EVOLUTION OF MALARIA IN THE WORLD

#1- Find the number of cases per year 2-Find the number of death per year 3- Replace the missing values by zero.

#Data Preprocessing #Data cleaning #Data Manipulation #Data visualisation

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

```
C:\ProgramData\Anaconda3\lib\site-packages\scipy\__init__.py:146: UserWarn
ing: A NumPy version >=1.16.5 and <1.23.0 is required for this version of
SciPy (detected version 1.23.2
  warnings.warn(f"A NumPy version >={np_minversion} and <{np_maxversion}"
```

In [2]:

```
file = pd.read_csv('estimated_numbers_project_python.csv')
file
```

Out[2]:

	Country	Year	No. of cases	Interval of cases	No. of deaths	Interval of deaths	No. of cases_median	No. of cases_min	No. of cases_max	deaths_
0	Afghanistan	2017	630308	495000-801000	298	110-510	630308	495000.0	801000.0	
1	Algeria	2017	0	NaN	0	NaN	0	NaN	NaN	
2	Angola	2017	4615605	3106000-6661000	13316	9970-16600	4615605	3106000.0	6661000.0	
3	Argentina	2017	0	NaN	0	NaN	0	NaN	NaN	
4	Armenia	2017	0	NaN	0	NaN	0	NaN	NaN	
...	...	...	...	...	...	...	...	...	...	
851	Venezuela (Bolivarian Republic	2010	57257	47000-74000	52	9-90	57257	47000.0	74000.0	

In [ ]:

In [3]:

```
data = file.copy()
data.head(20)
```

Out[3]:

	Country	Year	No. of cases	Interval of cases	No. of deaths	Interval of deaths	No. of cases_median	No. of cases_min	I cases
0	Afghanistan	2017	630308	495000-801000	298	110-510	630308	495000.0	801
1	Algeria	2017	0	NaN	0	NaN	0	NaN	
2	Angola	2017	4615605	3106000-6661000	13316	9970-16600	4615605	3106000.0	6661
3	Argentina	2017	0	NaN	0	NaN	0	NaN	
4	Armenia	2017	0	NaN	0	NaN	0	NaN	
5	Azerbaijan	2017	0	NaN	0	NaN	0	NaN	
6	Bangladesh	2017	32924	30000-36000	76	3-130	32924	30000.0	36
7	Belize	2017	7	NaN	0	NaN	7	NaN	
8	Benin	2017	4111699	2774000-6552000	7328	5740-8920	4111699	2774000.0	6552
9	Bhutan	2017	11	NaN	0	NaN	11	NaN	
10	Bolivia (Plurinational State of)	2017	6512	4900-8300	2	0-4	6512	4900.0	8
11	Botswana	2017	2989	2300-4200	7	0-20	2989	2300.0	4
12	Brazil	2017	217928	196000-236000	30	NaN	217928	196000.0	236
13	Burkina Faso	2017	7907562	5645000-11330000	27791	25100-30500	7907562	5645000.0	11330
14	Burundi	2017	2113066	1284000-3401000	5253	4300-6200	2113066	1284000.0	3401
15	Cabo Verde	2017	423	NaN	1	NaN	423	NaN	
16	Cambodia	2017	208273	186000-236000	345	30-590	208273	186000.0	236
17	Cameroon	2017	7307515	4704000-11030000	11566	8900-14200	7307515	4704000.0	11030
18	Central African Republic	2017	1804550	777000-3363000	4804	3980-5640	1804550	777000.0	3363
19	Chad	2017	2779489	1449000-4832000	8729	6640-10800	2779489	1449000.0	4832

In [4]:

```
type(data)
```

Out[4]:

```
pandas.core.frame.DataFrame
```

In [5]:

```
#Display all the dataset
pd.options.display.max_columns = None
pd.options.display.max_rows = None
display(data)
```

	Country	Year	No. of cases	Interval of cases	No. of deaths	Interval of deaths	No. of cases_median	No. of cases_min	No. of cases_max	dea
0	Afghanistan	2017	630308	495000-801000	298	110-510	630308	495000.0	801000.0	
1	Algeria	2017	0	NaN	0	NaN	0	NaN	NaN	
2	Angola	2017	4615605	3106000-6661000	13316	9970-16600	4615605	3106000.0	6661000.0	
3	Argentina	2017	0	NaN	0	NaN	0	NaN	NaN	
4	Armenia	2017	0	NaN	0	NaN	0	NaN	NaN	
5	Azerbaijan	2017	0	NaN	0	NaN	0	NaN	NaN	
6	Bangladesh	2017	32924	30000-36000	76	3-130	32924	30000.0	36000.0	
7	Belize	2017	7	NaN	0	NaN	7	NaN	NaN	

In [118]:

```
#Checking all the informations of our table
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 856 entries, 0 to 855
Data columns (total 13 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   Country               856 non-null    object 
 1   Year                  856 non-null    int64  
 2   No. of cases          856 non-null    int64  
 3   Interval of cases     544 non-null    object 
 4   No. of deaths         856 non-null    int64  
 5   Interval of deaths    524 non-null    object 
 6   No. of cases_median   856 non-null    int64  
 7   No. of cases_min      544 non-null    float64
 8   No. of cases_max      544 non-null    float64
 9   No. of deaths_median  856 non-null    int64  
 10  No. of deaths_min     524 non-null    float64
 11  No. of deaths_max     524 non-null    float64
 12  WHO Region            856 non-null    object 
dtypes: float64(4), int64(5), object(4)
memory usage: 87.1+ KB
```

In [7]:

```
#We can see, we have many missing values. According to the recomendations, we have to rep
data.fillna(0)
```

9	Bhutan	2017	11	0	0	0	11	0.0	0.0
10	Bolivia (Plurinational State of)	2017	6512	4900-8300	2	0-4	6512	4900.0	8300.0
11	Botswana	2017	2989	2300-4200	7	0-20	2989	2300.0	4200.0
12	Brazil	2017	217928	196000-236000	30	0	217928	196000.0	236000.0
13	Burkina Faso	2017	7907562	5645000-11330000	27791	25100-30500	7907562	5645000.0	11330000.0
14	Burundi	2017	2113066	1284000-3401000	5253	4300-6200	2113066	1284000.0	3401000.0
15	Cabo Verde	2017	423	0	1	0	423	0.0	0.0
16	Cambodia	2017	208273	186000-236000	345	30-590	208273	186000.0	236000.0
17	Cameroon	2017	7307515	4704000-11030000	11566	8900-14200	7307515	4704000.0	11030000.0

In [70]:

```
data.shape
```

Out[70]:

```
(856, 13)
```

Type *Markdown* and LaTeX: α^2

In [9]:

```
data['Country']
```

Out[9]:

0	Afghanistan
1	Algeria
2	Angola
3	Argentina
4	Armenia
5	Azerbaijan
6	Bangladesh
7	Belize
8	Benin
9	Bhutan
10	Bolivia (Plurinational State of)
11	Botswana
12	Brazil
13	Burkina Faso
14	Burundi
15	Cabo Verde
16	Cambodia
17	Cameroon
18	Central African Republic
19	Chad
20	China
21	Colombia
22	Comoros
23	Congo
24	Costa Rica
25	Côte d'Ivoire
26	Democratic People's Republic of Korea
27	Democratic Republic of the Congo
28	Djibouti
29	Dominican Republic
30	Ecuador
31	Egypt
32	El Salvador
33	Equatorial Guinea
34	Eritrea
35	Eswatini
36	Ethiopia
37	Gabon
38	Gambia
39	Georgia
40	Ghana
41	Guatemala
42	Guinea
43	Guinea-Bissau
44	Guyana
45	Haiti
46	Honduras
47	India
48	Indonesia
49	Iran (Islamic Republic of)
50	Iraq
51	Kazakhstan
52	Kenya
53	Kyrgyzstan
54	Lao People's Democratic Republic
55	Liberia
56	Madagascar
57	Malawi
58	Malaysia
59	Mali
60	Mauritania

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61                                 Mexico
62                                Morocco
63                             Mozambique
64                                Myanmar
65                                Namibia
66                                  Nepal
67                              Nicaragua
68                                  Niger
69                                Nigeria
70                                   Oman
71                                Pakistan
72                                 Panama
73                       Papua New Guinea
74                                Paraguay
75                                    Peru
76                             Philippines
77                        Republic of Korea
78                                 Rwanda
79                   Sao Tome and Principe
80                            Saudi Arabia
81                                 Senegal
82                            Sierra Leone
83                         Solomon Islands
84                                 Somalia
85                            South Africa
86                             South Sudan
87                               Sri Lanka
88                                   Sudan
89                                Suriname
90                    Syrian Arab Republic
91                              Tajikistan
92                                Thailand
93                             Timor-Leste
94                                    Togo
95                                  Turkey
96                              Turkmenistan
97                                  Uganda
98                    United Arab Emirates
99              United Republic of Tanzania
100                             Uzbekistan
101                                Vanuatu
102      Venezuela (Bolivarian Republic of)
103                                Viet Nam
104                                   Yemen
105                                  Zambia
106                                Zimbabwe
107                             Afghanistan
108                                 Algeria
109                                  Angola
110                               Argentina
111                                 Armenia
112                              Azerbaijan
113                              Bangladesh
114                                  Belize
115                                   Benin
116                                  Bhutan
117        Bolivia (Plurinational State of)
118                                Botswana
119                                  Brazil
120                            Burkina Faso
121                                 Burundi
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122                              Cabo Verde
123                                Cambodia
124                                Cameroon
125                  Central African Republic
126                                    Chad
127                                   China
128                                Colombia
129                                 Comoros
130                                   Congo
131                              Costa Rica
132                           Côte d'Ivoire
133    Democratic People's Republic of Korea
134         Democratic Republic of the Congo
135                                Djibouti
136                        Dominican Republic
137                                 Ecuador
138                                   Egypt
139                             El Salvador
140                          Equatorial Guinea
141                                 Eritrea
142                                Eswatini
143                                Ethiopia
144                                   Gabon
145                                  Gambia
146                                 Georgia
147                                   Ghana
148                                Guatemala
149                                   Guinea
150                           Guinea-Bissau
151                                  Guyana
152                                   Haiti
153                                Honduras
154                                   India
155                               Indonesia
156                Iran (Islamic Republic of)
157                                    Iraq
158                              Kazakhstan
159                                   Kenya
160                              Kyrgyzstan
161           Lao People's Democratic Republic
162                                 Liberia
163                              Madagascar
164                                  Malawi
165                                Malaysia
166                                    Mali
167                              Mauritania
168                                  Mexico
169                                 Morocco
170                              Mozambique
171                                 Myanmar
172                                 Namibia
173                                   Nepal
174                               Nicaragua
175                                   Niger
176                                 Nigeria
177                                    Oman
178                                Pakistan
179                                  Panama
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182                                    Peru
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183                          Philippines
184                     Republic of Korea
185                               Rwanda
186                 Sao Tome and Principe
187                          Saudi Arabia
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189                          Sierra Leone
190                       Solomon Islands
191                               Somalia
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193                           South Sudan
194                             Sri Lanka
195                                 Sudan
196                              Suriname
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199                              Thailand
200                           Timor-Leste
201                                  Togo
202                                Turkey
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204                                Uganda
205                  United Arab Emirates
206           United Republic of Tanzania
207                           Uzbekistan
208                              Vanuatu
209     Venezuela (Bolivarian Republic of)
210                              Viet Nam
211                                 Yemen
212                                Zambia
213                              Zimbabwe
214                           Afghanistan
215                               Algeria
216                                Angola
217                             Argentina
218                               Armenia
219                            Azerbaijan
220                            Bangladesh
221                                Belize
222                                 Benin
223                                Bhutan
224       Bolivia (Plurinational State of)
225                              Botswana
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227                          Burkina Faso
228                               Burundi
229                            Cabo Verde
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234                                 China
235                              Colombia
236                               Comoros
237                                 Congo
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239                       Côte d'Ivoire
240   Democratic People's Republic of Korea
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242                              Djibouti
243                    Dominican Republic
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254                                Ghana
255                            Guatemala
256                               Guinea
257                        Guinea-Bissau
258                               Guyana
259                                Haiti
260                             Honduras
261                                India
262                            Indonesia
263          Iran (Islamic Republic of)
264                                 Iraq
265                           Kazakhstan
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267                           Kyrgyzstan
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278                              Myanmar
279                              Namibia
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281                            Nicaragua
282                                Niger
283                              Nigeria
284                                 Oman
285                             Pakistan
286                               Panama
287                 Papua New Guinea
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292                               Rwanda
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305                              Tajikistan
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315                                 Vanuatu
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317                                Viet Nam
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319                                  Zambia
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332                                 Botswana
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346                           Côte d'Ivoire
347    Democratic People's Republic of Korea
348         Democratic Republic of the Congo
349                                 Djibouti
350                       Dominican Republic
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353                              El Salvador
354                           Equatorial Guinea
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366                                Haiti
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370          Iran (Islamic Republic of)
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374                           Kyrgyzstan
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376                              Liberia
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378                               Malawi
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381                           Mauritania
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383                              Morocco
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394                     Papua New Guinea
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398                     Republic of Korea
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403                         Sierra Leone
404                       Solomon Islands
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416                               Turkey
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419                United Arab Emirates
420          United Republic of Tanzania
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438        Bolivia (Plurinational State of)
439                              Botswana
440                                Brazil
441                          Burkina Faso
442                               Burundi
443                            Cabo Verde
444                              Cambodia
445                              Cameroon
446               Central African Republic
447                                  Chad
448                                 China
449                              Colombia
450                               Comoros
451                                 Congo
452                            Costa Rica
453                         Côte d'Ivoire
454   Democratic People's Republic of Korea
455        Democratic Republic of the Congo
456                              Djibouti
457                    Dominican Republic
458                               Ecuador
459                                 Egypt
460                           El Salvador
461                     Equatorial Guinea
462                               Eritrea
463                              Eswatini
464                              Ethiopia
465                                 Gabon
466                                Gambia
467                               Georgia
468                                 Ghana
469                             Guatemala
470                                Guinea
471                         Guinea-Bissau
472                                Guyana
473                                 Haiti
474                              Honduras
475                                 India
476                             Indonesia
477             Iran (Islamic Republic of)
478                                  Iraq
479                            Kazakhstan
480                                 Kenya
481                            Kyrgyzstan
482        Lao People's Democratic Republic
483                              Liberia
484                           Madagascar
485                               Malawi
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487                                 Mali
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488                              Mauritania
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490                                 Morocco
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496                                   Niger
497                                 Nigeria
498                                    Oman
499                                Pakistan
500                                  Panama
501                        Papua New Guinea
502                                Paraguay
503                                    Peru
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505                        Republic of Korea
506                                  Rwanda
507                    Sao Tome and Principe
508                            Saudi Arabia
509                                 Senegal
510                            Sierra Leone
511                           Solomon Islands
512                                  Somalia
513                             South Africa
514                              South Sudan
515                                Sri Lanka
516                                    Sudan
517                                 Suriname
518                     Syrian Arab Republic
519                                Tajikistan
520                                  Thailand
521                               Timor-Leste
522                                     Togo
523                                   Turkey
524                               Turkmenistan
525                                   Uganda
526                    United Arab Emirates
527             United Republic of Tanzania
528                               Uzbekistan
529                                  Vanuatu
530       Venezuela (Bolivarian Republic of)
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532                                    Yemen
533                                   Zambia
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535                              Afghanistan
536                                  Algeria
537                                   Angola
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539                                  Armenia
540                               Azerbaijan
541                               Bangladesh
542                                   Belize
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544                                   Bhutan
545          Bolivia (Plurinational State of)
546                                 Botswana
547                                   Brazil
548                              Burkina Faso
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549                              Burundi
550                            Cabo Verde
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555                                 China
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557                               Comoros
558                                 Congo
559                            Costa Rica
560                          Côte d'Ivoire
561    Democratic People's Republic of Korea
562         Democratic Republic of the Congo
563                              Djibouti
564                     Dominican Republic
565                               Ecuador
566                                 Egypt
567                           El Salvador
568                        Equatorial Guinea
569                               Eritrea
570                              Eswatini
571                              Ethiopia
572                                 Gabon
573                                Gambia
574                               Georgia
575                                 Ghana
576                             Guatemala
577                                Guinea
578                           Guinea-Bissau
579                                Guyana
580                                 Haiti
581                              Honduras
582                                 India
583                             Indonesia
584               Iran (Islamic Republic of)
585                                  Iraq
586                            Kazakhstan
587                                 Kenya
588                            Kyrgyzstan
589         Lao People's Democratic Republic
590                               Liberia
591                            Madagascar
592                                Malawi
593                              Malaysia
594                                  Mali
595                            Mauritania
596                                Mexico
597                               Morocco
598                            Mozambique
599                               Myanmar
600                               Namibia
601                                 Nepal
602                             Nicaragua
603                                 Niger
604                               Nigeria
605                                  Oman
606                              Pakistan
607                                Panama
608                      Papua New Guinea
609                              Paraguay
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610                                  Peru
611                           Philippines
612                      Republic of Korea
613                                Rwanda
614                  Sao Tome and Principe
615                          Saudi Arabia
616                               Senegal
617                          Sierra Leone
618                        Solomon Islands
619                               Somalia
620                          South Africa
621                           South Sudan
622                             Sri Lanka
623                                 Sudan
624                              Suriname
625                   Syrian Arab Republic
626                             Tajikistan
627                              Thailand
628                           Timor-Leste
629                                  Togo
630                                Turkey
631                            Turkmenistan
632                                Uganda
633                  United Arab Emirates
634            United Republic of Tanzania
635                            Uzbekistan
636                               Vanuatu
637      Venezuela (Bolivarian Republic of)
638                                Viet Nam
639                                   Yemen
640                                  Zambia
641                                Zimbabwe
642                             Afghanistan
643                                 Algeria
644                                  Angola
645                               Argentina
646                                 Armenia
647                              Azerbaijan
648                              Bangladesh
649                                  Belize
650                                   Benin
651                                  Bhutan
652        Bolivia (Plurinational State of)
653                                Botswana
654                                  Brazil
655                            Burkina Faso
656                                 Burundi
657                              Cabo Verde
658                                Cambodia
659                                Cameroon
660               Central African Republic
661                                    Chad
662                                   China
663                                Colombia
664                                 Comoros
665                                   Congo
666                              Costa Rica
667                          Côte d'Ivoire
668   Democratic People's Republic of Korea
669        Democratic Republic of the Congo
670                                Djibouti
```

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671                      Dominican Republic
672                                 Ecuador
673                                   Egypt
674                             El Salvador
675                       Equatorial Guinea
676                                 Eritrea
677                                Eswatini
678                                Ethiopia
679                                   Gabon
680                                  Gambia
681                                 Georgia
682                                   Ghana
683                                Guatemala
684                                  Guinea
685                           Guinea-Bissau
686                                  Guyana
687                                   Haiti
688                                Honduras
689                                   India
690                               Indonesia
691              Iran (Islamic Republic of)
692                                    Iraq
693                               Kazakhstan
694                                   Kenya
695                               Kyrgyzstan
696          Lao People's Democratic Republic
697                                 Liberia
698                               Madagascar
699                                  Malawi
700                                Malaysia
701                                    Mali
702                               Mauritania
703                                  Mexico
704                                 Morocco
705                              Mozambique
706                                 Myanmar
707                                 Namibia
708                                   Nepal
709                               Nicaragua
710                                   Niger
711                                 Nigeria
712                                    Oman
713                                Pakistan
714                                  Panama
715                        Papua New Guinea
716                                Paraguay
717                                    Peru
718                             Philippines
719                        Republic of Korea
720                                  Rwanda
721                  Sao Tome and Principe
722                           Saudi Arabia
723                                Senegal
724                           Sierra Leone
725                         Solomon Islands
726                                 Somalia
727                            South Africa
728                             South Sudan
729                               Sri Lanka
730                                   Sudan
731                                Suriname
```

```
732                     Syrian Arab Republic
733                                Tajikistan
734                                  Thailand
735                                Timor-Leste
736                                       Togo
737                                     Turkey
738                                 Turkmenistan
739                                     Uganda
740                     United Arab Emirates
741             United Republic of Tanzania
742                                 Uzbekistan
743                                    Vanuatu
744       Venezuela (Bolivarian Republic of)
745                                   Viet Nam
746                                      Yemen
747                                     Zambia
748                                   Zimbabwe
749                                Afghanistan
750                                    Algeria
751                                     Angola
752                                  Argentina
753                                    Armenia
754                                 Azerbaijan
755                                 Bangladesh
756                                     Belize
757                                      Benin
758                                     Bhutan
759         Bolivia (Plurinational State of)
760                                   Botswana
761                                     Brazil
762                               Burkina Faso
763                                    Burundi
764                                 Cabo Verde
765                                   Cambodia
766                                   Cameroon
767                 Central African Republic
768                                       Chad
769                                      China
770                                   Colombia
771                                    Comoros
772                                      Congo
773                                 Costa Rica
774                            Côte d'Ivoire
775    Democratic People's Republic of Korea
776         Democratic Republic of the Congo
777                                   Djibouti
778                       Dominican Republic
779                                    Ecuador
780                                      Egypt
781                                El Salvador
782                          Equatorial Guinea
783                                    Eritrea
784                                   Eswatini
785                                   Ethiopia
786                                      Gabon
787                                     Gambia
788                                    Georgia
789                                      Ghana
790                                  Guatemala
791                                     Guinea
792                               Guinea-Bissau
```

```
793                                  Guyana
794                                   Haiti
795                                Honduras
796                                   India
797                               Indonesia
798              Iran (Islamic Republic of)
799                                    Iraq
800                              Kazakhstan
801                                   Kenya
802                              Kyrgyzstan
803        Lao People's Democratic Republic
804                                 Liberia
805                              Madagascar
806                                  Malawi
807                                Malaysia
808                                    Mali
809                              Mauritania
810                                  Mexico
811                                 Morocco
812                              Mozambique
813                                 Myanmar
814                                 Namibia
815                                   Nepal
816                               Nicaragua
817                                   Niger
818                                 Nigeria
819                                    Oman
820                                Pakistan
821                                  Panama
822                        Papua New Guinea
823                                Paraguay
824                                    Peru
825                             Philippines
826                       Republic of Korea
827                                  Rwanda
828                   Sao Tome and Principe
829                            Saudi Arabia
830                                 Senegal
831                            Sierra Leone
832                         Solomon Islands
833                                 Somalia
834                            South Africa
835                             South Sudan
836                               Sri Lanka
837                                   Sudan
838                                Suriname
839                    Syrian Arab Republic
840                              Tajikistan
841                                Thailand
842                             Timor-Leste
843                                    Togo
844                                  Turkey
845                            Turkmenistan
846                                  Uganda
847                    United Arab Emirates
848             United Republic of Tanzania
849                              Uzbekistan
850                                 Vanuatu
851      Venezuela (Bolivarian Republic of)
852                                Viet Nam
853                                   Yemen
```

In [ ]:

```

```

In [10]:

```
data['Year']
```

```
836    2010
837    2010
838    2010
839    2010
840    2010
841    2010
842    2010
843    2010
844    2010
845    2010
846    2010
847    2010
848    2010
849    2010
850    2010
851    2010
852    2010
853    2010
854    2010
855    2010
```

In [122]:

```
#As we can see here, our dataset starts from 2010 to 2017.
data['Year'].unique()
```

Out[122]:

```
array([2017, 2016, 2015, 2014, 2013, 2012, 2011, 2010], dtype=int64)
```

```
854                                  Zambia
855                                Zimbabwe
Name: Country, dtype: object
```

In [11]:

```
data['No. of cases']
```

Out[11]:

```
0        630308
1             0
2       4615605
3             0
4             0
5             0
6         32924
7             7
8       4111699
9            11
10         6512
11         2989
12       217928
13      7907562
14      2113066
15          423
16       208273
17      7307515
```

In [12]:

```
data['No. of deaths']
```

Out[12]:

```
0         298
1           0
2       13316
3           0
4           0
5           0
6          76
7           0
8        7328
9           0
10          2
11          7
12         30
13      27791
14       5253
15          1
16        345
17      11566
```

In [123]:

```
#According to the recommendation, we are going to replace the missing values by 0
data[['Country', 'Year', 'No. of cases', 'No. of deaths','No. of cases_min','No. of cases
data_a = data.fillna(0)
data_a
```

Out[123]:

	Country	Year	No. of cases	Interval of cases	No. of deaths	Interval of deaths	No. of cases_median	No. of cases_min	No. of cases_max	deaths
0	Afghanistan	2017	630308	495000-801000	298	110-510	630308	495000.0	801000.0	
1	Algeria	2017	0	0	0	0	0	0.0	0.0	
2	Angola	2017	4615605	3106000-6661000	13316	9970-16600	4615605	3106000.0	6661000.0	
3	Argentina	2017	0	0	0	0	0	0.0	0.0	
4	Armenia	2017	0	0	0	0	0	0.0	0.0	
5	Azerbaijan	2017	0	0	0	0	0	0.0	0.0	
6	Bangladesh	2017	32924	30000-36000	76	3-130	32924	30000.0	36000.0	

In [124]:

```
#The key factor of our work is base on the column year. We will do some manipulations on
```

YEAR

In [14]:

```
len(data['Year'])
```

Out[14]:

```
856
```

In [15]:

```
data['Year'].unique()       #In our dataset, the datas start from 2010 to 2017
```

Out[15]:

```
array([2017, 2016, 2015, 2014, 2013, 2012, 2011, 2010], dtype=int64)
```

In [16]:

```
year_columns = pd.get_dummies(data['Year'])
year_columns
```

Out[16]:

	2010	2011	2012	2013	2014	2015	2016	2017
0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	1
3	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	1
5	0	0	0	0	0	0	0	1
6	0	0	0	0	0	0	0	1
7	0	0	0	0	0	0	0	1
8	0	0	0	0	0	0	0	1
9	0	0	0	0	0	0	0	1
10	0	0	0	0	0	0	0	1

In [45]:

```
#2017 starts from 0 to 106
#2016 starts from 107 to 213
#2015 starts from 214 to 320
#2014 starts from 321 to 427
#2013 starts from 428 to 534
#2012 starts from 535 to 641
#2011 starts from 642 to 748
#2010 starts from 749 to 855
```

In [17]:

```
#After the repartition of years, we will analyse year by year.
```

2017

In [19]:

```
study = data_a[['Country', 'Year', 'No. of cases', 'No. of deaths','No. of cases_min','No
study_2017 = study.loc[0:106,:]
study_2017
```

Out[19]:

	Country	Year	No. of cases	No. of deaths	No. of cases_min	No. of cases_max	No. of deaths_min	No. of deaths_max	WHO Region
0	Afghanistan	2017	630308	298	495000.0	801000.0	110.0	510.0	Eastern Mediterranean
1	Algeria	2017	0	0	0.0	0.0	0.0	0.0	Africa
2	Angola	2017	4615605	13316	3106000.0	6661000.0	9970.0	16600.0	Africa
3	Argentina	2017	0	0	0.0	0.0	0.0	0.0	Americas
4	Armenia	2017	0	0	0.0	0.0	0.0	0.0	Europe
5	Azerbaijan	2017	0	0	0.0	0.0	0.0	0.0	Europe
6	Bangladesh	2017	32924	76	30000.0	36000.0	3.0	130.0	South-East Asia
7	Belize	2017	7	0	0.0	0.0	0.0	0.0	Americas

In [20]:

```
study_2017['No. of cases'].sum()   #The number of cases in 2017 is 219 001 657.
```

Out[20]:

```
219001657
```

In [21]:

```
study_2017['No. of deaths'].sum()        #The number of deaths in 2017 is 435 102.
```

Out[21]:

```
435102
```

In [ ]:

In [ ]:

2016

In [22]:

```
study_2016 = study.loc[107:213,:]
study_2016
```

Out[22]:

	Country	Year	No. of cases	No. of deaths	No. of cases_min	No. of cases_max	No. of deaths_min	No. of deaths_max	WHO Region
107	Afghanistan	2016	614491	294	439000.0	838000.0	100.0	530.0	Eastern Mediterranean
108	Algeria	2016	0	0	0.0	0.0	0.0	0.0	Africa
109	Angola	2016	4485050	13197	3010000.0	6468000.0	9840.0	16600.0	Africa
110	Argentina	2016	0	0	0.0	0.0	0.0	0.0	Americas
111	Armenia	2016	0	0	0.0	0.0	0.0	0.0	Europe
112	Azerbaijan	2016	0	0	0.0	0.0	0.0	0.0	Europe
113	Bangladesh	2016	31169	73	28000.0	34000.0	3.0	120.0	South-East Asia
114	Belize	2016	4	0	0.0	0.0	0.0	0.0	Americas

In [23]:

```
study_2016['No. of cases'].sum()   #The number of cases in 2016 is 216 654 765.
```

Out[23]:

```
216654765
```

In [26]:

```
study_2016['No. of deaths'].sum()  #The number of deaths in 2016 is 450 759.
```

Out[26]:

```
450759
```

In [ ]:

```

```

2015

In [27]:

```
study_2015 = study.loc[214:320,:]
study_2015
```

Out[27]:

	Country	Year	No. of cases	No. of deaths	No. of cases_min	No. of cases_max	No. of deaths_min	No. of deaths_max	WHO Region
214	Afghanistan	2015	369809	175	247000.0	524000.0	60.0	320.0	Eastern Mediterranean
215	Algeria	2015	0	0	0.0	0.0	0.0	0.0	Africa
216	Angola	2015	4303582	13046	2882000.0	6212000.0	9640.0	16400.0	Africa
217	Argentina	2015	0	0	0.0	0.0	0.0	0.0	Americas
218	Armenia	2015	0	0	0.0	0.0	0.0	0.0	Europe
219	Azerbaijan	2015	0	0	0.0	0.0	0.0	0.0	Europe
220	Bangladesh	2015	44948	107	41000.0	49000.0	4.0	180.0	South-East Asia
221	Belize	2015	9	0	0.0	0.0	0.0	0.0	Americas

In [28]:

```
study_2015['No. of cases'].sum()          #The number of cases in 2015 is 214 170 951.
```

Out[28]:

```
214170951
```

In [29]:

```
study_2015['No. of deaths'].sum()                    #The number of deaths in 2017 is 468
```

Out[29]:

```
468768
```

In [ ]:

In [ ]:

2014

In [30]:

```
study_2014 = study.loc[321:427,:]
study_2014
```

Out[30]:

	Country	Year	No. of cases	No. of deaths	No. of cases_min	No. of cases_max	No. of deaths_min	No. of deaths_max	WHO Region
321	Afghanistan	2014	284198	136	189000.0	409000.0	50.0	260.0	Eastern Mediterranean
322	Algeria	2014	0	0	0.0	0.0	0.0	0.0	Africa
323	Angola	2014	3768087	12763	2485000.0	5526000.0	9410.0	16100.0	Africa
324	Argentina	2014	0	0	0.0	0.0	0.0	0.0	Americas
325	Armenia	2014	0	0	0.0	0.0	0.0	0.0	Europe
326	Azerbaijan	2014	0	0	0.0	0.0	0.0	0.0	Europe
327	Bangladesh	2014	53948	132	49000.0	59000.0	5.0	210.0	South-East Asia
328	Belize	2014	19	0	0.0	0.0	0.0	0.0	Americas

In [31]:

```
study_2014['No. of cases'].sum()          #The number of cases in 2014 is 217 072 770.
```

Out[31]:

```
217072770
```

In [32]:

```
study_2014['No. of deaths'].sum()                    #The number of deaths in 2017 is 483
```

Out[32]:

```
483273
```

In [ ]:

2013

In [33]:

```
study_2013 = study.loc[428:534,:]
study_2013
```

Out[33]:

	Country	Year	No. of cases	No. of deaths	No. of cases_min	No. of cases_max	No. of deaths_min	No. of deaths_max	WHO Region
428	Afghanistan	2013	213914	99	118000.0	352000.0	30.0	200.0	Eastern Mediterranean
429	Algeria	2013	8	0	0.0	0.0	0.0	0.0	Africa
430	Angola	2013	3384997	12399	2191000.0	4970000.0	9070.0	15700.0	Africa
431	Argentina	2013	0	0	0.0	0.0	0.0	0.0	Americas
432	Armenia	2013	0	0	0.0	0.0	0.0	0.0	Europe
433	Azerbaijan	2013	0	0	0.0	0.0	0.0	0.0	Europe
434	Bangladesh	2013	25019	60	22000.0	28000.0	2.0	100.0	South-East Asia
435	Belize	2013	20	0	0.0	0.0	0.0	0.0	Americas

In [34]:

```
study_2013['No. of cases'].sum()          #The number of cases in 2013 is 220 965 004.
```

Out[34]:

```
220965004
```

In [35]:

```
study_2013['No. of deaths'].sum()                    #The number of deaths in 2013 is 500
```

Out[35]:

```
500341
```

In [ ]:

```

```

2012

In [36]:

```
study_2012 = study.loc[535:641,:]
study_2012
```

Out[36]:

	Country	Year	No. of cases	No. of deaths	No. of cases_min	No. of cases_max	No. of deaths_min	No. of deaths_max	WHO Region
535	Afghanistan	2012	278223	117	134000.0	472000.0	30.0	260.0	Eastern Mediterranean
536	Algeria	2012	55	0	0.0	0.0	0.0	0.0	Africa
537	Angola	2012	3111760	12437	1964000.0	4531000.0	9050.0	15800.0	Africa
538	Argentina	2012	0	0	0.0	0.0	0.0	0.0	Americas
539	Armenia	2012	0	0	0.0	0.0	0.0	0.0	Europe
540	Azerbaijan	2012	3	0	0.0	0.0	0.0	0.0	Europe
541	Bangladesh	2012	35333	87	31000.0	40000.0	3.0	140.0	South-East Asia
542	Belize	2012	33	0	0.0	0.0	0.0	0.0	Americas

In [37]:

```
study_2012['No. of cases'].sum()          #The number of cases in 2012 is 226 444 288.
```

Out[37]:

```
226444288
```

In [38]:

```
study_2012['No. of deaths'].sum()                    #The number of deaths in 2012 is 528
```

Out[38]:

```
528784
```

In [ ]:

```

```

2011

In [39]:

```
study_2011 = study.loc[642:748,:]
study_2011
```

Out[39]:

	Country	Year	No. of cases	No. of deaths	No. of cases_min	No. of cases_max	No. of deaths_min	No. of deaths_max	WHO Region
642	Afghanistan	2011	454823	242	210000.0	746000.0	70.0	490.0	Eastern Mediterranean
643	Algeria	2011	1	0	0.0	0.0	0.0	0.0	Africa
644	Angola	2011	3040461	12763	1910000.0	4456000.0	9270.0	16300.0	Africa
645	Argentina	2011	0	0	0.0	0.0	0.0	0.0	Americas
646	Armenia	2011	0	0	0.0	0.0	0.0	0.0	Europe
647	Azerbaijan	2011	4	0	0.0	0.0	0.0	0.0	Europe
648	Bangladesh	2011	102302	250	88000.0	118000.0	10.0	420.0	South-East Asia
649	Belize	2011	72	0	0.0	0.0	0.0	0.0	Americas

In [40]:

```
study_2011['No. of cases'].sum()          #The number of cases in 2015 is 229 088 588.
```

Out[40]:

```
229088588
```

In [41]:

```
study_2011['No. of deaths'].sum()                    #The number of deaths in 2011 is 560
```

Out[41]:

```
560976
```

In [ ]:

In [ ]:

2010

In [42]:

```
study_2010 = study.loc[749:855,:]
study_2010
```

Out[42]:

	Country	Year	No. of cases	No. of deaths	No. of cases_min	No. of cases_max	No. of deaths_min	No. of deaths_max
749	Afghanistan	2010	353343	200	181000.0	581000.0	60.0	410.0
750	Algeria	2010	1	1	0.0	0.0	0.0	0.0
751	Angola	2010	3125901	13351	2009000.0	4595000.0	9730.0	17000.0
752	Argentina	2010	14	0	0.0	0.0	0.0	0.0
753	Armenia	2010	0	0	0.0	0.0	0.0	0.0
754	Azerbaijan	2010	50	0	0.0	0.0	0.0	0.0
755	Bangladesh	2010	113895	274	97000.0	133000.0	10.0	470.0
756	Belize	2010	150	0	0.0	0.0	0.0	0.0
757	Benin	2010	3713395	8273	2495000.0	5565000.0	6520.0	10000.0
758	Bhutan	2010	526	2	0.0	0.0	0.0	0.0
759	Bolivia (Plurinational State of)	2010	19614	11	15000.0	25000.0	3.0	20.0
760	Botswana	2010	3072	7	1300.0	8600.0	0.0	30.0
761	Brazil	2010	384655	76	346000.0	417000.0	0.0	0.0
762	Burkina Faso	2010	9221846	43695	6578000.0	12230000.0	37300.0	50100.0
763	Burundi	2010	1608931	4801	955000.0	2677000.0	3840.0	5760.0
764	Cabo Verde	2010	47	1	0.0	0.0	0.0	0.0
765	Cambodia	2010	361377	659	304000.0	430000.0	40.0	1170.0
766	Cameroon	2010	5361329	12340	3578000.0	7972000.0	9450.0	15200.0
767	Central African Republic	2010	2140887	8165	1060000.0	3519000.0	6590.0	9730.0
768	Chad	2010	3594883	13695	2594000.0	4735000.0	10300.0	17000.0
769	China	2010	4990	19	0.0	0.0	0.0	0.0
770	Colombia	2010	163874	42	125000.0	204000.0	0.0	0.0
771	Comoros	2010	36538	90	0.0	0.0	3.0	140.0
772	Congo	2010	835820	1962	468000.0	1370000.0	1710.0	2210.0
773	Costa Rica	2010	110	0	0.0	0.0	0.0	0.0
774	Côte d'Ivoire	2010	7939844	16925	5391000.0	11380000.0	13800.0	20000.0
775	Democratic People's Republic of Korea	2010	13520	0	0.0	0.0	0.0	0.0
776	Democratic Republic of the Congo	2010	23691683	62375	16060000.0	35620000.0	48100.0	76600.0
777	Djibouti	2010	1010	0	0.0	0.0	0.0	0.0

	Country	Year	No. of cases	No. of deaths	No. of cases_min	No. of cases_max	No. of deaths_min	No. of deaths_max
778	Dominican Republic	2010	4247	10	3600.0	5000.0	0.0	20.0
779	Ecuador	2010	1888	0	0.0	0.0	0.0	0.0
780	Egypt	2010	0	2	0.0	0.0	0.0	0.0
781	El Salvador	2010	19	0	0.0	0.0	0.0	0.0
782	Equatorial Guinea	2010	381639	1047	239000.0	558000.0	840.0	1260.0
783	Eritrea	2010	83471	161	53000.0	119000.0	9.0	330.0
784	Eswatini	2010	268	0	0.0	0.0	0.0	1.0
785	Ethiopia	2010	7701107	14514	478000.0	27080000.0	60.0	64700.0
786	Gabon	2010	285725	413	130000.0	549000.0	360.0	460.0
787	Gambia	2010	465479	619	367000.0	580000.0	520.0	720.0
788	Georgia	2010	0	0	0.0	0.0	0.0	0.0
789	Ghana	2010	9171294	15241	6265000.0	13160000.0	13200.0	17300.0
790	Guatemala	2010	9545	3	7900.0	12000.0	1.0	7.0
791	Guinea	2010	4348149	12896	3111000.0	5940000.0	10200.0	15600.0
792	Guinea-Bissau	2010	122027	664	67000.0	203000.0	550.0	770.0
793	Guyana	2010	32656	57	26000.0	41000.0	4.0	100.0
794	Haiti	2010	82766	211	48000.0	131000.0	5.0	480.0
795	Honduras	2010	13106	7	10000.0	16000.0	2.0	10.0
796	India	2010	20490000	30930	15080000.0	28300000.0	2770.0	58600.0
797	Indonesia	2010	2730079	4364	2199000.0	3531000.0	380.0	8290.0
798	Iran (Islamic Republic of)	2010	1847	0	0.0	0.0	0.0	0.0
799	Iraq	2010	0	0	0.0	0.0	0.0	0.0
800	Kazakhstan	2010	0	0	0.0	0.0	0.0	0.0
801	Kenya	2010	2845913	11375	1647000.0	4630000.0	10000.0	12700.0
802	Kyrgyzstan	2010	3	0	0.0	0.0	0.0	0.0
803	Lao People's Democratic Republic	2010	40528	101	30000.0	54000.0	3.0	190.0
804	Liberia	2010	1295630	2764	838000.0	2051000.0	2280.0	3250.0
805	Madagascar	2010	937413	2399	559000.0	1501000.0	70.0	5360.0
806	Malawi	2010	4602005	9506	3214000.0	6681000.0	7800.0	11200.0
807	Malaysia	2010	5194	13	0.0	0.0	0.0	0.0
808	Mali	2010	5772983	17725	4132000.0	7960000.0	13900.0	21600.0
809	Mauritania	2010	128567	1226	21000.0	287000.0	1040.0	1410.0

	Country	Year	No. of cases	No. of deaths	No. of cases_min	No. of cases_max	No. of deaths_min	No. of deaths_max
810	Mexico	2010	1226	0	0.0	0.0	0.0	0.0
811	Morocco	2010	3	2	0.0	0.0	0.0	0.0
812	Mozambique	2010	8455521	17542	6102000.0	11640000.0	14200.0	20900.0
813	Myanmar	2010	2019172	3885	1393000.0	3044000.0	240.0	8270.0
814	Namibia	2010	2601	6	800.0	6200.0	0.0	20.0
815	Nepal	2010	30690	27	15000.0	63000.0	4.0	70.0
816	Nicaragua	2010	866	0	730.0	1000.0	0.0	1.0
817	Niger	2010	7007707	21750	3855000.0	10710000.0	16400.0	27200.0
818	Nigeria	2010	60749349	146734	43800000.0	83240000.0	115000.0	179000.0
819	Oman	2010	7	0	0.0	0.0	0.0	0.0
820	Pakistan	2010	1445704	1617	660000.0	2959000.0	190.0	4250.0
821	Panama	2010	444	1	430.0	470.0	0.0	0.0
822	Papua New Guinea	2010	1240109	2634	439000.0	2154000.0	100.0	6250.0
823	Paraguay	2010	18	0	0.0	0.0	0.0	0.0
824	Peru	2010	37121	0	33000.0	42000.0	0.0	0.0
825	Philippines	2010	54209	114	39000.0	71000.0	5.0	220.0
826	Republic of Korea	2010	1267	1	0.0	0.0	0.0	0.0
827	Rwanda	2010	1260186	3253	848000.0	1729000.0	2820.0	3690.0
828	Sao Tome and Principe	2010	2740	14	0.0	0.0	0.0	0.0
829	Saudi Arabia	2010	29	0	0.0	0.0	0.0	0.0
830	Senegal	2010	792643	4284	563000.0	1046000.0	3710.0	4860.0
831	Sierra Leone	2010	3031470	23575	1954000.0	4234000.0	20400.0	26800.0
832	Solomon Islands	2010	91425	163	65000.0	132000.0	10.0	330.0
833	Somalia	2010	356323	912	214000.0	527000.0	20.0	1990.0
834	South Africa	2010	8060	83	0.0	0.0	0.0	0.0
835	South Sudan	2010	1940101	5286	1283000.0	2836000.0	4470.0	6110.0
836	Sri Lanka	2010	684	0	0.0	0.0	0.0	0.0
837	Sudan	2010	961960	2462	606000.0	1453000.0	70.0	5520.0
838	Suriname	2010	1712	1	0.0	0.0	0.0	0.0
839	Syrian Arab Republic	2010	0	0	0.0	0.0	0.0	0.0

	Country	Year	No. of cases	No. of deaths	No. of cases_min	No. of cases_max	No. of deaths_min	No. of deaths_max
840	Tajikistan	2010	111	0	0.0	0.0	0.0	0.0
841	Thailand	2010	32480	80	0.0	0.0	0.0	0.0
842	Timor-Leste	2010	103604	200	74000.0	137000.0	10.0	390.0
843	Togo	2010	2366948	5064	1580000.0	3356000.0	4100.0	6030.0
844	Turkey	2010	0	0	0.0	0.0	0.0	0.0
845	Turkmenistan	2010	0	0	0.0	0.0	0.0	0.0
846	Uganda	2010	11503116	21558	7618000.0	17700000.0	17200.0	26000.0
847	United Arab Emirates	2010	0	0	0.0	0.0	0.0	0.0
848	United Republic of Tanzania	2010	6545932	20281	3955000.0	9995000.0	17600.0	23000.0
849	Uzbekistan	2010	3	0	0.0	0.0	0.0	0.0
850	Vanuatu	2010	15695	20	12000.0	20000.0	2.0	40.0
851	Venezuela (Bolivarian Republic of)	2010	57257	52	47000.0	74000.0	9.0	90.0
852	Viet Nam	2010	23062	45	21000.0	26000.0	2.0	80.0
853	Yemen	2010	1134927	2874	611000.0	2686000.0	90.0	8490.0
854	Zambia	2010	2169307	6544	1449000.0	3095000.0	5580.0	7510.0
855	Zimbabwe	2010	1095083	2803	606000.0	1717000.0	80.0	6190.0

In [43]:
```
study_2010['No. of cases'].sum()          #The number of cases in 2010 is 238 785 725.
```

Out[43]:

238785725

In [44]:
```
study_2010['No. of deaths'].sum()          #The number of deaths in 2010 is 607
```

Out[44]:

607079

In [ ]:
```

```

In [ ]:
```

```

IV- DATA VISUALIZATION

In [68]:
```
sns.set()
```

In [81]:

```
#We are going to create a table which will contain all the values that we got from our an
#The number of cases in 2017 is 219 001 657
#The number of deaths in 2017 is 435102

#The number of cases in 2016 is 216654765.
#The number of deaths in 2016 is 450759.

#The number of cases in 2015 is 214170951.
#The number of deaths in 2017 is 468768.

#The number of cases in 2014 is 217072770.
#The number of deaths in 2017 is 483273.

#The number of cases in 2013 is 220965004.
#The number of deaths in 2013 is 500341.

#The number of cases in 2012 is 226444288.
#The number of deaths in 2012 is 528 784.

#The number of cases in 2011 is 229088588.
#The number of deaths in 2011 is 560976.

#The number of cases in 2010 is 238785725.
#The number of deaths in 2010 is 607079.
```

In [103]:

```
evolution = [{'Year':'2017', 'No. of cases': 219001657, 'No. of deaths': 435102},
             {'Year':'2016', 'No. of cases': 216654765, 'No. of deaths': 450759},
             {'Year':'2015', 'No. of cases': 214170951, 'No. of deaths': 468768},
             {'Year':'2014', 'No. of cases': 217072770, 'No. of deaths': 483273},
             {'Year':'2013', 'No. of cases': 220965004, 'No. of deaths': 500341},
             {'Year':'2012', 'No. of cases': 226444288, 'No. of deaths': 528784},
             {'Year':'2011', 'No. of cases': 229088588, 'No. of deaths': 560976},
             {'Year':'2010', 'No. of cases': 238785725, 'No. of deaths': 607079}]
malaria_evolution = pd.DataFrame(evolution)
malaria_evolution_a = malaria_evolution.sort_values('Year')
malaria_evolution_a
```

Out[103]:

	Year	No. of cases	No. of deaths
7	2010	238785725	607079
6	2011	229088588	560976
5	2012	226444288	528784
4	2013	220965004	500341
3	2014	217072770	483273
2	2015	214170951	468768
1	2016	216654765	450759
0	2017	219001657	435102

In [ ]:

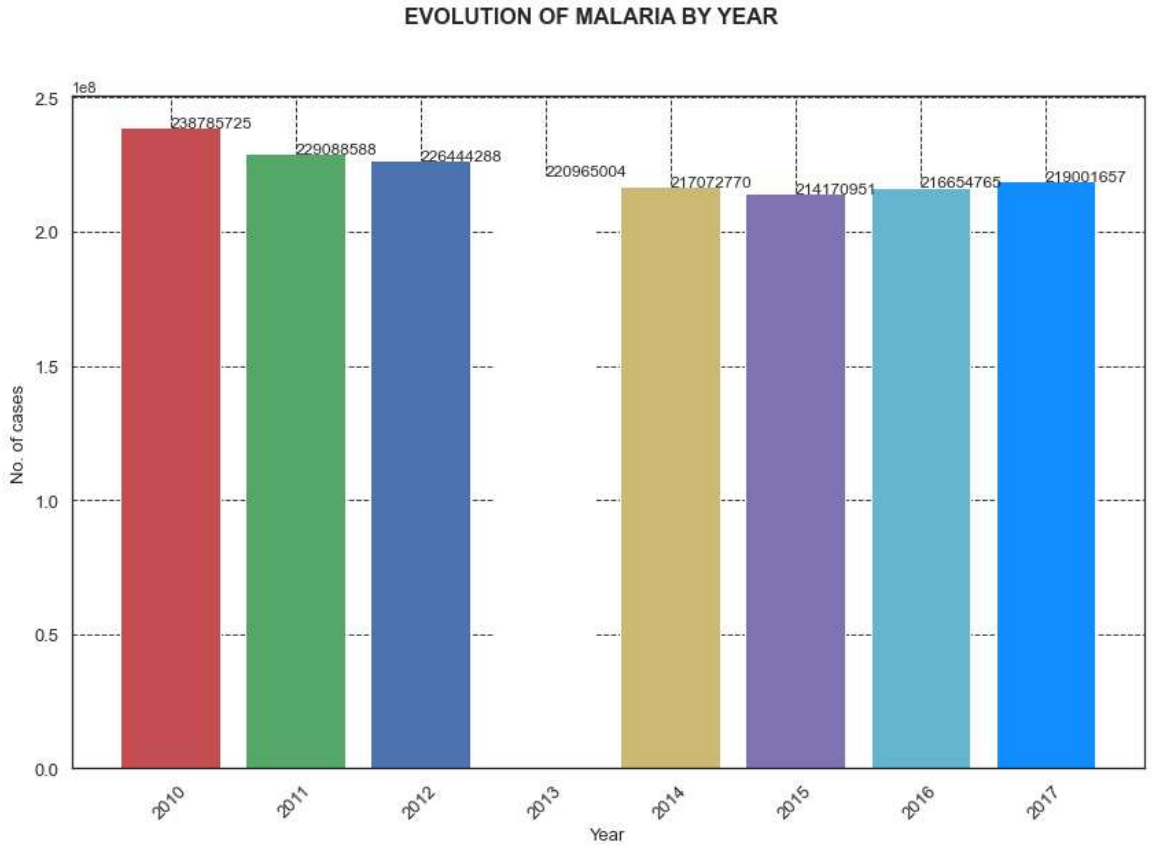
```
```

In [117]:

```
plt.figure(figsize = (14, 9))
ax1 = plt.subplot(111)
color = ['r', 'g', 'b', 'w', 'y', 'm', 'c', '#118DFF']
ax1.bar(malaria_evolution_a['Year'], malaria_evolution_a['No. of cases'])
plt.bar(x = malaria_evolution_a['Year'],
        height = malaria_evolution_a['No. of cases'],
        color = color)
plt.xticks(rotation = 45, fontsize = 13)
plt.yticks(fontsize = 13)
plt.ylabel('No. of cases', fontsize = 13)
plt.xlabel('Year', fontsize = 13)
plt.suptitle('EVOLUTION OF MALARIA BY YEAR', fontsize = 16, fontweight = 'bold')
for pX, pY in enumerate(malaria_evolution_a['No. of cases']):
    plt.annotate(pY, xy=(pX,pY))
plt.grid(linestyle = '--', linewidth = 1, color = '#404040')

plt.savefig('Evolution of malaria from 2010 to 2017')

plt.show()
```



In [ ]:

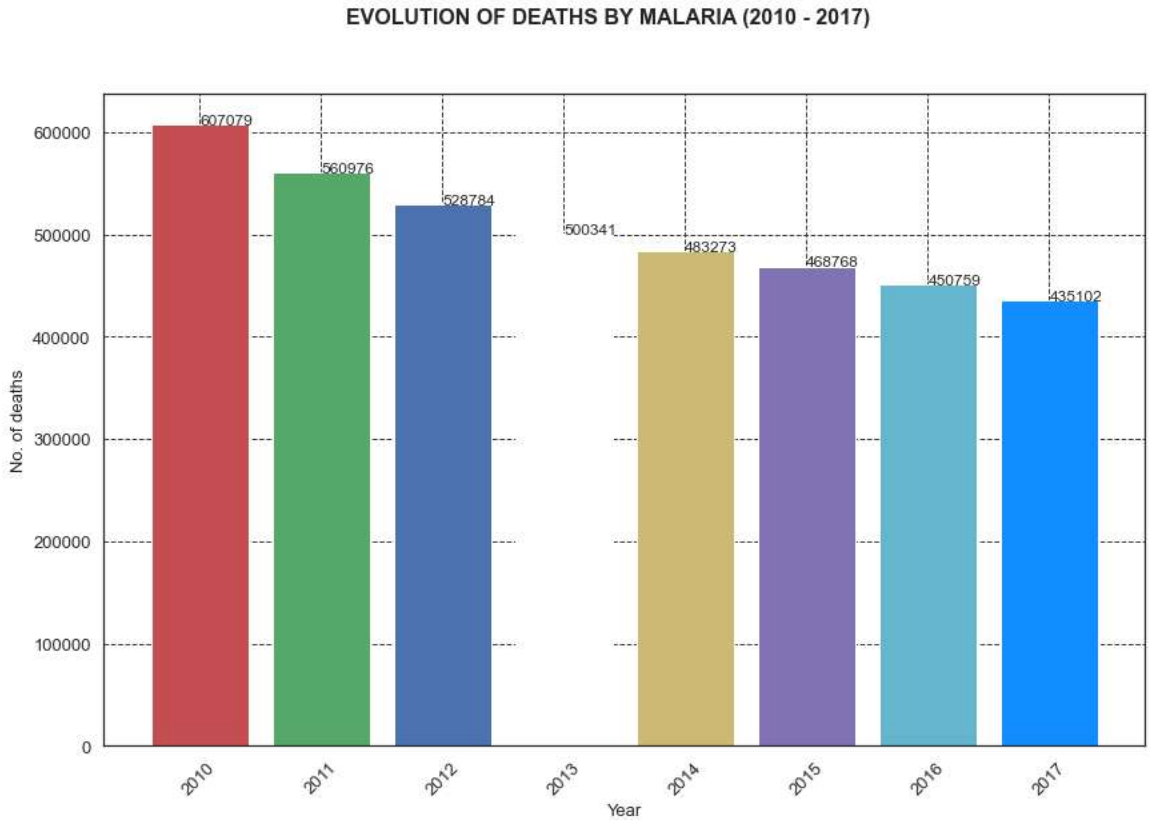
```
```

In [116]:

```
plt.figure(figsize = (14, 9))
ax1 = plt.subplot(111)
color = ['r', 'g', 'b', 'w', 'y', 'm', 'c', '#118DFF']
ax1.bar(malaria_evolution_a['Year'], malaria_evolution_a['No. of deaths'])
plt.bar(x = malaria_evolution_a['Year'],
        height = malaria_evolution_a['No. of deaths'],
        color = color)
plt.xticks(rotation = 45, fontsize = 13)
plt.yticks(fontsize = 13)
plt.ylabel('No. of deaths', fontsize = 13)
plt.xlabel('Year', fontsize = 13)
plt.suptitle('EVOLUTION OF DEATHS BY MALARIA (2010 - 2017)', fontsize = 16, fontweight =
for pX, pY in enumerate(malaria_evolution_a['No. of deaths']):
    plt.annotate(pY, xy=(pX,pY))
plt.grid(linestyle = '--', linewidth = 1, color = '#404040')

plt.savefig('Evolution of deaths from 2010 to 2017')

plt.show()
```



In [114]:

```
#As we can see here, the numbers of deaths decreases from 2010 where the value was 607 07
#We can explain this one by the fact that many campagnes have been done by the WHO and ma
```

In [ ]: