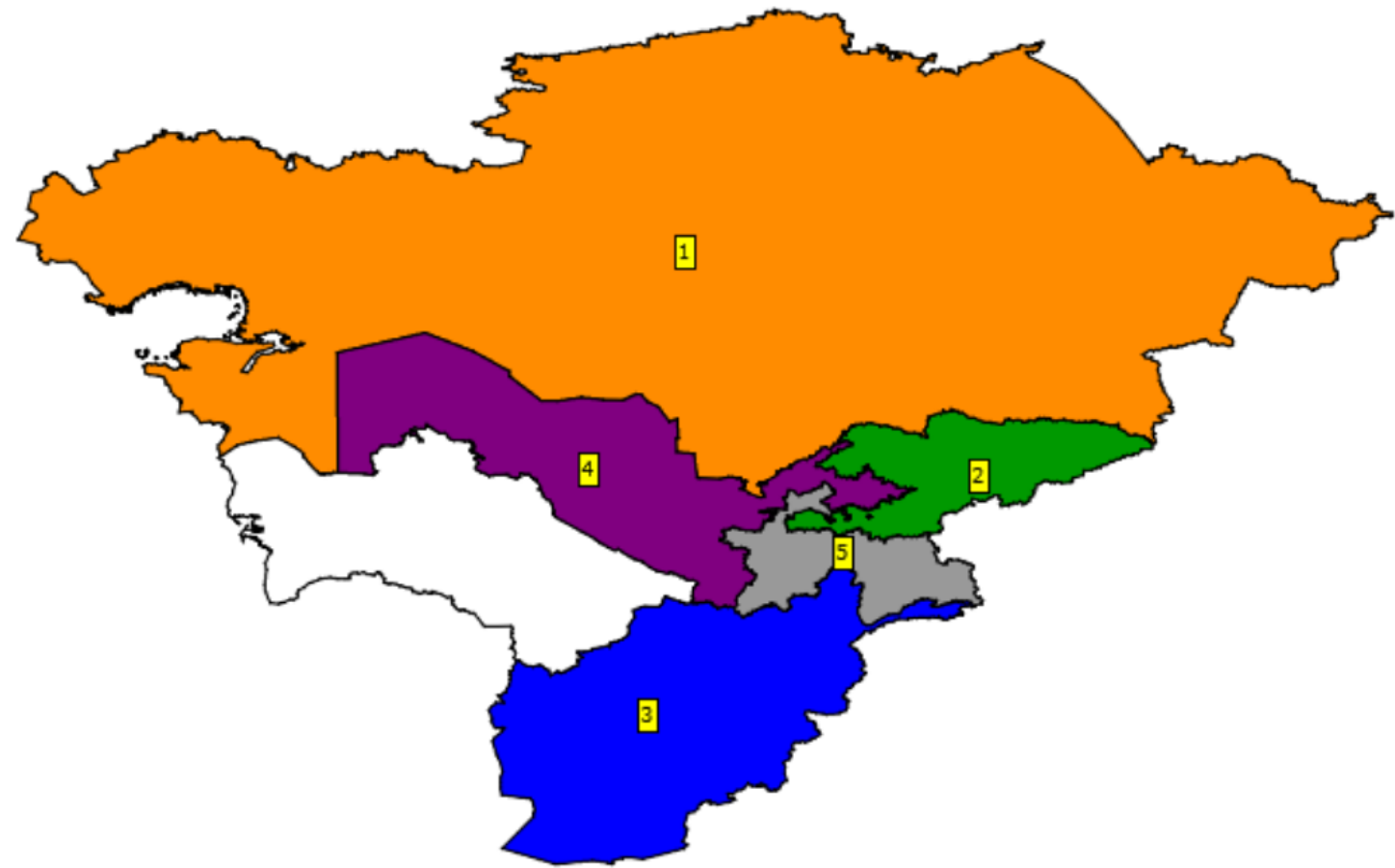
# Central Asia Missing Data Countries Are Identified in a SubTitle (can't be in the lists)

Country : Rank : Case Rate  
In Alphabetical Order:  
Afghanistan : 3 : 0.5599  
Kazakhstan : 1 : 7.7475  
Kyrgyzstan : 2 : 1.3413  
Tajikistan : 5 : 0.1787  
Uzbekistan : 4 : 0.5056

Case Rate In Central Asia For 5 Countries  
Countries With No Data (have Empty Area Fill): Turkmenistan  
■ 0.1787 - 0.1787 (1 lowest) ■ 0.5056 - 0.5056 (below median) ■ 0.5599 - 0.5599 (median)  
■ 1.3413 - 1.3413 (above median) ■ 7.7475 - 7.7475 (1 highest) □ No Data  
[No Annotation](#) [Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [BarChart](#) [SpreadSheet](#) [Index](#)  
[World Map of Case Rate By Continent and Region](#) (linked to world maps of other four COVID-19 variables)

Rank : Country : Case Rate  
In Rank Order Within Range:  
■ Top 1 Countries:  
1 : Kazakhstan : 7.7475  
■ Above Median Countries:  
2 : Kyrgyzstan : 1.3413  
■ Median Countries:  
3 : Afghanistan : 0.5599  
■ Below Median Countries:  
4 : Uzbekistan : 0.5056  
■ Bottom 1 Countries:  
5 : Tajikistan : 0.1787

**HERE:** Use the mouse for more information for any country.  
For a too small country, find its Rank in the alphabetic list, and click that Rank button in the map.



**Central Asia** Missing Data Countries Are Identified in a SubTitle (can't be in the lists)

Case Rate In Central Asia For 5 Countries

Countries With No Data (have Empty Area Fill): Turkmenistan

# Indian SubContinent It is on the Indian tectonic plate south of the Himalayas

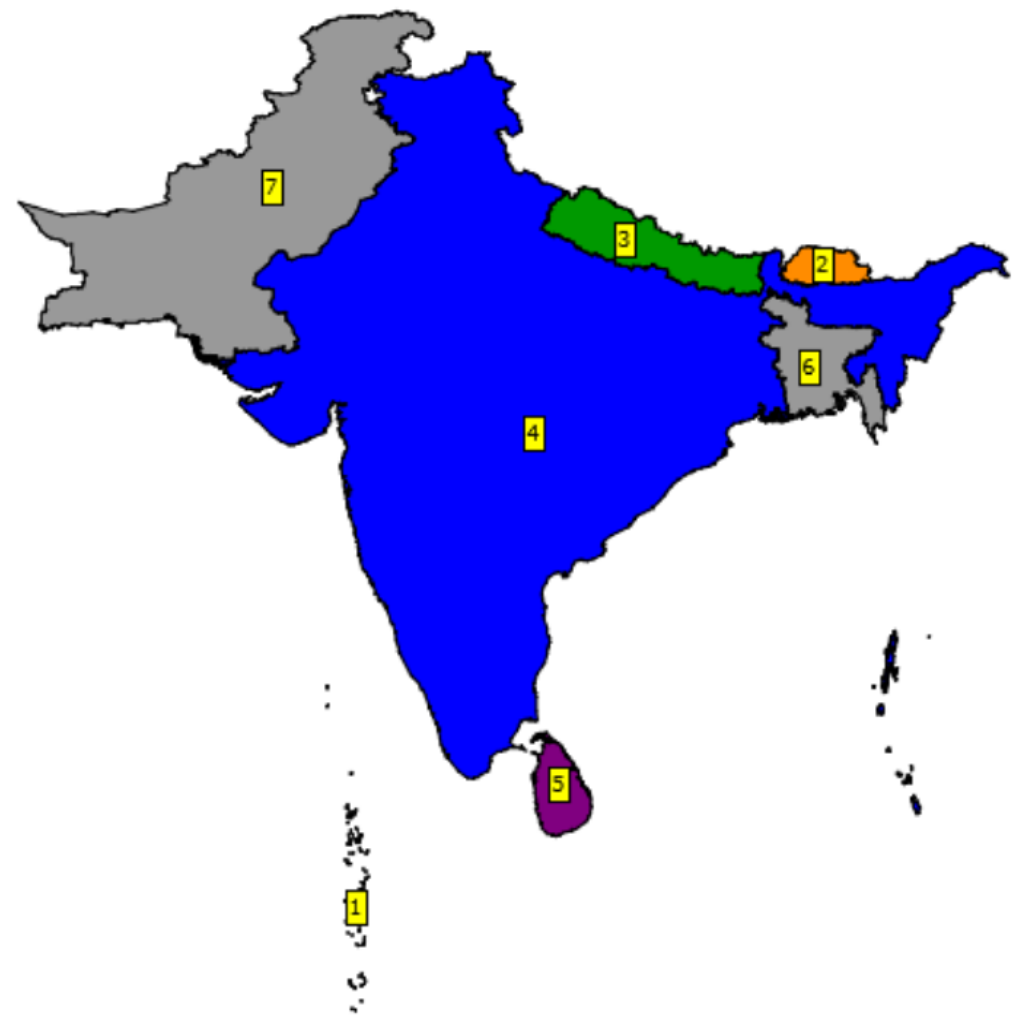
Country : Rank : Case Rate  
In Alphabetical Order:  
Bangladesh : 6 : 1.1953  
Bhutan : 2 : 8.0128  
India : 4 : 3.1761  
Maldives : 1 : 35.6424  
Nepal : 3 : 3.2849  
Pakistan : 7 : 0.6703  
Sri Lanka : 5 : 3.0812

Case Rate In Indian SubContinent For 7 Countries  
■ 0.6703 - 1.1953 (2 lowest) ■ 3.0812 - 3.0812 (below median) ■ 3.1761 - 3.1761 (median)  
■ 3.2849 - 3.2849 (above median) ■ 8.0128 - 35.6424 (2 highest)

[No Annotation](#) [Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [BarChart](#) [SpreadSheet](#) [Index](#)  
[World Map of Case Rate By Continent and Region](#) (linked to world maps of other four COVID-19 variables)

**HERE:** Use the mouse for more information for any country.  
For a too small country, find its Rank in the alphabetic list, and click that Rank button in the map.

Rank : Country : Case Rate  
In Rank Order Within Range:  
■ Top 2 Countries:  
1 : Maldives : 35.6424  
2 : Bhutan : 8.0128  
■ Above Median Countries:  
3 : Nepal : 3.2849  
■ Median Countries:  
4 : India : 3.1761  
■ Below Median Countries:  
5 : Sri Lanka : 3.0812  
■ Bottom 2 Countries:  
6 : Bangladesh : 1.1953  
7 : Pakistan : 0.6703



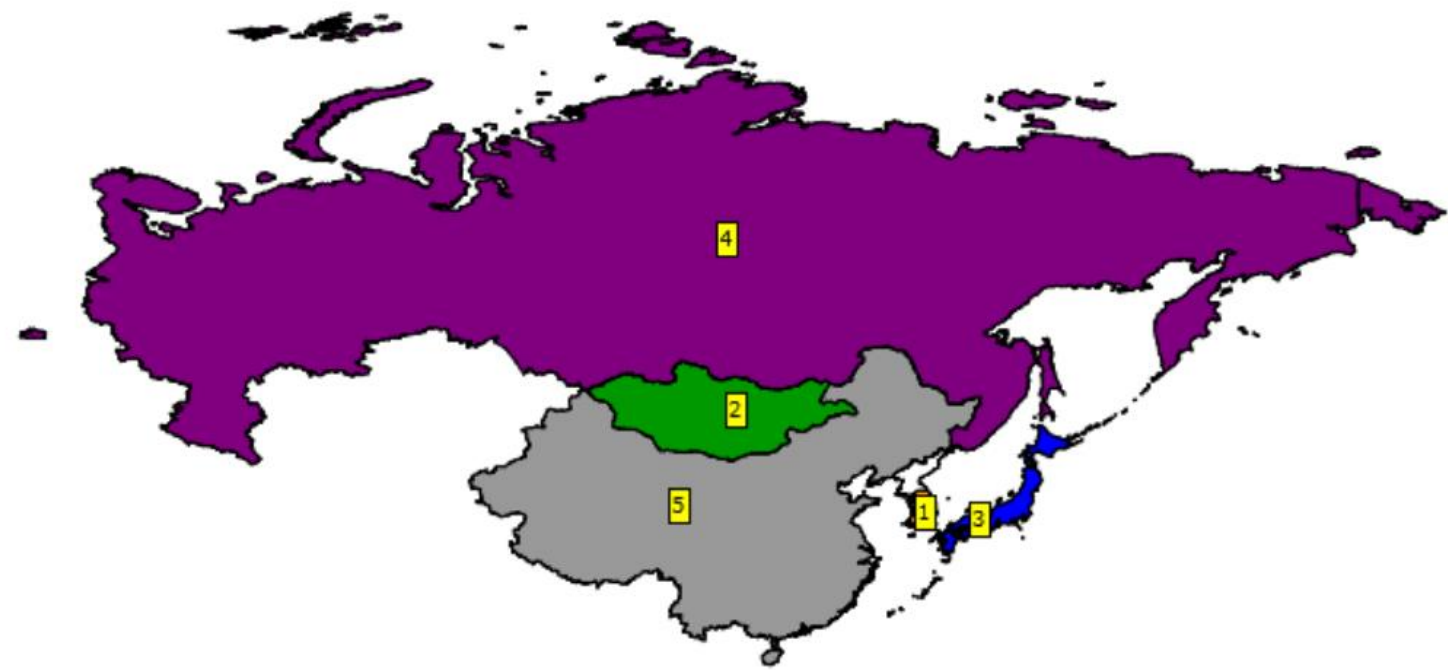
**North Asia and East Asia** (not "NorthEast Asia" which does not include ALL of Russia)  
 North of Mainland Russia are its numerous Arctic islands. West of it, is Kaliningrad.  
 NOT an island, it is a Russian enclave on the Baltic Sea between Lithuania and Poland.

Country : Rank : Case Rate  
 In Alphabetical Order:  
 China : 5 : 6.9657  
 Japan : 3 : 27.2716  
 Mongolia : 2 : 29.7619  
 Russia : 4 : 16.3141  
 South Korea : 1 : 66.7207

Case Rate In North Asia And East Asia For 5 Countries  
 Countries With No Data (have Empty Area Fill): North Korea  
 ■ 6.9657 - 6.9657 (1 lowest) ■ 16.3141 - 16.3141 (below median) ■ 27.2716 - 27.2716 (median)  
 ■ 29.7619 - 29.7619 (above median) ■ 66.7207 - 66.7207 (1 highest) □ No Data  
[No Annotation](#) [Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [BarChart](#) [SpreadSheet](#) [Index](#)  
[World Map of Case Rate By Continent and Region](#) (linked to world maps of other four COVID-19 variables)

Rank : Country : Case Rate  
 In Rank Order Within Range:  
 ■ Top 1 Countries:  
 1 : South Korea : 66.7207  
 ■ Above Median Countries:  
 2 : Mongolia : 29.7619  
 ■ Median Countries:  
 3 : Japan : 27.2716  
 ■ Below Median Countries:  
 4 : Russia : 16.3141  
 ■ Bottom 1 Countries:  
 5 : China : 6.9657

**HERE:** Use the mouse for more information for any country.  
 For a too small country, find its Rank in the alphabetic list, and click that Rank button in the map.



# South America Almost No Rank Button Overlays

Country : Rank : Case Rate  
In Alphabetical Order:  
Argentina : 5 : 22.1384  
Bolivia : 11 : 9.9125  
Brazil : 6 : 17.4257  
Chile : 4 : 27.1841  
Colombia : 9 : 12.3097  
Ecuador : 13 : 5.9242  
Falkland Islands : 1 : 50.5919  
French Guiana : 2 : 32.1902  
Guyana : 12 : 9.1107  
Paraguay : 10 : 10.8569  
Peru : 8 : 13.3239  
Suriname : 7 : 13.3495  
Uruguay : 3 : 30.4170  
Venezuela : 14 : 1.9529

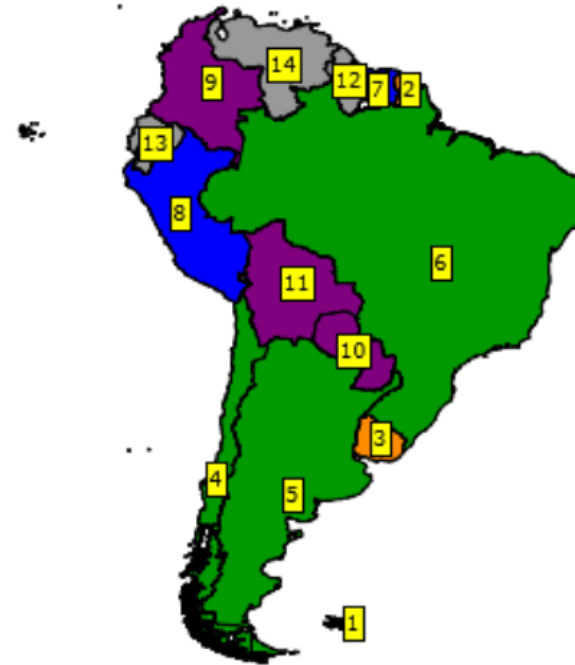
Case Rate In South America For 14 Countries

■ 1.9529 - 9.1107 (3 lowest) ■ 9.9125 - 12.3097 (below median) ■ 13.3239 - 13.3495 (median)  
■ 17.4257 - 27.1841 (above median) ■ 30.4170 - 50.5919 (3 highest)

[No Annotation](#) [Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [BarChart](#) [SpreadSheet](#) [Index](#)  
[World Map of Case Rate By Continent and Region](#) (linked to world maps of other four COVID-19 variables)

**HERE:** Use the mouse for more information for any country.

For a too small country, find its Rank in the alphabetic list, and click that Rank button in the map.



Rank : Country : Case Rate  
In Rank Order Within Range:  
■ Top 3 Countries:  
1 : Falkland Islands : 50.5919  
2 : French Guiana : 32.1902  
3 : Uruguay : 30.4170  
■ Above Median Countries:  
4 : Chile : 27.1841  
5 : Argentina : 22.1384  
6 : Brazil : 17.4257  
■ Median Countries:  
7 : Suriname : 13.3495  
8 : Peru : 13.3239  
■ Below Median Countries:  
9 : Colombia : 12.3097  
10 : Paraguay : 10.8569  
11 : Bolivia : 9.9125  
■ Bottom 3 Countries:  
12 : Guyana : 9.1107  
13 : Ecuador : 5.9242  
14 : Venezuela : 1.9529

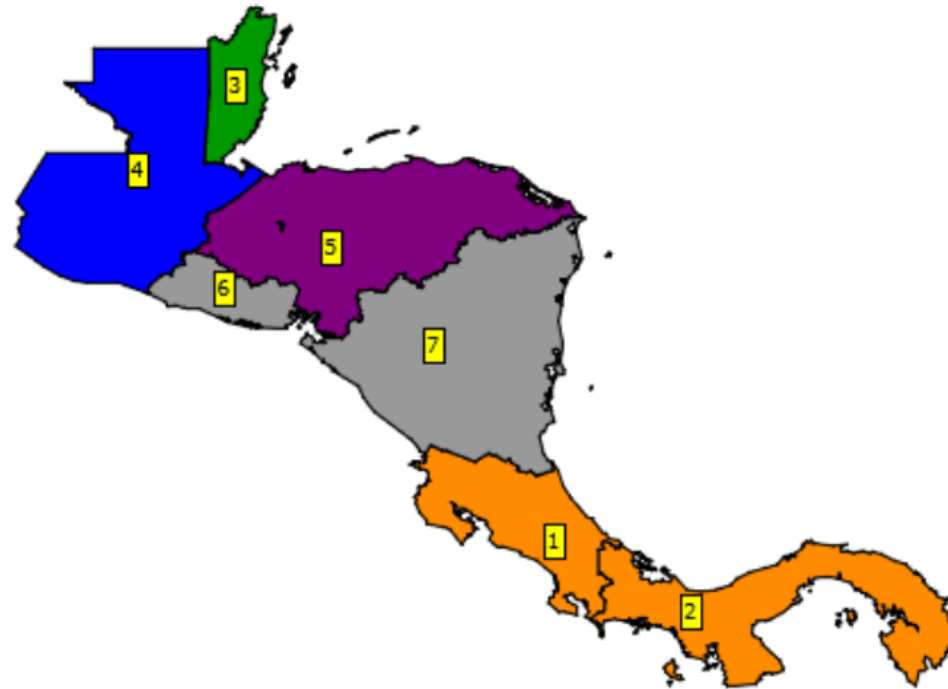
# Central America No Rank Button Overlays

Country : Rank : Case Rate  
In Alphabetical Order:  
Belize : 3 : 17.6106  
Costa Rica : 1 : 23.7539  
El Salvador : 6 : 3.1853  
Guatemala : 4 : 7.0069  
Honduras : 5 : 4.5313  
Nicaragua : 7 : 0.2315  
Panama : 2 : 23.6340

Case Rate In Central America For 7 Countries  
■ 0.2315 - 3.1853 (2 lowest) ■ 4.5313 - 4.5313 (below median) ■ 7.0069 - 7.0069 (median)  
■ 17.6106 - 17.6106 (above median) ■ 23.6340 - 23.7539 (2 highest)

[No Annotation](#) [Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [BarChart](#) [SpreadSheet](#) [Index](#)  
[World Map of Case Rate By Continent and Region](#) (linked to world maps of other four COVID-19 variables)

**HERE:** Use the mouse for more information for any country.  
For a too small country, find its Rank in the alphabetic list, and click that Rank button in the map.



Rank : Country : Case Rate  
In Rank Order Within Range:  
■ Top 2 Countries:  
1 : Costa Rica : 23.7539  
2 : Panama : 23.6340  
■ Above Median Countries:  
3 : Belize : 17.6106  
■ Median Countries:  
4 : Guatemala : 7.0069  
■ Below Median Countries:  
5 : Honduras : 4.5313  
■ Bottom 2 Countries:  
6 : El Salvador : 3.1853  
7 : Nicaragua : 0.2315

# Caribbean Islands A much larger image height could eliminate most of the overlays

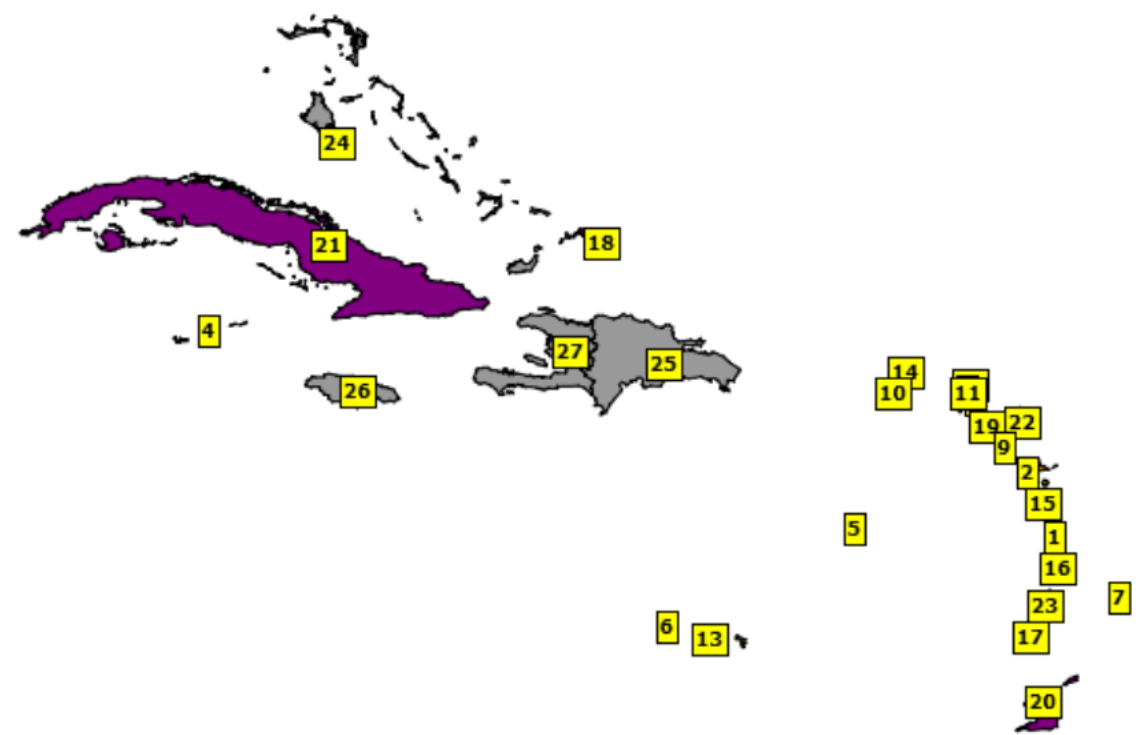
Country : Rank : Case Rate  
 In Alphabetical Order:

Anguilla	: 12	: 24.5890
Antigua and Barbuda	: 22	: 9.7108
Aruba	: 6	: 41.5409
Bahamas	: 24	: 9.2890
Barbados	: 7	: 39.1104
Bonaire and Sint Eustatius and Saba	: 5	: 44.0707
British Virgin Islands	: 14	: 23.5925
Cayman Islands	: 4	: 45.7961
Cuba	: 21	: 9.9449
Curacao	: 13	: 24.0008
Dominica	: 15	: 22.0429
Dominican Republic	: 25	: 5.8882
Grenada	: 17	: 15.6968
Guadeloupe	: 2	: 51.3528
Haiti	: 27	: 0.2979
Jamaica	: 26	: 5.5381
Martinique	: 1	: 62.6793
Montserrat	: 9	: 31.7924
Saint Barthelemy	: 3	: 50.0910
Saint Kitts and Nevis	: 19	: 13.8567
Saint Lucia	: 16	: 16.7947
Saint Martin	: 8	: 38.7352
Saint Vincent and the Grenadines	: 23	: 9.3056
Sint Maarten	: 11	: 25.0068
Trinidad and Tobago	: 20	: 12.5076
Turks and Caicos Islands	: 18	: 14.6766
United States Virgin Islands	: 10	: 25.5220

Case Rate In Caribbean Islands For 27 Countries

■ 0.2979 - 9.3056 (5 lowest) ■ 9.7108 - 22.0429 (below median) ■ 23.5925 - 23.5925 (median)  
 ■ 24.0008 - 41.5409 (above median) ■ 44.0707 - 62.6793 (5 highest)

[No Annotation](#) [Population](#) [Total Cases](#) [Total Deaths](#) [Mortality Rate](#) [BarChart](#) [SpreadSheet](#) [Index](#)  
[World Map of Case Rate By Continent and Region](#) (linked to world maps of other four COVID-19 variables)  
**HERE:** Use the mouse for more information for any country. For a too small country, find its Rank in the alphabetic list, and click that Rank button in the map.



Rank : Country : Case Rate  
 In Rank Order Within Range:

■	Top 5 Countries:
1	: Martinique : 62.6793
2	: Guadeloupe : 51.3528
3	: Saint Barthelemy : 50.0910
4	: Cayman Islands : 45.7961
5	: Bonaire and Sint Eustatius and Saba : 44.0707
■	Above Median Countries:
6	: Aruba : 41.5409
7	: Barbados : 39.1104
8	: Saint Martin : 38.7352
9	: Montserrat : 31.7924
10	: United States Virgin Islands : 25.5220
11	: Sint Maarten : 25.0068
12	: Anguilla : 24.5890
13	: Curacao : 24.0008
■	Median Countries:
14	: British Virgin Islands : 23.5925
■	Below Median Countries:
15	: Dominica : 22.0429
16	: Saint Lucia : 16.7947
17	: Grenada : 15.6968
18	: Turks and Caicos Islands : 14.6766
19	: Saint Kitts and Nevis : 13.8567
20	: Trinidad and Tobago : 12.5076
21	: Cuba : 9.9449
22	: Antigua and Barbuda : 9.7108
■	Bottom 5 Countries:
23	: Saint Vincent and the Grenadines : 9.3056
24	: Bahamas : 9.2890
25	: Dominican Republic : 5.8882
26	: Jamaica : 5.5381
27	: Haiti : 0.2979

**Was there much cross-border propagation of COVID-19?**

**Which high case rate countries had a high median case rate for their adjacent countries?**

**The collections of adjacent countries are the Continents.**

**Two continents to ignore:**

- ▶ North America has only one surrounded country**
- ▶ Oceania is all islands.  
(Australia is its biggest "island".)**

- ▶ **Initial challenge: How to programmatically identify adjacent countries?**
- ▶ **Ask me for the code, if interested**

## **What to do:**

- ▶ **Plot Median Surrounding Country Case Rate Versus Surrounded Country Case Rate**
- ▶ **Annotate Each Country on Map with its Case Rate and the Median Surrounding Country Case Rate**
- ▶ **The Map Is Response Range Color-Coded**

# Africa: For five Case Rates $> 6$ , and three at or below 1.7, the Median Adjacent Case Rate is Much Higher than the Median of All Median Adjacent Case Rates.

Median COVID-19 Case Rate of Adjacent Countries Versus That of Each Surrounded Country in Africa

57 Countries In Africa Have Case Rate Data. 48 Countries Have At Least One Adjacent Country.

The Countries In Africa With No Case Rate Data (Not Includable): Western Sahara

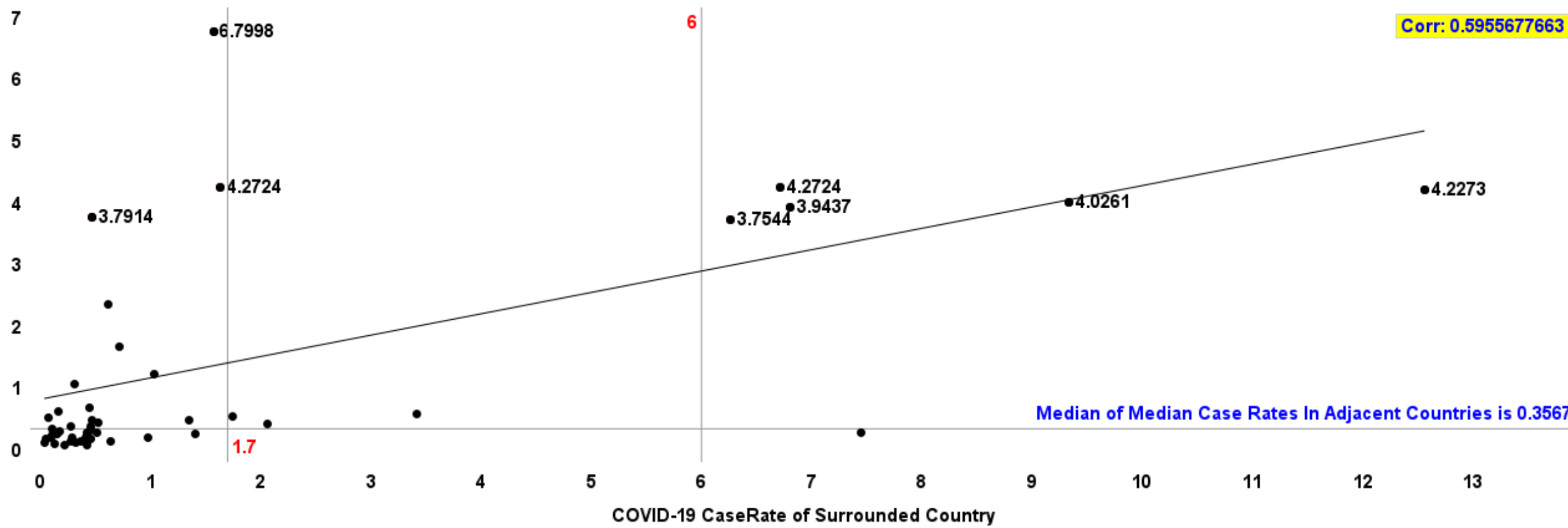
Use the mouse for Country, Number of Adjacent Countries, Case Rate, Case Rate Rank, and Median, Min, Max, & Rank for Median Adjacent Countries' Case Rate

Median, Min, Max Case Rate of All Countries In Africa (Including Islands) = 0.4666 0.0363 50.7765

Median, Min, Max Case Rate of All Countries In The World (Including Islands) = 13.62565 0.0354 75.0727

Islands Or Countries Without At Least One Adjacent Country With Data (Not Includable): Cape Verde, Comoros, Madagascar, Mauritius, Mayotte, Reunion, Sao Tome and Principe, Seychelles, St Helena and Ascension and Tristan da Cunha

A Case Rate greater than 6 is, except for Libya, is accompanied by high Median Case Rate in Adjacent Countries. All of those medians are much greater than the Median of Medians. However, for three Surrounded Countries with Case Rate less than 1.7, the Median Case Rate in Adjacent Countries is equal or greater.



# Africa: There is a High Case Rate cluster around Botswana which is Case Rate Rank 1

Rank : Country : Case Rate : Rank Adj : Median Adj : Count Adj  
In Rank Order Within Range:

- Top 10 Countries:
- 1 : Botswana : 12.5620 : 4 : 4.2274 : 4
- 2 : Tunisia : 9.3343 : 5 : 4.0261 : 2
- 3 : Libya : 7.4463 : 29 : 0.3007 : 6
- 4 : South Africa : 6.7998 : 6 : 3.9437 : 6
- 5 : Namibia : 6.7097 : 2 : 4.2724 : 4
- 6 : Eswatini : 6.2572 : 8 : 3.7544 : 2
- 7 : Morocco : 3.4125 : 15 : 0.6058 : 1
- 8 : Gabon : 2.0532 : 21 : 0.4483 : 3
- 9 : Zambia : 1.7450 : 16 : 0.5730 : 8
- 10 : Zimbabwe : 1.6301 : 3 : 4.2724 : 4
- Above Median Countries:
- 11 : Lesotho : 1.5671 : 1 : 6.7998 : 1
- 12 : Djibouti : 1.3998 : 33 : 0.2766 : 3
- 13 : Mauritania : 1.3465 : 19 : 0.5143 : 3
- 14 : Equatorial Guinea : 1.0227 : 11 : 1.2508 : 2
- 15 : Rwanda : 0.9669 : 36 : 0.2321 : 4
- 16 : Mozambique : 0.7089 : 10 : 1.6876 : 6
- 17 : Kenya : 0.6369 : 41 : 0.1724 : 5
- 18 : Algeria : 0.6058 : 9 : 2.3795 : 6
- 19 : Senegal : 0.5143 : 20 : 0.4566 : 5
- 20 : Ghana : 0.5133 : 27 : 0.3139 : 3
- 21 : Gambia : 0.4666 : 18 : 0.5143 : 1
- 22 : Egypt : 0.4649 : 7 : 3.7914 : 2
- 23 : Guinea-Bissau : 0.4566 : 23 : 0.3963 : 2
- Median Countries:
- 24 : Cameroon : 0.4483 : 25 : 0.3495 : 6
- 25 : Togo : 0.4467 : 39 : 0.2100 : 3
- Below Median Countries:
- 26 : Malawi : 0.4370 : 13 : 0.7089 : 3
- 27 : Burundi : 0.4225 : 48 : 0.1003 : 3
- 28 : Congo : 0.4223 : 30 : 0.2999 : 5
- 29 : Ethiopia : 0.4062 : 37 : 0.2245 : 6
- 30 : Uganda : 0.3638 : 42 : 0.1724 : 5
- 31 : Cote d'Ivoire : 0.3139 : 44 : 0.1526 : 5
- 32 : Angola : 0.2999 : 12 : 1.0837 : 4
- 33 : Guinea : 0.2783 : 35 : 0.2333 : 6
- 34 : Central African Republic : 0.2767 : 43 : 0.1545 : 6
- 35 : Eritrea : 0.2766 : 22 : 0.4062 : 3
- 36 : Benin : 0.2100 : 47 : 0.1099 : 4
- 37 : South Sudan : 0.1724 : 26 : 0.3203 : 6
- 38 : Somalia : 0.1553 : 14 : 0.6369 : 3
- Bottom 10 Countries:
- 39 : Liberia : 0.1526 : 31 : 0.2783 : 3
- 40 : Mali : 0.1468 : 28 : 0.3139 : 7
- 41 : Sudan : 0.1365 : 32 : 0.2767 : 7
- 42 : Nigeria : 0.1223 : 46 : 0.1267 : 4
- 43 : Dem. Republic of the Congo : 0.1003 : 24 : 0.3638 : 9
- 44 : Burkina Faso : 0.0975 : 34 : 0.2620 : 6
- 45 : Sierra Leone : 0.0904 : 38 : 0.2155 : 2
- 46 : Tanzania : 0.0660 : 17 : 0.5370 : 8
- 47 : Chad : 0.0434 : 40 : 0.2066 : 6
- 48 : Niger : 0.0363 : 45 : 0.1468 : 7

Map Of Surrounded Country Case Rates With Information About Median Case Rate Of Adjacent Countries  
57 Countries In Africa Have Case Rate Data. 48 in Africa Have At Least One Adjacent Country.

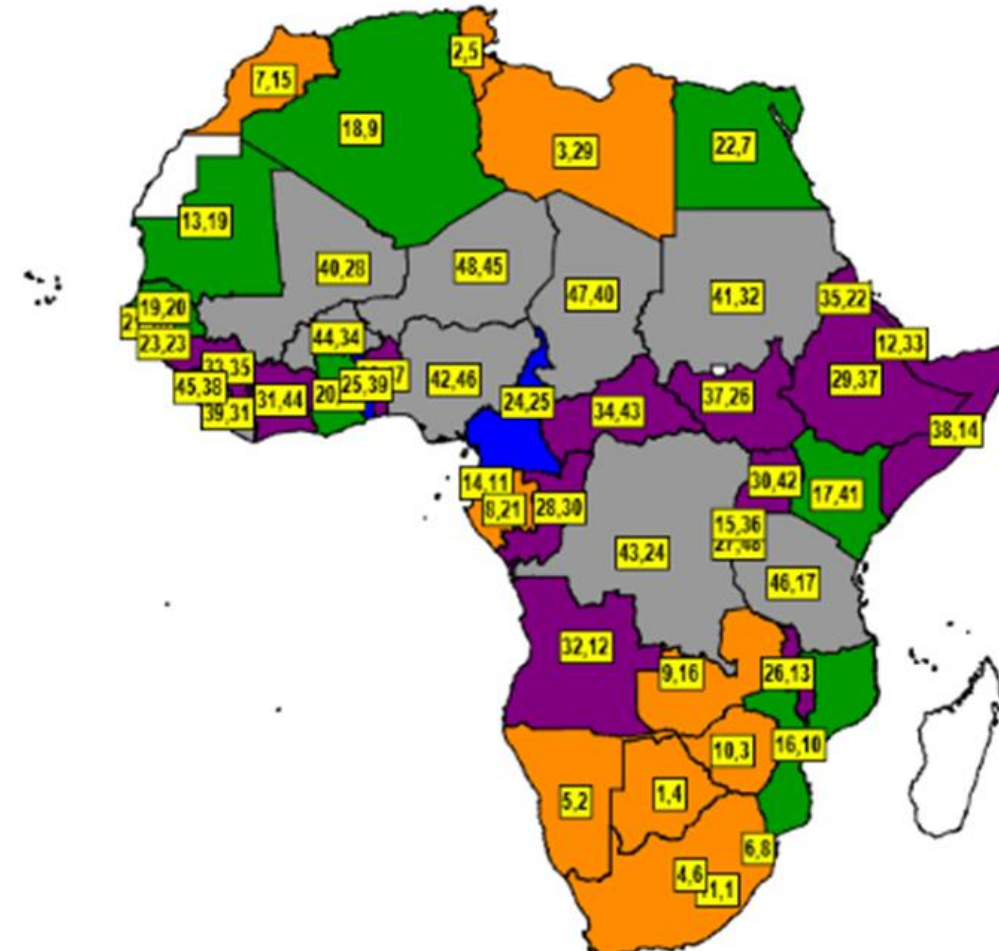
Any countries that are islands, or have no adjacent countries with data, are not annotated, and are not in the list at Left. If any have a large enough land area, the area will be visible, but white (empty).

□ Empty Color Fill Is Also Used For Countries With No Data: **Western Sahara**  
9 Countries Listed At The Right Were NOT Surrounded By Countries With A Case Rate. Some or All may be islands.

■ 0.0363 - 0.1526 (10 lowest) ■ 0.1553 - 0.4370 (below median) ■ 0.4467 - 0.4483 (median)  
■ 0.4566 - 1.5671 (above median) ■ 1.6301 - 12.5620 (10 highest) □ No Data

Below, left number is Rank of the Country's Case Rate, right number is Rank of Median of Adjacent Countries' Case Rates.  
Mouse: Country, CaseRate, Rank, Adj CountryCount, Median Adj CaseRate, Median Adj CaseRate Rank, Min&Max Adj CaseRate

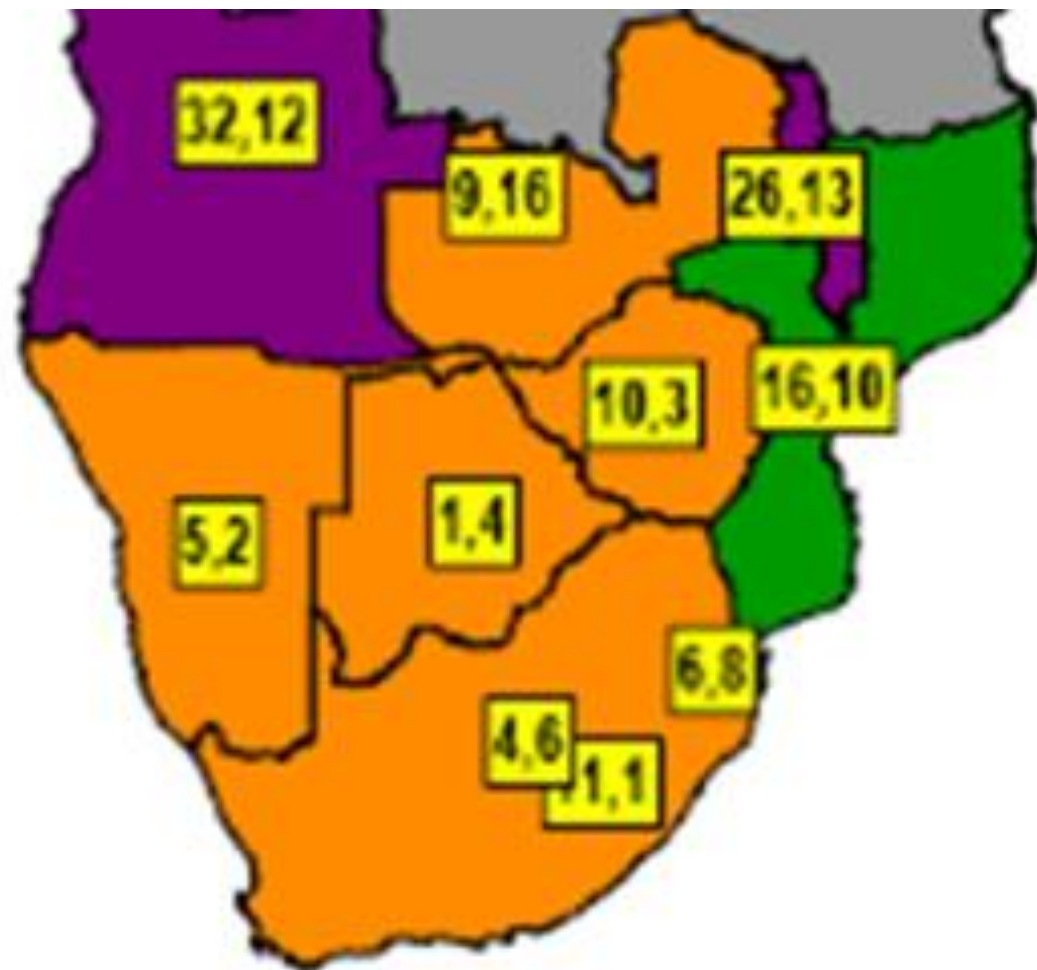
- Not Surrounded Country : Case Rate
- In Alphabetic Order:
- Cape Verde : 10.8695
- Comoros : 1.0886
- Madagascar : 0.2312
- Mauritius : 24.7345
- Mayotte : 12.8873
- Reunion : 50.7765
- Sao Tome and Principe : 2.9614
- Seychelles : 47.8088
- St Helena and Ascension and Tristan da Cunha : 40.1037



## High Case Rate cluster around Botswana which is Case Rate Rank 1

### ■ Top 10 Countries:

- 1 : Botswana : 12.5620 : 4 : 4.2274 : 4
- 2 : Tunisia : 9.3343 : 5 : 4.0261 : 2
- 3 : Libya : 7.4463 : 29 : 0.3007 : 6
- 4 : South Africa : 6.7998 : 6 : 3.9437 : 6
- 5 : Namibia : 6.7097 : 2 : 4.2724 : 4
- 6 : Eswatini : 6.2572 : 8 : 3.7544 : 2
- 7 : Morocco : 3.4125 : 15 : 0.6058 : 1
- 8 : Gabon : 2.0532 : 21 : 0.4483 : 3
- 9 : Zambia : 1.7450 : 16 : 0.5730 : 8
- 10 : Zimbabwe : 1.6301 : 3 : 4.2724 : 4



# Asia: Except for Case Rates 13.4 and 22.6, all Surrounded Country Case Rates > 10 have Median Adjacent Countries' Case Rates comparable to those for Case Rates < 10

Plot Of Asia Median Case Rate Of Adjacent Countries Versus Surrounded Country Case Rate

[Go To Map Of Asia Surrounded Country Case Rates And Median Case Rate Of Adjacent Countries](#)

This Plot For: [South America](#) [Europe](#) [Africa](#) [World](#)

45 Countries In Asia Have Case Rate Data. 38 Countries Have At Least One Adjacent Country.

The Countries In Asia With No Case Rate Data (Not Includable): North Korea, Turkmenistan, Taiwan

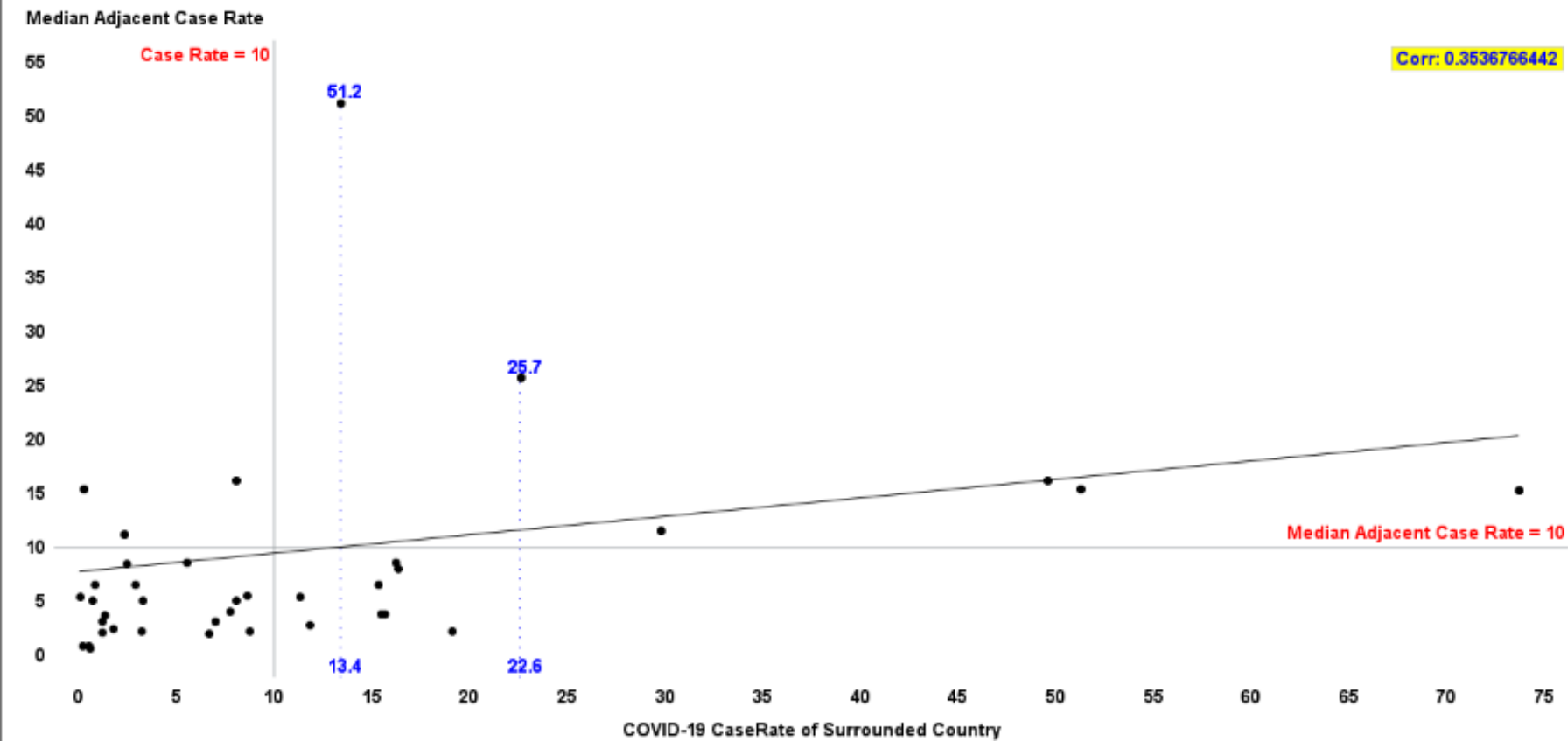
Use the mouse for Country, Number of Adjacent Countries, Case Rate, Case Rate Rank, and Median, Min, Max, & Rank for Median Adjacent Countries' Case Rate

Median, Min, Max Case Rate of All Countries In Asia (Including Islands) = 8.0128 0.0354 73.6692

Median, Min, Max Case Rate of All Countries In The World (Including Islands) = 13.62565 0.0354 75.0727

7 Islands Or Countries Without At Least One Adjacent Country With Data (Not Includable): Bahrain, Japan, Maldives, Philippines, Singapore, South Korea, Sri Lanka

Except for Surrounded Countries with a Case Rates of 13.4 and 22.6, all of the other countries with Case Rate over 10 have Median Adjacent Case Rates comparable to Median Adjacent Case Rates for Surrounded Country Case Rates less than 10.



# Asia: Some Top 10 Countries are under Rank buttons. Adjacent Pairs, Some Visible, are: Israel (2) & Lebanon (5); Georgia (3) & Russia (7); Georgia (3) & Armenia (8); Mongolia (4) & Russia (7)

Rank : Country : Case Rate : Rank Adj : Median Adj : Count Adj  
In Rank Order Within Range:

- Top 10 Countries:
- 1 : Brunei : 73.6692 : 7 : 15.3418 : 1
- 2 : Israel : 51.2388 : 5 : 15.4795 : 3
- 3 : Georgia : 49.5486 : 4 : 16.2330 : 3
- 4 : Mongolia : 29.7619 : 8 : 11.6399 : 2
- 5 : Lebanon : 22.5858 : 2 : 25.7492 : 2
- 6 : Qatar : 19.0909 : 32 : 2.3112 : 1
- 7 : Russia : 16.3141 : 13 : 8.0535 : 5
- 8 : Armenia : 16.2330 : 10 : 8.6114 : 3
- 9 : Kuwait : 15.6150 : 25 : 3.9261 : 2
- 10 : Jordan : 15.4795 : 24 : 3.9261 : 4
- Above Median Countries:
- 11 : Malaysia : 15.3418 : 16 : 6.6415 : 3
- 12 : Palestine : 13.3946 : 1 : 51.2388 : 1
- 13 : Viet Nam : 11.8387 : 29 : 2.9073 : 3
- 14 : United Arab Emirates : 11.3019 : 18 : 5.5199 : 2
- 15 : Oman : 8.7286 : 31 : 2.3112 : 3
- 16 : Iran : 8.6114 : 17 : 5.5410 : 5
- 17 : Azerbaijan : 8.0535 : 3 : 16.2736 : 4
- 18 : Bhutan : 8.0128 : 20 : 5.0709 : 2
- Median Countries:
- 19 : Kazakhstan : 7.7475 : 23 : 4.1535 : 4
- 20 : China : 6.9657 : 27 : 3.1761 : 13
- Below Median Countries:
- 21 : Thailand : 6.6415 : 35 : 2.0456 : 4
- 22 : Iraq : 5.5410 : 11 : 8.6114 : 5
- 23 : Nepal : 3.2849 : 21 : 5.0709 : 2
- 24 : India : 3.1761 : 33 : 2.2401 : 6
- 25 : Laos : 2.9073 : 15 : 6.6415 : 5
- 26 : Indonesia : 2.4758 : 12 : 8.5455 : 2
- 27 : Saudi Arabia : 2.3112 : 9 : 11.3019 : 7
- 28 : Timor-Leste : 1.7491 : 30 : 2.4758 : 1
- Bottom 10 Countries:
- 29 : Kyrgyzstan : 1.3413 : 26 : 3.7357 : 4
- 30 : Bangladesh : 1.1953 : 34 : 2.1800 : 2
- 31 : Myanmar : 1.1839 : 28 : 3.1761 : 5
- 32 : Cambodia : 0.8291 : 14 : 6.6415 : 3
- 33 : Pakistan : 0.6703 : 22 : 5.0709 : 4
- 34 : Afghanistan : 0.5599 : 38 : 0.6703 : 5
- 35 : Uzbekistan : 0.5056 : 37 : 0.9506 : 4
- 36 : Syria : 0.2595 : 6 : 15.4795 : 3
- 37 : Tajikistan : 0.1787 : 36 : 0.9506 : 4
- 38 : Yemen : 0.0354 : 19 : 5.5199 : 2

Map Of Surrounded Country Case Rates With Information About Median Case Rate Of Adjacent Countries

45 Countries In Asia Have Case Rate Data. 38 in Asia Have At Least One Adjacent Country.

Any countries that are islands, or have no adjacent countries with data, are not annotated, and are not in the list at Left.

If any have a large enough land area, the area will be visible, but white (empty).

□ Empty Color Fill Is Also Used For Countries With No Data: North Korea | Taiwan | Turkmenistan

7 Countries Listed At The Right Were NOT Surrounded By Countries With A Case Rate. Some or All may be islands.

■ 0.0354 - 1.3413 (10 lowest) ■ 1.7491 - 6.6415 (below median) ■ 6.9657 - 7.7475 (median)

■ 8.0128 - 15.3418 (above median) ■ 15.4795 - 73.6692 (10 highest) □ No Data

Below, left number is Rank of the Country's Case Rate, right number is Rank of Median of Adjacent Countries' Case Rates.

Mouse: Country, CaseRate, Rank, Adj CountryCount, Median Adj CaseRate, Median Adj CaseRate Rank, Min&Max Adj CaseRate

Not Surrounded Country : Case Rate

In Alphabetic Order:

Bahrain : 47.3167

Japan : 27.2716

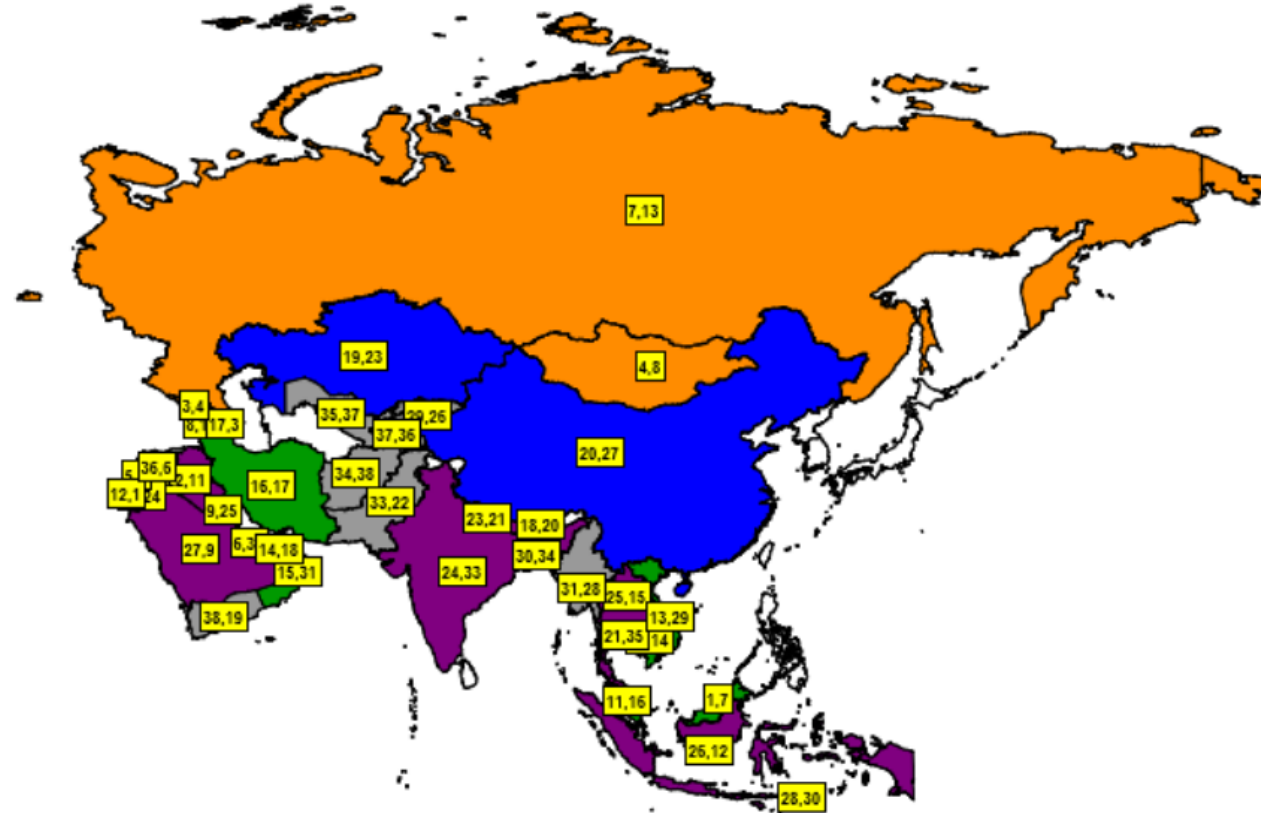
Maldives : 35.6424

Philippines : 3.6117

Singapore : 51.8805

South Korea : 66.7207

Sri Lanka : 3.0812



# South America: Only Half of the Case Rates > 9.9 have Median Adjacent Case Rates substantially higher than those for Case Rates < 9.9

Median COVID-19 Case Rate of Adjacent Countries Versus That of Each Surrounded Country in South America

14 Countries In South America Have Case Rate Data. 13 Countries Have At Least One Adjacent Country. Each Country is annotated with its Number of Adjacent Countries.

Use the mouse for Country, Number of Adjacent Countries, Case Rate, Case Rate Rank, and Median, Min, Max, & Rank for Median Adjacent Countries' Case Rate

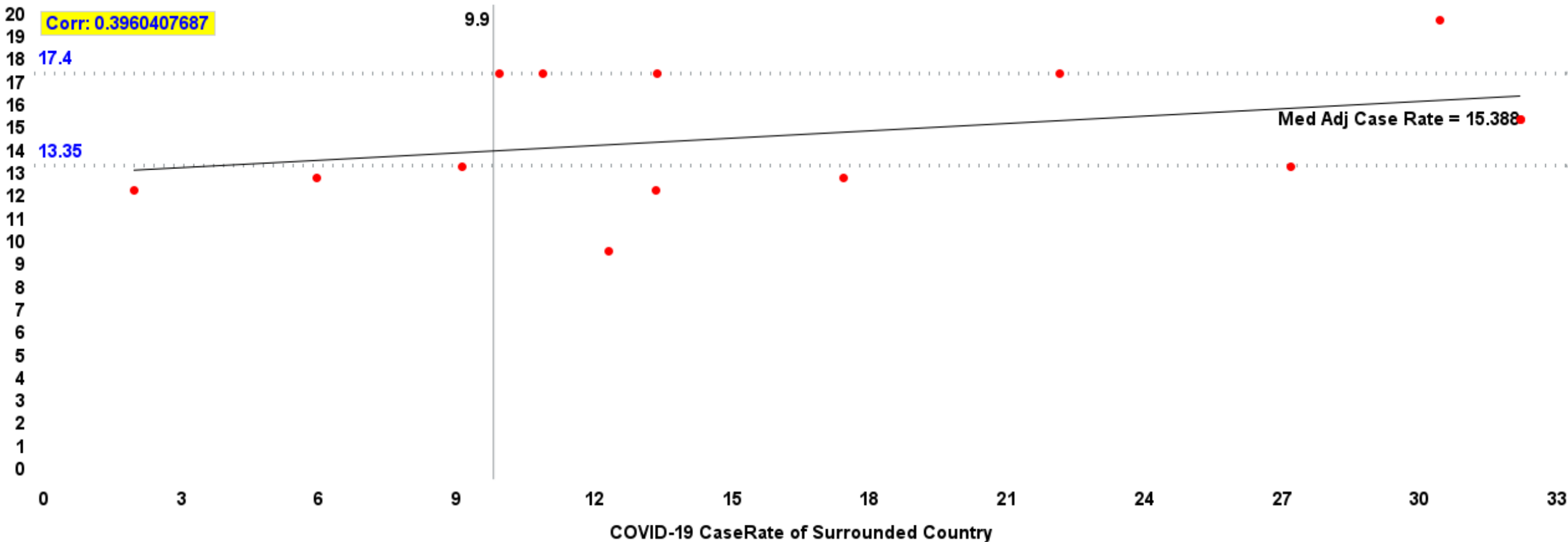
Median, Min, Max Case Rate of All Countries In South America (Including Islands) = 13.3367 1.9529 50.5919

Median, Min, Max Case Rate of All Countries In The World (Including Islands) = 13.62565 0.0354 75.0727

Islands Or Countries Without At Least One Adjacent Country With Data (Not Includable): Falkland Islands

Only half of the ten Case Rates Greater Than 9.9 have Median Adjacent Case Rates substantially higher than those for 7 of the other 8 Surrounded Country Case Rates.

The highest Surrounded Country Case Rate has a Median Adjacent Case Rate which is only 2 more than the Median Adjacent Case Rate of the other seven countries in that lower tier.



**South America:** The Top Three Case Rate Ranked Countries are isolated from each other. Argentina (4) has a small border with Brazil (5). Uruguay (2) is surrounded by Argentina (4) and Brazil (5).

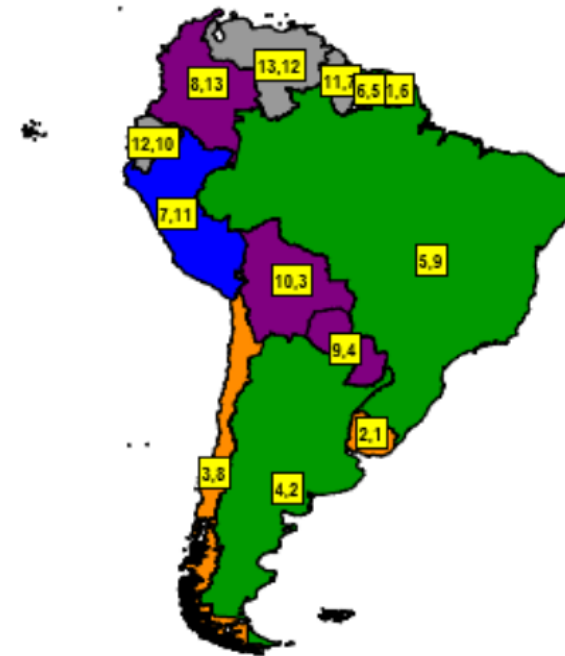
Rank : Country : Case Rate : Rank Adj : Median Adj : Count Adj  
In Rank Order Within Range:

- Top 3 Countries:
- 1 : French Guiana : 32.1902 : 6 : 15.3876 : 2
- 2 : Uruguay : 30.4170 : 1 : 19.7821 : 2
- 3 : Chile : 27.1841 : 8 : 13.3239 : 3
- Above Median Countries:
- 4 : Argentina : 22.1384 : 2 : 17.4257 : 5
- 5 : Brazil : 17.4257 : 9 : 12.8168 : 10
- 6 : Suriname : 13.3495 : 5 : 17.4257 : 3
- Median Countries:
- 7 : Peru : 13.3239 : 11 : 12.3097 : 5
- Below Median Countries:
- 8 : Colombia : 12.3097 : 13 : 9.6241 : 4
- 9 : Paraguay : 10.8569 : 4 : 17.4257 : 3
- 10 : Bolivia : 9.9125 : 3 : 17.4257 : 5
- Bottom 3 Countries:
- 11 : Guyana : 9.1107 : 7 : 13.3495 : 3
- 12 : Ecuador : 5.9242 : 10 : 12.8168 : 2
- 13 : Venezuela : 1.9529 : 12 : 12.3097 : 3

Map Of Surrounded Country Case Rates With Information About Median Case Rate Of Adjacent Countries  
14 Countries In South America Have Case Rate Data. 13 in South America Have At Least One Adjacent Country.  
Any countries that are islands, or have no adjacent countries with data, are not annotated, and are not in the list at Left.  
If any have a large enough land area, the area will be visible, but white (empty).

- 1 Countries Listed At The Right Were NOT Surrounded By Countries With A Case Rate. Some or All may be islands.
- 1.9529 - 9.1107 (3 lowest)   ■ 9.9125 - 12.3097 (below median)   ■ 13.3239 - 13.3239 (median)
- 13.3495 - 22.1384 (above median)   ■ 27.1841 - 32.1902 (3 highest)
- Below, left number is Rank of the Country's Case Rate, right number is Rank of Median of Adjacent Countries' Case Rates.
- Mouse: Country, CaseRate, Rank, Adj CountryCount, Median Adj CaseRate, Median Adj CaseRate Rank, Min&Max Adj CaseRate

Not Surrounded Country : Case Rate  
In Alphabetic Order:  
Falkland Islands : 50.5919



# Europe: The Median Adjacent Countries' Case Rate is clearly higher when the Surrounded Country Case Rate is at least 29

Median COVID-19 Case Rate of Adjacent Countries Versus That of Each Surrounded Country in Europe

51 Countries In Europe Have Case Rate Data. 44 Countries Have At Least One Adjacent Country. Each Country is annotated with its Number of Adjacent Countries.

Use the mouse for Country, Number of Adjacent Countries, Case Rate, Case Rate Rank, and Median, Min, Max, & Rank for Median Adjacent Countries' Case Rate

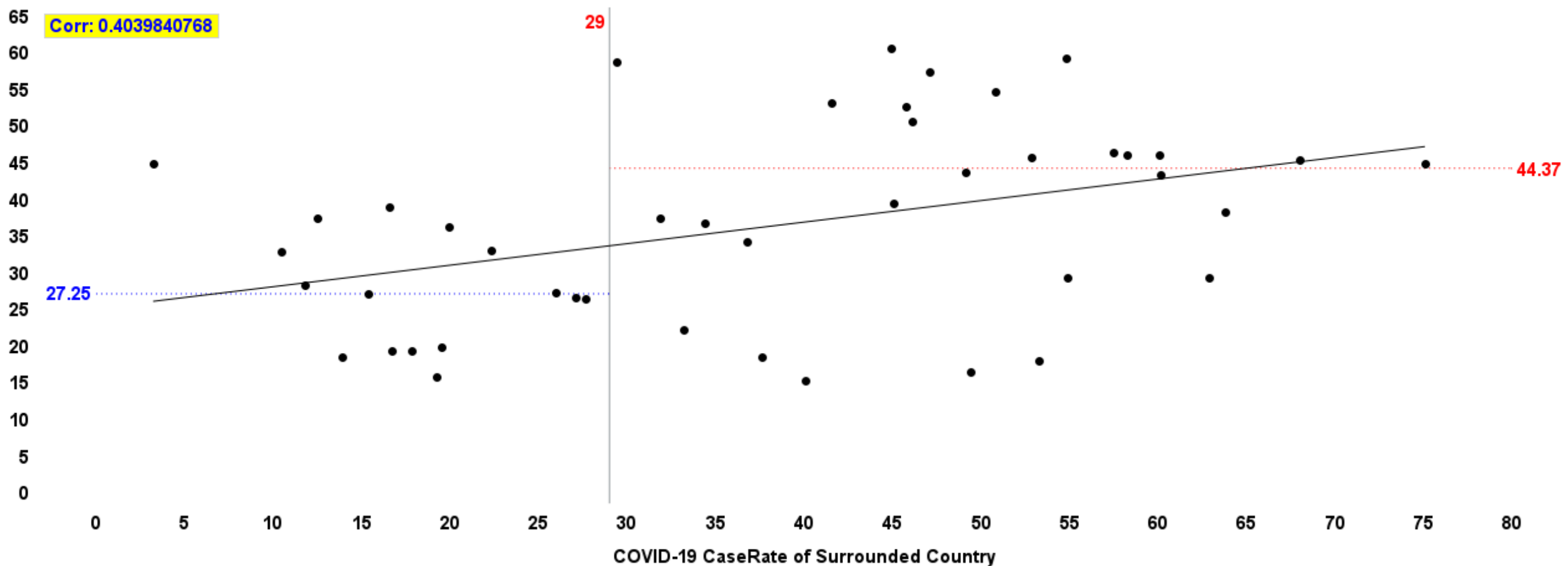
Median, Min, Max Case Rate of All Countries In Europe (Including Islands) = 44.9167 3.2178 75.0727

Median, Min, Max Case Rate of All Countries In The World (Including Islands) = 13.62565 0.0354 75.0727

7 Islands Or Countries Without At Least One Adjacent Country With Data (Not Includable): Cyprus, Faroe Islands, Guernsey, Iceland, Isle of Man, Jersey, Malta

The Case Rate of Surrounded Countries does appear to affect the Median Case Rate of Adjacent Countries.

The Median of Median Adjacent Country Case Rates is clearly higher when the Surrounded Country Case Rate is 29 or higher.



**Europe:** Two countries of the Top 10 are adjacent: Austria and Slovenia.

Some of the Above Median are adjacent: (a) Baltic States (Latvia, Lithuania, Estonia);  
 (b) Germany which is bordered by Switzerland, Netherlands, Belgium, and Czechia.

Rank : Country : Case Rate : Rank Adj : Median Adj : Count Adj  
 In Rank Order Within Range:

- Top 10 Countries:
- 1 : San Marino : 75.0727 : 14 : 44.9167 : 1
- 2 : Austria : 68.0263 : 13 : 45.5883 : 8
- 3 : Slovenia : 63.8156 : 20 : 38.4056 : 4
- 4 : Gibraltar : 62.8883 : 28 : 29.3960 : 1
- 5 : Andorra : 60.1368 : 17 : 43.4517 : 2
- 6 : Luxembourg : 60.0686 : 11 : 46.1051 : 3
- 7 : Denmark : 58.2498 : 10 : 46.1051 : 1
- 8 : France : 57.5074 : 9 : 46.5940 : 8
- 9 : Portugal : 54.8846 : 29 : 29.3960 : 1
- 10 : Liechtenstein : 54.7783 : 2 : 59.4224 : 2
- Above Median Countries:
- 11 : Greece : 53.2882 : 41 : 18.1035 : 4
- 12 : Latvia : 52.8300 : 12 : 45.7887 : 3
- 13 : Switzerland : 50.8184 : 5 : 54.7783 : 5
- 14 : Lithuania : 49.4255 : 42 : 16.5820 : 3
- 15 : Netherlands : 49.1214 : 16 : 43.8228 : 2
- 16 : Monaco : 47.0828 : 4 : 57.5074 : 1
- 17 : Germany : 46.1051 : 8 : 50.8184 : 9
- 18 : Estonia : 45.7887 : 7 : 52.8300 : 1
- 19 : Czechia : 45.0715 : 18 : 39.6500 : 4
- 20 : Italy : 44.9167 : 1 : 60.6615 : 6
- 21 : Belgium : 41.5405 : 6 : 53.3144 : 4
- Median Countries:
- 22 : Montenegro : 40.0713 : 44 : 15.3906 : 5
- 23 : Serbia : 37.5966 : 39 : 18.6606 : 8
- Below Median Countries:
- 24 : United Kingdom : 36.8004 : 25 : 34.3898 : 1
- 25 : Ireland : 34.3898 : 23 : 36.8004 : 1
- 26 : Slovakia : 33.1948 : 35 : 22.3113 : 5
- 27 : Croatia : 31.8944 : 22 : 37.5966 : 5
- 28 : Spain : 29.3960 : 3 : 58.8221 : 4
- 29 : Norway : 27.6247 : 34 : 26.5314 : 2
- 30 : Finland : 27.0670 : 33 : 26.8103 : 2
- 31 : Sweden : 25.9958 : 31 : 27.3459 : 2
- 32 : Hungary : 22.3113 : 26 : 33.1948 : 7
- 33 : Turkey : 19.9255 : 24 : 36.3841 : 2
- 34 : Bulgaria : 19.4799 : 36 : 19.9255 : 5
- Bottom 10 Countries:
- 35 : Moldova : 19.2332 : 43 : 15.8731 : 2
- 36 : Romania : 17.8412 : 38 : 19.4799 : 5
- 37 : North Macedonia : 16.7270 : 37 : 19.4799 : 5
- 38 : Poland : 16.5820 : 19 : 39.1332 : 6
- 39 : Kosovo : 15.3906 : 32 : 27.1618 : 4
- 40 : Ukraine : 13.9049 : 40 : 18.5372 : 6
- 41 : Bosnia and Herzegovina : 12.4776 : 21 : 37.5966 : 3
- 42 : Albania : 11.7705 : 30 : 28.3992 : 4
- 43 : Belarus : 10.4252 : 27 : 33.0038 : 4
- 44 : Vatican City State : 3.2178 : 15 : 44.9167 : 1

Map Of Surrounded Country Case Rates With Information About Median Case Rate Of Adjacent Countries

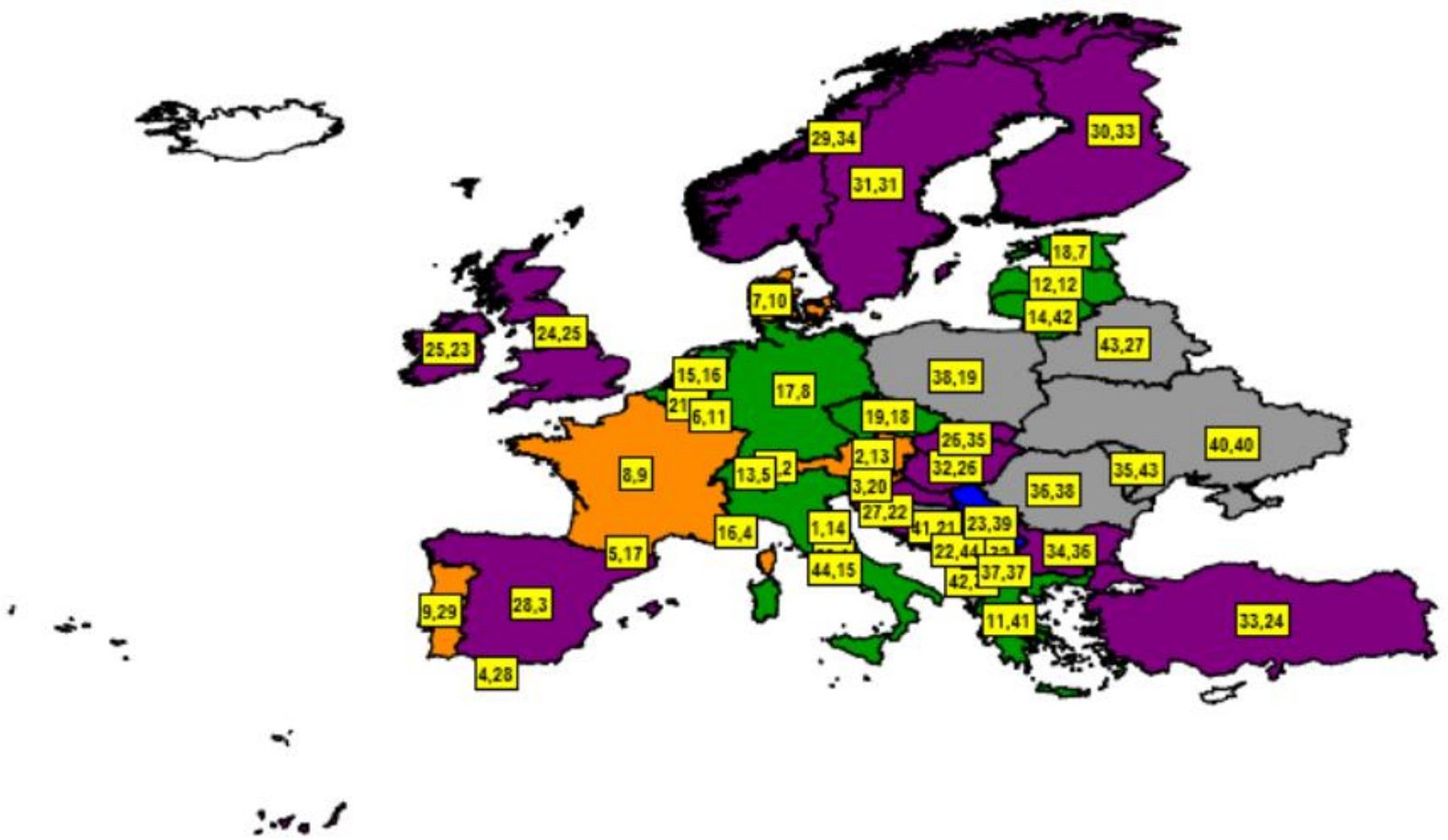
51 Countries In Europe Have Case Rate Data. 44 in Europe Have At Least One Adjacent Country.  
 Any countries that are islands, or have no adjacent countries with data, are not annotated, and are not in the list at Left.  
 If any have a large enough land area, the area will be visible, but white (empty).  
 7 Countries Listed At The Right Were NOT Surrounded By Countries With A Case Rate. Some or All may be islands.

- 3.2178 - 19.2332 (10 lowest)
- 19.4799 - 36.8004 (below median)
- 37.5966 - 40.0713 (median)
- 41.5405 - 53.2882 (above median)
- 54.7783 - 75.0727 (10 highest)

Below, left number is Rank of the Country's Case Rate, right number is Rank of Median of Adjacent Countries' Case Rates.  
 Mouse: Country, CaseRate, Rank, Adj CountryCount, Median Adj CaseRate, Median Adj CaseRate Rank, Min&Max Adj CaseRate

Not Surrounded Country : Case Rate

- In Alphabetic Order:  
 Cyprus : 73.9907  
 Faroe Islands : 65.2484  
 Guernsey : 55.7817  
 Iceland : 56.2211  
 Isle of Man : 44.9618  
 Jersey : 59.9218  
 Malta : 22.6633



**Besides the data elements already mapped,  
there are fifteen other data elements  
listed on the next slide.**

**Source:**

`owid-covid-data.csv`

`https://covid.ourworldindata.org/ on 5 January 2024`

## The Number of Countries with Each Data Element Is:

236 Population

227 Life Expectancy

210 People Per Sq. Km.

202 Diabetes Percent of Aged 20 to 79

194 Median Age

192 Cardiac Deaths Per 1000

192 GDP (\$K) Per Capita

192 Pop. Percent Aged 70 or Older

188 Pop. Percent Aged 65 or Older

187 Human Development Index

170 Hospital Beds Per 1000 People

146 Females Percent Who Smoke

144 Males Percent Who Smoke

125 Pop. Percent in Extreme Poverty

94 Pop. Percent with On-Premises HandWashing

# Data Source's Fifteen Data Elements By Country

- ▶ Do they have an effect on:
  - Case Rate or Mortality Rate?
  - Case Count or Mortality Count?
- ▶ How SHOULD any relationships be found?

# Plots of any COVID-19 Measure versus Fifteen Variables is Delivered With:

1. Fifteen Stand-Alone Full Web Pages
2. One 3-Row BY 5-Column Panel of scatter plot miniatures in 15 cells
3. Fifteen links in the panel to the full web pages

Why the panels?

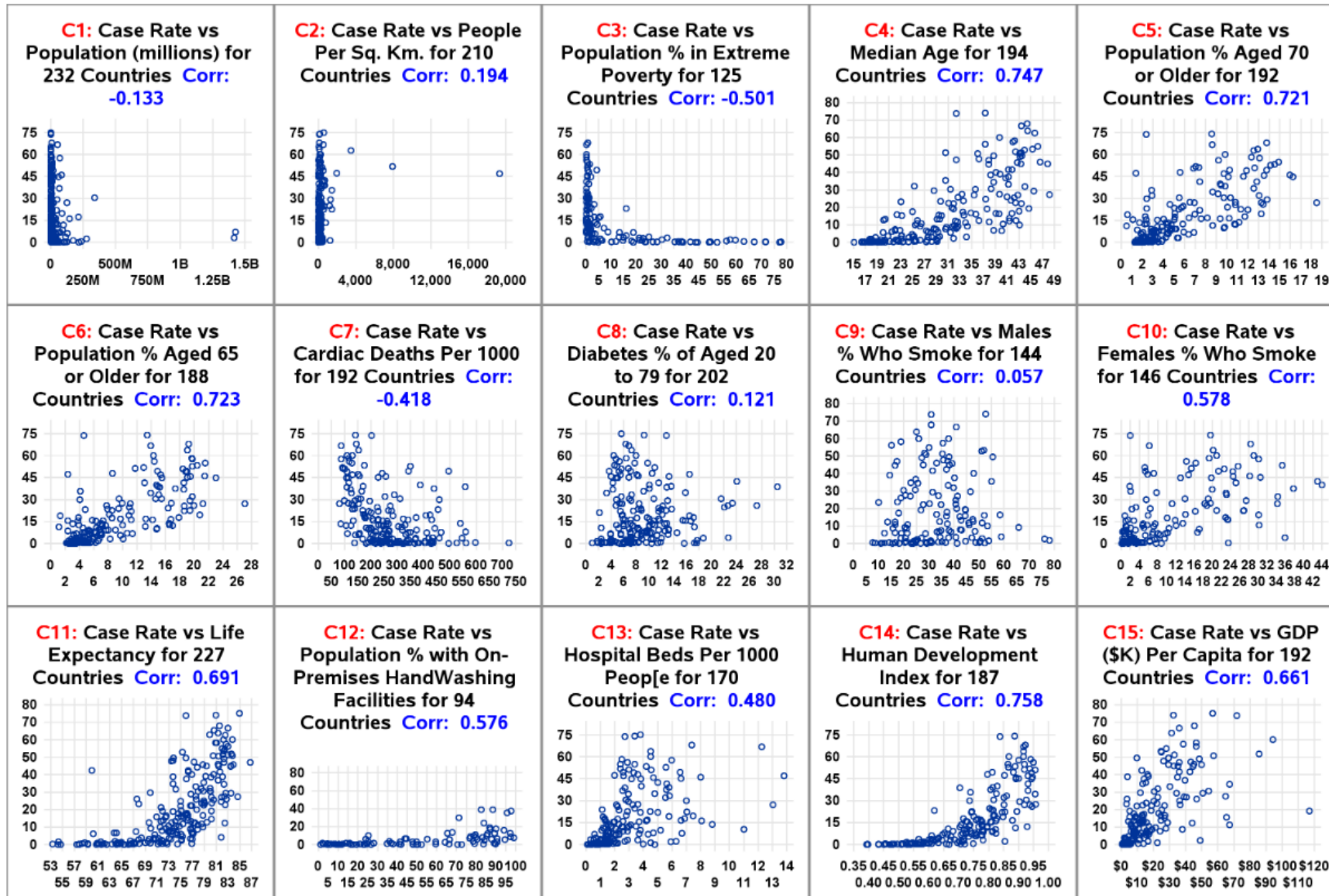
Overview into the collection of 60 full web pages.

# Panel of Scatter Plots of Case Rate vs 15 variables

Case Rate with [Correlation Coefficients & No Fit](#) [Go to Plots of Mortality Rate versus the Fifteen X Variables](#) [Go To Table of Contents](#)

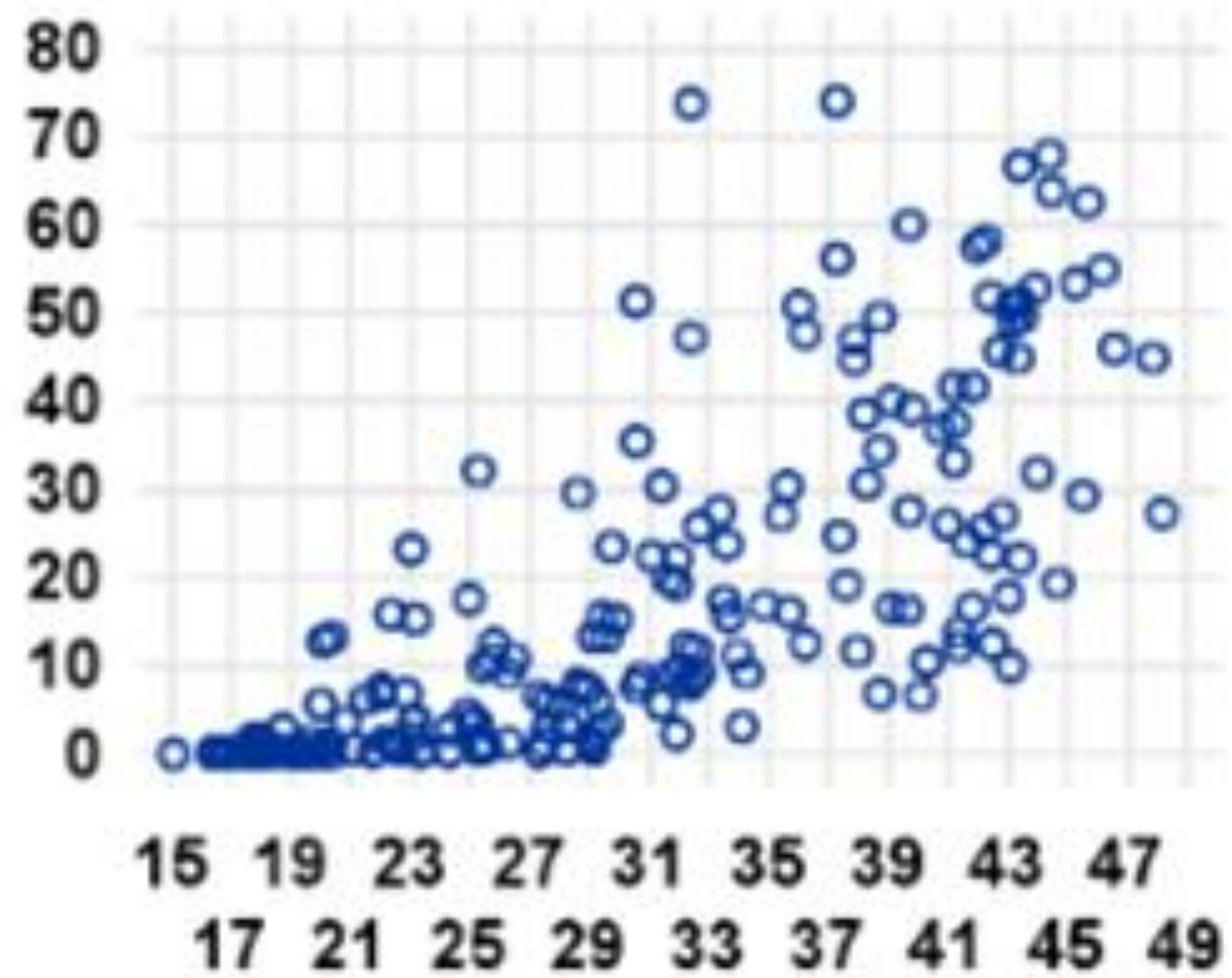
For any plot, its full-size equivalent with mouseover data tips is at the link corresponding to its red plot number title prefix:

[C1](#) [C2](#) [C3](#) [C4](#) [C5](#) [C6](#) [C7](#) [C8](#) [C9](#) [C10](#) [C11](#) [C12](#) [C13](#) [C14](#) [C15](#)



Magnified  
Excerpt of Cell  
C4 from Screen  
Capture of Full  
Panel Web Page

**C4: Case Rate vs  
Median Age for 194  
Countries Corr: 0.747**



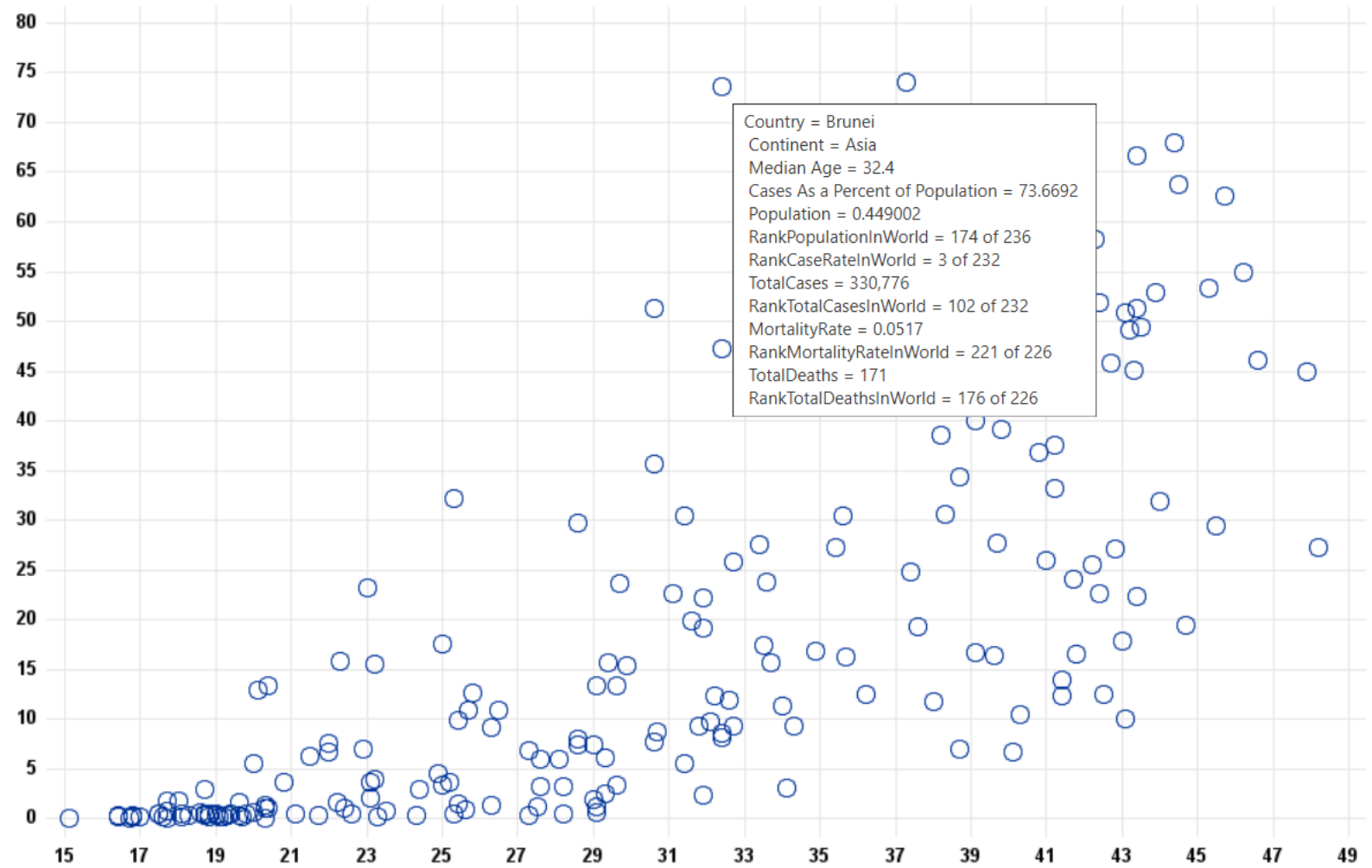
# Mouseover Text in its Full Web Page Plot

C1: Cases As a Percent of Population versus Median Age for 194 Countries Corr: 0.747

[Mortality Rate versus Median Age](#)

[Panel of Plots of Case Rate versus each of fifteen X Variables](#)

[Panel of Plots of Mortality Rate versus each of fifteen X Variables](#)



**Mouseover  
Text  
Magnified**

Country = Brunei

Continent = Asia

Median Age = 32.4

Cases As a Percent of Population = 73.6692

Population = 0.449002

RankPopulationInWorld = 174 of 236

RankCaseRateInWorld = 3 of 232

TotalCases = 330,776

RankTotalCasesInWorld = 102 of 232

MortalityRate = 0.0517

RankMortalityRateInWorld = 221 of 226

TotalDeaths = 171

RankTotalDeathsInWorld = 176 of 226

# Highlight the Top N & Bottom N Countries

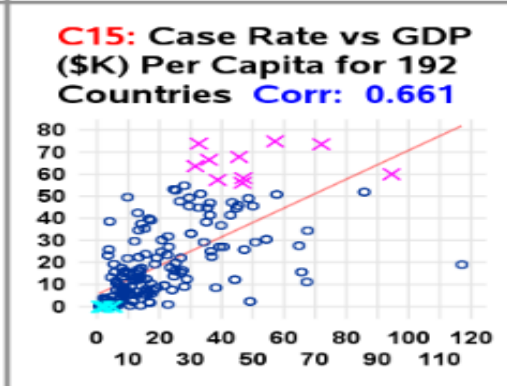
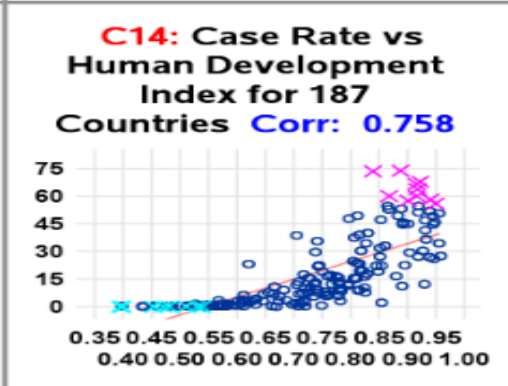
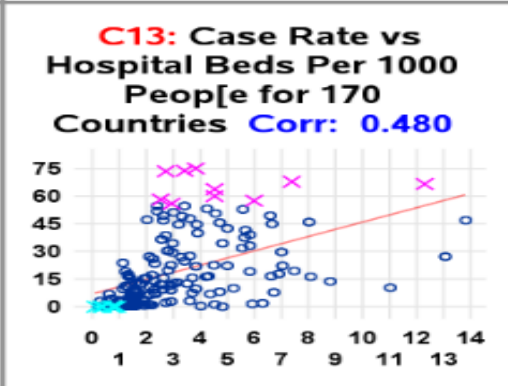
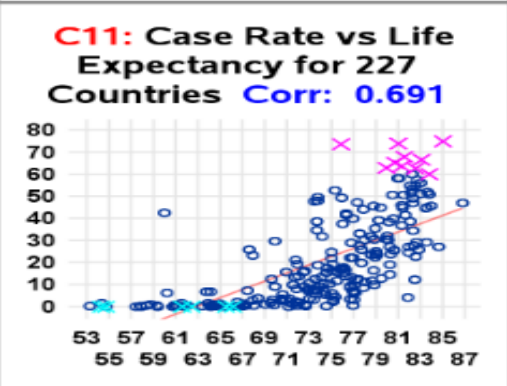
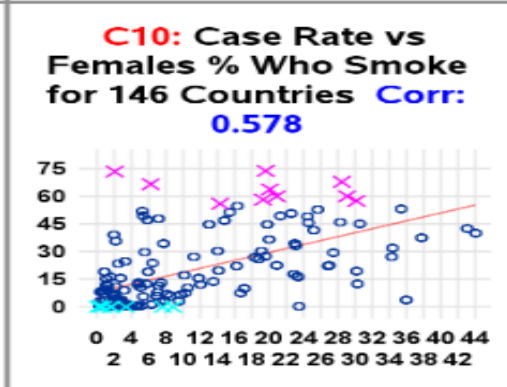
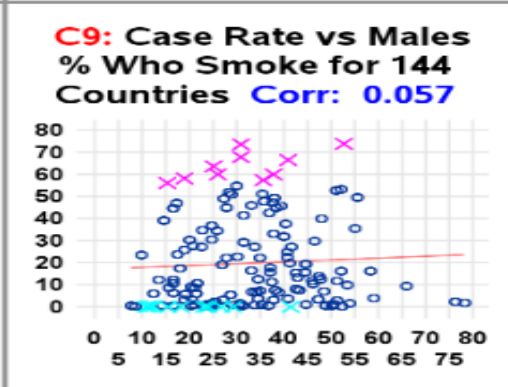
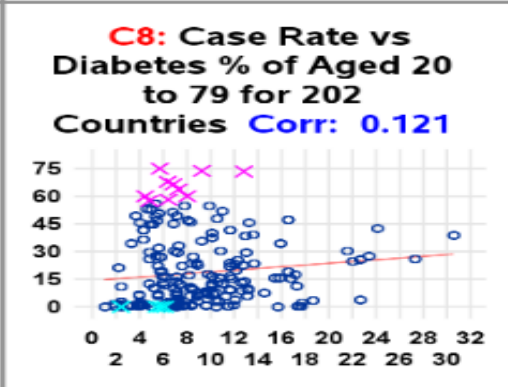
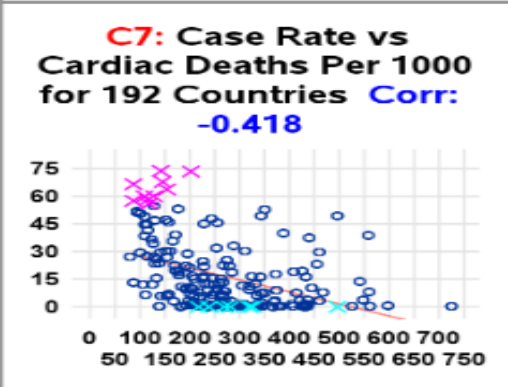
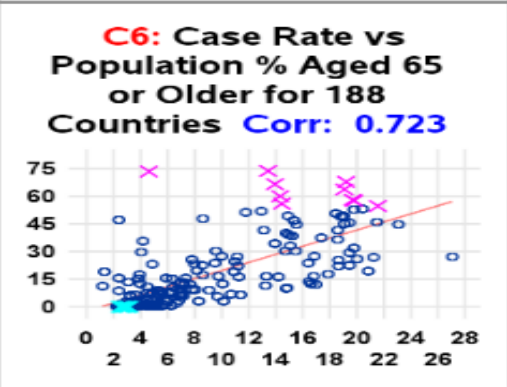
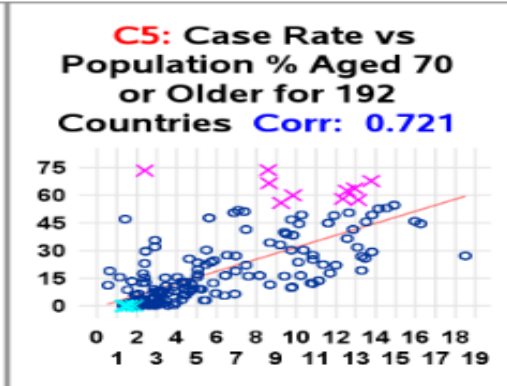
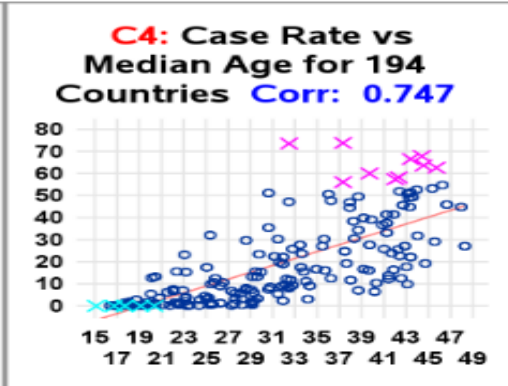
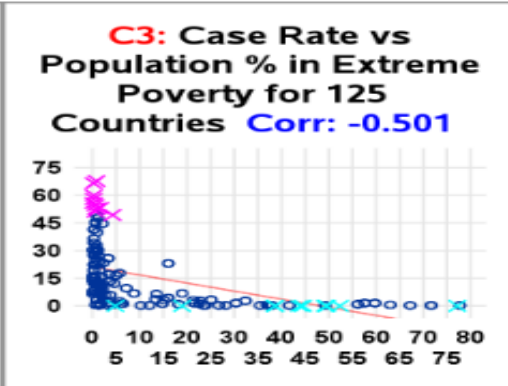
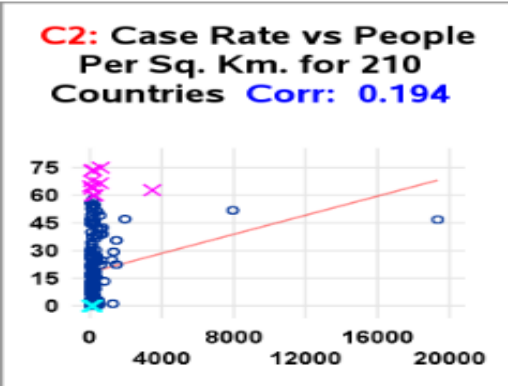
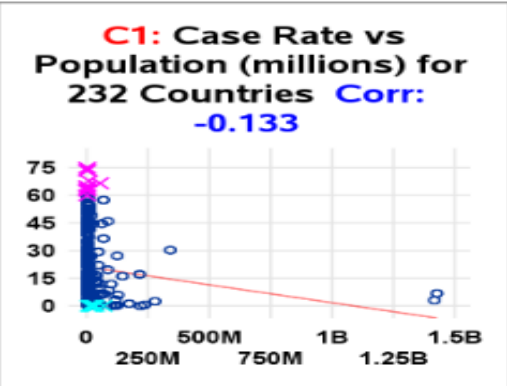
- ▶ Depending on the X variable,  
there may be 94 to 236 countries

# Case Rate Plots with Linear Fit & Highlight Top and Bottom 10 Countries

Case Rate with [Correlation Coefficients](#) & Linear Fit & Highlights: **X** = Top 10 Case Rate **X** = Bottom 10 Case Rate [Go to Plots of Mortality Rate vs Case Rate](#)

For any plot, its full-size equivalent with mouseover data tips is at the link corresponding to its red plot number title prefix:

[C1](#) [C2](#) [C3](#) [C4](#) [C5](#) [C6](#) [C7](#) [C8](#) [C9](#) [C10](#) [C11](#) [C12](#) [C13](#) [C14](#) [C15](#)



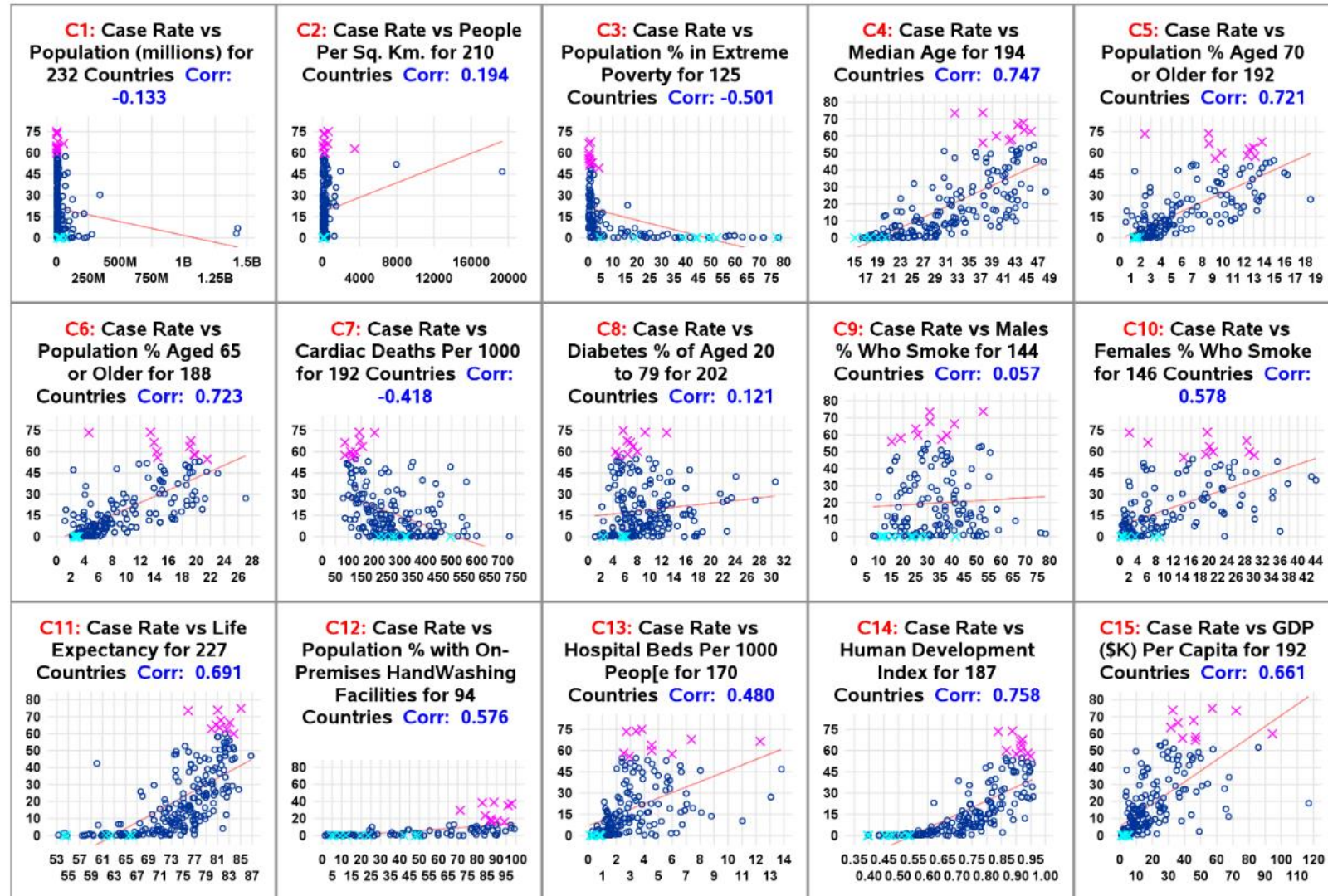
# Case Rate Plots with Linear Fit & Highlight Top and Bottom 10 Countries

## Outliers Present (See C1 & C2 cell excerpts below)

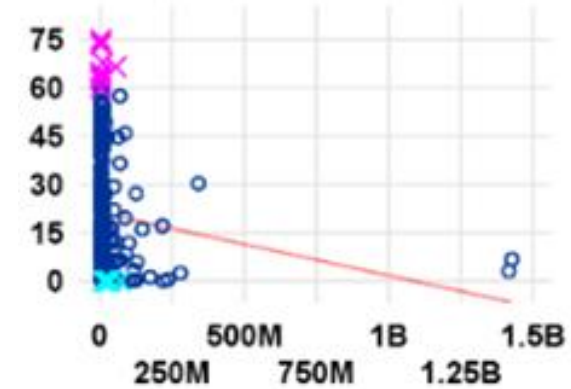
Case Rate with [Correlation Coefficients](#) & Linear Fit & Highlights: x = Top 10 Case Rate x = Bottom 10 Case Rate [Go to Plots of Mortality Rate vs](#)

For any plot, its full-size equivalent with mouseover data tips is at the link corresponding to its red plot number title prefix:

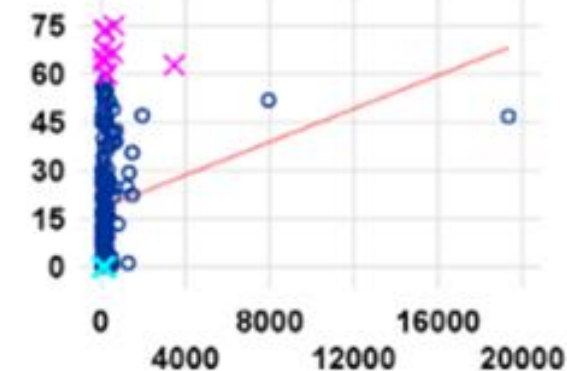
[C1](#) [C2](#) [C3](#) [C4](#) [C5](#) [C6](#) [C7](#) [C8](#) [C9](#) [C10](#) [C11](#) [C12](#) [C13](#) [C14](#) [C15](#)



**C1: Case Rate vs Population (millions) for 232 Countries** **Corr: -0.133**



**C2: Case Rate vs People Per Sq. Km. for 210 Countries** **Corr: 0.194**



# Case Rate Plots with Linear Fit & Highlight Top and Bottom 10 Countries

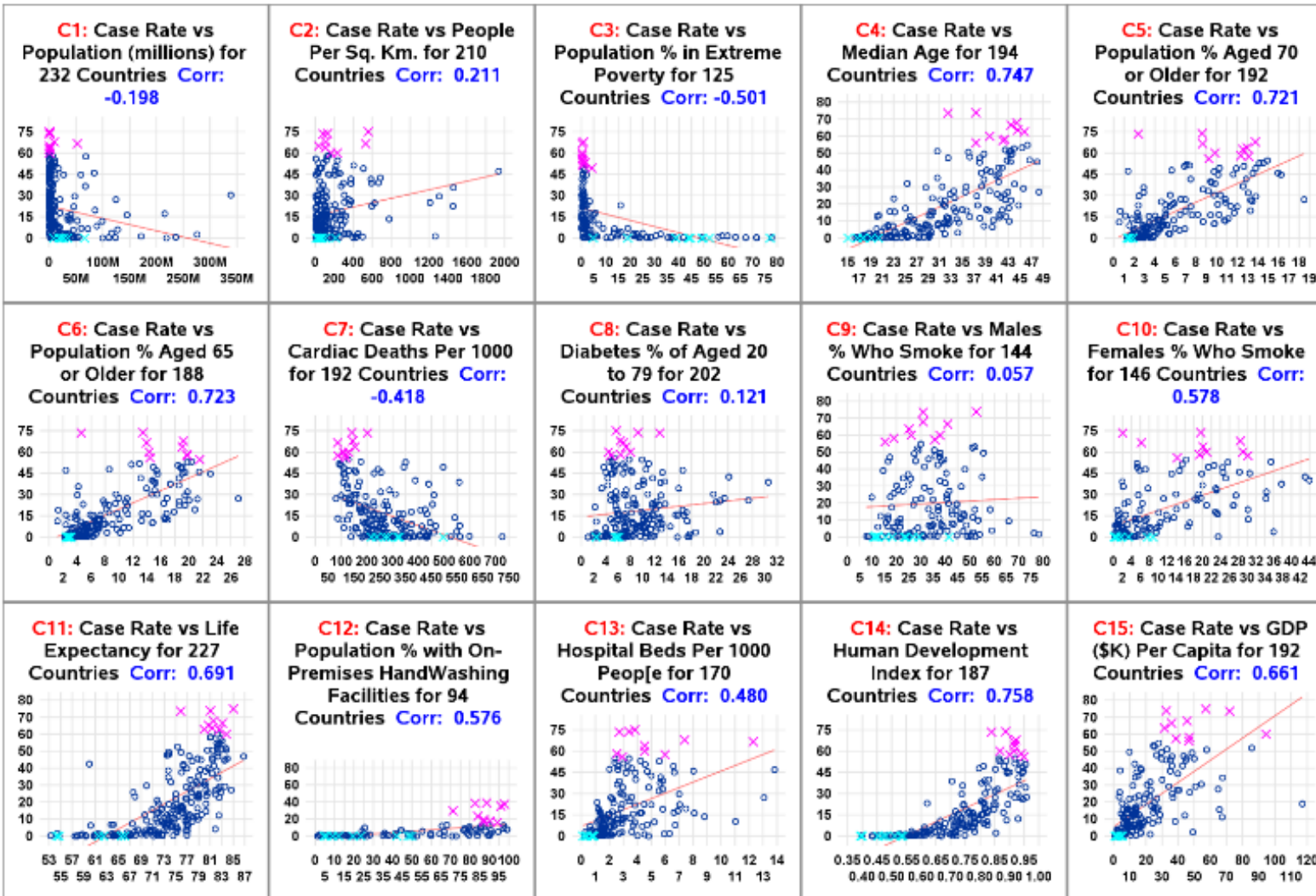
## Outliers Removed Cited in Red Subtitle (see the affected cells below)

Case Rate with [Correlation Coefficients & Linear Fit & Highlights](#): X = Top 10 Case Rate X = Bottom 10 Case Rate [Go to Plots of Mortality Rate v](#)

Omitting Outliers: Population China & India (both > 1.4B), Pop. Density Monaco (19,346), Singapore (7,916), Gibraltar (3,457)

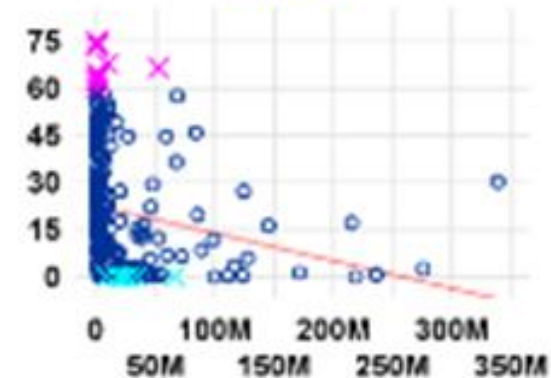
For any plot, its full-size equivalent with mouseover data tips is at the link corresponding to its red plot number title prefix:

[C1](#) [C2](#) [C3](#) [C4](#) [C5](#) [C6](#) [C7](#) [C8](#) [C9](#) [C10](#) [C11](#) [C12](#) [C13](#) [C14](#) [C15](#)



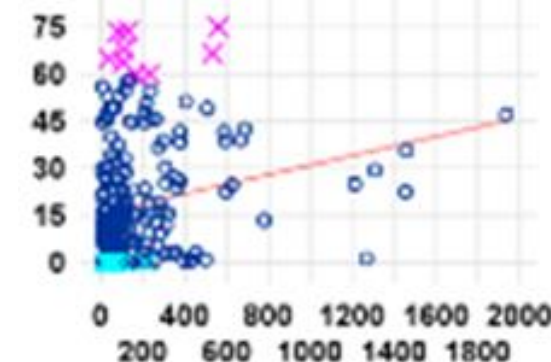
**C1:** Case Rate vs Population (millions) for 232 Countries **Corr:**

-0.198



**C2:** Case Rate vs People Per Sq. Km. for 210 Countries **Corr:**

0.211





# After Clicking on C2 (Case Rate vs Pop. Density) in Panel Title Line 3 Highest Case Rates Are Not Apparently Driven by Population Density

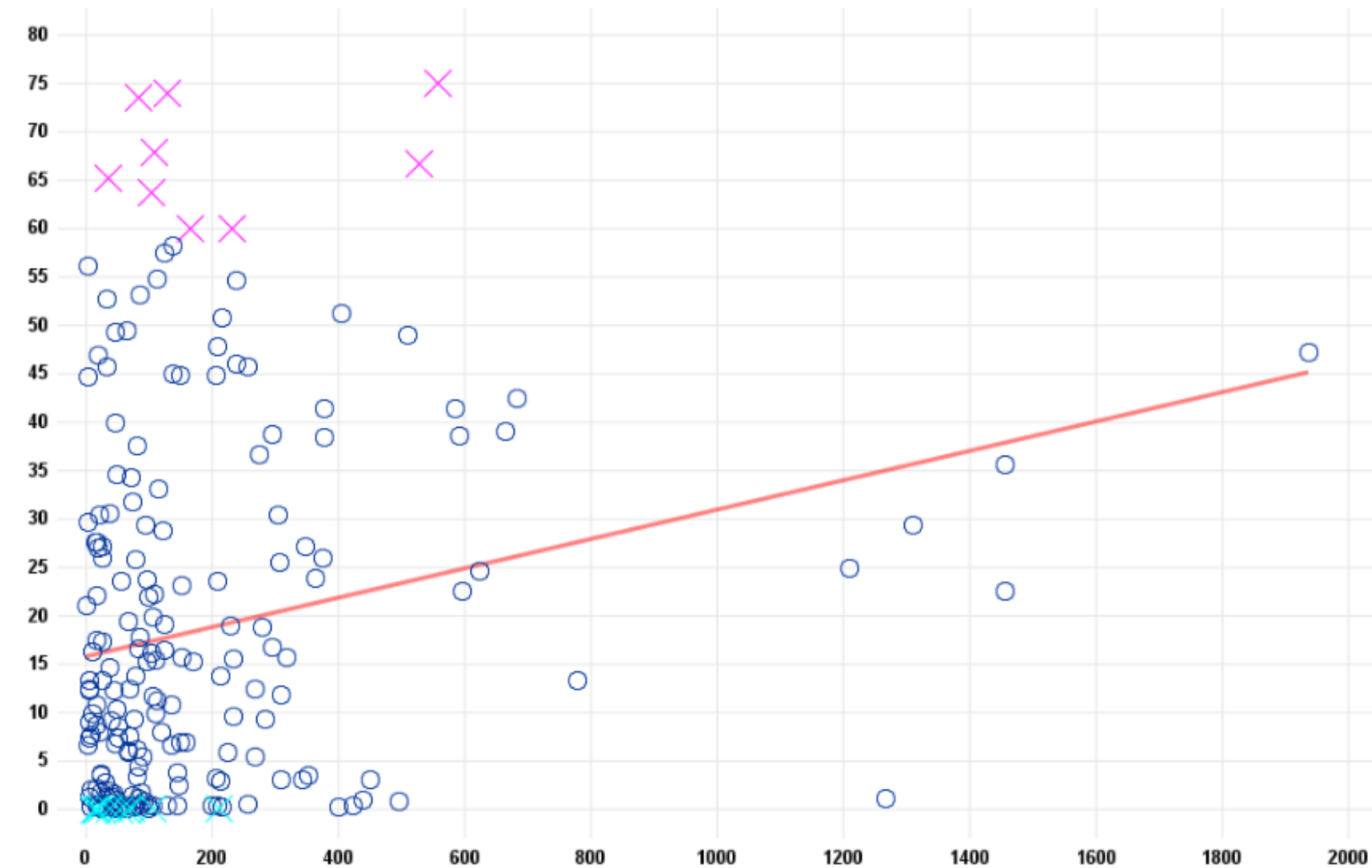
C2: Cases As a Percent of Population versus People Per Sq. Km. for 210 Countries    Corr: 0.211    X = Top 10 Cases As a Percent of Population    X = Bottom 10 Cases As a Percent of Population

Omitting outliers: Population China & India (both > 1.4B), Pop. Density Monaco (19,346), Singapore (7,916), Gibraltar (3,457)

[Mortality Rate versus People Per Sq. Km.](#)

[Panel of Plots of Case Rate versus each of fifteen X Variables](#)

[Panel of Plots of Mortality Rate versus each of fifteen X Variables](#)



- ▶ **All Case Rate Plots, Mortality Rate Plots, Total Cases, and Total Mortalities are available upon email request.**
- ▶ **Likewise any maps other than Case Rate maps shown, and any bar charts or spreadsheets.**
- ▶ **Source data and code to build it all yourself, if interested.**

This presentation uses my software-independent principles for communication-effective graphic design and for communication-effective use of color.

For all of the principles, see Chapters 1 & 2 of my book:

*Visual Data Insights Using SAS<sup>®</sup> ODS Graphics:*

*A Guide to Communication-Effective Data Visualization.*

See the book for 327 examples (and code), using **every** tool in ODS Graphics, except vector plots.

**This is a presentation on Data Visualization.  
I'm interested in YOUR conclusions, if any,  
and suggestions of other ways to present the data.**

**Your Questions, Suggestions, Comments,  
and Requests for Data and/or Code Are Welcome**

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