

In [1]: `import pandas as pd`

*#load the file*

```
df = pd.read_csv('HIV_Epidemiology_Children_Adolescents_2024 - Data.csv')  
df
```

Out[1]:

	ISO3	Type	Country/Region	UNICEF Region	Indicator	Data source	Year	Sex	Age	Value	Lower	Upper
0	AFG	Country	Afghanistan	South Asia	Estimated incidence rate (new HIV infection pe...	UNAIDS 2024 estimates	2000	Both	Age 0-14	<0.01	<0.01	0.01
1	AFG	Country	Afghanistan	South Asia	Estimated incidence rate (new HIV infection pe...	UNAIDS 2024 estimates	2000	Both	Age 15-19	<0.01	<0.01	0.02
2	AFG	Country	Afghanistan	South Asia	Estimated incidence rate (new HIV infection pe...	UNAIDS 2024 estimates	2000	Female	Age 0-14	<0.01	<0.01	0.01
3	AFG	Country	Afghanistan	South Asia	Estimated incidence rate (new HIV infection pe...	UNAIDS 2024 estimates	2000	Female	Age 15-19	<0.01	<0.01	0.01
4	AFG	Country	Afghanistan	South Asia	Estimated incidence rate (new HIV infection pe...	UNAIDS 2024 estimates	2000	Male	Age 0-14	<0.01	<0.01	0.01
...	...	...	...	...	...	...	...	...	...	...	...	...
220863	regionWCA	Region	UNICEF Reporting - West and Central Africa	NaN	Estimated rate of annual	UNAIDS 2024 estimates	2023	Female	Age 10-19	5.18	3.82	6.57

	ISO3	Type	Country/Region	UNICEF Region	Indicator	Data source	Year	Sex	Age	Value	Lower	Upper
					AIDS-related deaths (...)							
220864	regionWCA	Region	UNICEF Reporting - West and Central Africa	NaN	Estimated rate of annual AIDS-related deaths (...)	UNAIDS 2024 estimates	2023	Female	Age 15-19	5.31	3.87	7.28
220865	regionWCA	Region	UNICEF Reporting - West and Central Africa	NaN	Estimated rate of annual AIDS-related deaths (...)	UNAIDS 2024 estimates	2023	Male	Age 0-14	12.08	8.89	15.82
220866	regionWCA	Region	UNICEF Reporting - West and Central Africa	NaN	Estimated rate of annual AIDS-related deaths (...)	UNAIDS 2024 estimates	2023	Male	Age 10-19	5.41	4.24	6.68
220867	regionWCA	Region	UNICEF Reporting - West and Central Africa	NaN	Estimated rate of annual AIDS-related deaths (...)	UNAIDS 2024 estimates	2023	Male	Age 15-19	5.78	4.32	7.59

220868 rows × 12 columns

```
In [2]: #filter by selecting the columns you need

fil_col = ['Country/Region', 'Year', 'Value']
new_df = df[fil_col]
```

```
new_df
```

Out[2]:

	Country/Region	Year	Value
0	Afghanistan	2000	<0.01
1	Afghanistan	2000	<0.01
2	Afghanistan	2000	<0.01
3	Afghanistan	2000	<0.01
4	Afghanistan	2000	<0.01
...	...	...	...
220863	UNICEF Reporting - West and Central Africa	2023	5.18
220864	UNICEF Reporting - West and Central Africa	2023	5.31
220865	UNICEF Reporting - West and Central Africa	2023	12.08
220866	UNICEF Reporting - West and Central Africa	2023	5.41
220867	UNICEF Reporting - West and Central Africa	2023	5.78

220868 rows × 3 columns

```
In [3]: #rename the column since there would only be countries in the new dataframe
new_df = new_df.rename(columns={"Country/Region": "Country"})
```

```
In [4]: #check for correct ASEAN countries string values
new_df['Country'].unique()
```

```
Out[4]: array(['Afghanistan', 'Angola', 'Albania', 'Argentina', 'Armenia',
'Australia', 'Azerbaijan', 'Burundi', 'Benin', 'Burkina Faso',
'Bangladesh', 'Bulgaria', 'Bahamas', 'Bosnia and Herzegovina',
'Belarus', 'Belize', 'Bolivia (Plurinational State of)',
'Barbados', 'Bhutan', 'Botswana', 'Canada', 'Switzerland', 'Chile',
"Côte d'Ivoire", 'Democratic Republic of the Congo', 'Congo',
'Colombia', 'Comoros', 'Cabo Verde', 'Costa Rica', 'Cuba',
'Czechia', 'Djibouti', 'Dominican Republic', 'Algeria', 'Ecuador',
'Egypt', 'Eritrea', 'Spain', 'Estonia', 'Ethiopia', 'Fiji',
'France', 'Gabon', 'Georgia', 'Ghana', 'Guinea', 'Gambia',
'Guinea-Bissau', 'Greece', 'Guatemala', 'Guyana', 'Honduras',
'Haiti', 'Indonesia', 'India', 'Ireland',
'Iran (Islamic Republic of)', 'Iraq', 'Iceland', 'Israel', 'Italy',
'Jamaica', 'Jordan', 'Kazakhstan', 'Kenya', 'Kyrgyzstan',
'Cambodia', 'Saint Kitts and Nevis', 'Kuwait',
'Lao People's Democratic Republic', 'Lebanon', 'Liberia', 'Libya',
'Saint Lucia', 'Sri Lanka', 'Lesotho', 'Lithuania', 'Luxembourg',
'Latvia', 'Morocco', 'Republic of Moldova', 'Madagascar', 'Mexico',
'North Macedonia', 'Mali', 'Malta', 'Myanmar', 'Montenegro',
'Mongolia', 'Mozambique', 'Mauritania', 'Mauritius', 'Malawi',
'Malaysia', 'Namibia', 'Niger', 'Nigeria', 'Nicaragua',
'Netherlands', 'Nepal', 'New Zealand', 'Oman', 'Pakistan',
'Panama', 'Peru', 'Philippines', 'Papua New Guinea', 'Portugal',
'Paraguay', 'Qatar', 'Romania', 'Rwanda', 'Saudi Arabia', 'Sudan',
'Senegal', 'Singapore', 'Sierra Leone', 'El Salvador', 'Somalia',
'Serbia', 'South Sudan', 'Suriname', 'Slovakia', 'Slovenia',
'Eswatini', 'Syrian Arab Republic', 'Chad', 'Togo', 'Thailand',
'Tajikistan', 'Timor-Leste', 'Tunisia',
'United Republic of Tanzania', 'Uganda', 'Ukraine',
'African Union', 'Sub-Saharan Africa', 'Uruguay', 'United States',
'Uzbekistan', 'Venezuela (Bolivarian Republic of)', 'Viet Nam',
'Global', 'Yemen', 'South Africa', 'Zambia', 'Zimbabwe',
'UNICEF Reporting - East Asia and Pacific',
'UNICEF Reporting - Eastern Europe and Central Asia',
'UNICEF Reporting - Eastern and Southern Africa',
'UNICEF Reporting - Latin America and Caribbean',
'UNICEF Reporting - Middle East and North Africa',
'UNICEF Reporting - South Asia',
'UNICEF Reporting - Sub-Saharan Africa',
'UNICEF Reporting - West and Central Africa'], dtype=object)
```

In [5]: *#filter by ASEAN countries*

```
fil_cou = ['Brunei',
            'Cambodia',
            'Indonesia',
            "Lao People's Democratic Republic",
            'Malaysia', 'Myanmar', 'Philippines',
            'Singapore',
            'Thailand',
            'Vietnam']

new_df = new_df[new_df['Country'].isin(fil_cou)]

new_df
```

Out[5]:

	Country	Year	Value
<b>77534</b>	Indonesia	2000	0.01
<b>77535</b>	Indonesia	2000	0.12
<b>77536</b>	Indonesia	2000	0.01
<b>77537</b>	Indonesia	2000	0.05
<b>77538</b>	Indonesia	2000	0.01
...	...	...	...
<b>172790</b>	Thailand	2023	1.11
<b>172791</b>	Thailand	2023	1.41
<b>172792</b>	Thailand	2023	1.01
<b>172793</b>	Thailand	2023	1.72
<b>172794</b>	Thailand	2023	1.46

14325 rows × 3 columns

```
In [6]: new_df['Country'] = new_df['Country'].replace({"Lao People's Democratic Republic" : 'Laos'})  
new_df['Country'].unique()
```

```
Out[6]: array(['Indonesia', 'Cambodia', 'Laos', 'Myanmar', 'Malaysia',  
              'Philippines', 'Singapore', 'Thailand'], dtype=object)
```

```
In [7]: new_df['Value'].unique()
```

```
Out[7]: array(['0.01', '0.12', '0.05', '0.19', '0.02', '0.23', '0.07', '0.37',
               '0.03', '0.28', '0.11', '0.45', '0.04', '0.14', '0.41', '0.06',
               '0.30', '0.17', '0.42', '0.32', '0.44', '0.09', '0.21', '0.43',
               '0.10', '0.31', '0.22', '0.40', '0.38', '0.13', '0.29', '0.15',
               '0.36', '0.27', '0.34', '0.26', '0.25', '0.18', '0.16', '0.20',
               '0.24', '48.8', '48.9', '48.4', '45.6', '43.1', '41.1', '39.0',
               '37.3', '36.1', '34.8', '34.1', '33.4', '32.9', '32.2', '31.5',
               '30.9', '30.2', '29.6', '29.3', '29.4', '30.0', '29.8', '4,000',
               '15,000', '11,000', '1,900', '5,500', '3,500', '2,100', '9,300',
               '7,200', '4,400', '5,600', '2,200', '9,500', '4,700', '2,300',
               '5,700', '2,400', '9,600', '<200', '<100', '<500', '550', '650',
               '740', '640', '840', '940', '830', '510', '1,100', '1,200',
               '1,000', '540', '500', '620', '530', '1,300', '1,400', '610',
               '660', '730', '1,500', '1,600', '760', '710', '770', '750',
               '1,700', '1,800', '810', '780', '800', '860', '930', '850', '870',
               '900', '990', '880', '920', '2,000', '980', '970', '2,500', '950',
               '890', '2,900', '2,600', '5,400', '4,900', '4,100', '720', '6,800',
               '6,100', '5,300', '7,000', '6,000', '5,000', '4,500', '7,600',
               '6,400', '4,600', '8,400', '2,800', '4,800', '8,800', '6,900',
               '3,100', '8,900', '6,600', '3,400', '9,000', '6,500', '3,600',
               '3,700', '3,000', '3,900', '3,300', '9,800', '5,800', '6,300',
               '3,800', '9,200', '8,500', '5,100', '8,100', '3,200', '7,700',
               '7,300', '4,300', '7,100', '4,200', '2,700', '6,200', '790',
               '8,000', '680', '12,000', '10,000', '570', '8,600', '14,000',
               '9,700', '16,000', '13,000', '17,000', '5,200', '19,000', '20,000',
               '630', '5,900', '21,000', '910', '22,000', '9,900', '8,200',
               '23,000', '9,100', '820', '24,000', '25,000', '9,400', '26,000',
               '7,900', '27,000', '6,700', '520', '8,300', '700', '28,000',
               '7,800', '7,400', '8,700', '0.33', '0.08', '0.50', '0.72', '0.57',
               '0.98', '0.67', '1.27', '0.48', '1.28', '1.59', '1.58', '0.35',
               '0.70', '1.91', '0.47', '1.90', '2.23', '2.22', '0.66', '2.46',
               '0.46', '2.45', '0.63', '2.64', '2.65', '0.62', '2.95', '2.94',
               '2.96', '0.61', '3.22', '3.21', '3.38', '3.37', '3.39', '3.41',
               '3.40', '0.60', '0.59', '3.34', '0.39', '3.35', '3.28', '3.27',
               '3.29', '0.55', '3.26', '0.56', '0.54', '0.52', '0.58', '3.23',
               '3.24', '3.15', '3.14', '3.16', '0.65', '3.05', '0.64', '3.06',
               '0.68', '0.76', '0.77', '0.82', '0.73', '0.69', '0.53', '0.49',
               '44.0', '42.2', '41.5', '40.8', '39.9', '38.7', '36.0', '31.2',
               '29.1', '26.7', '25.1', '22.4', '21.9', '20.7', '19.4', '17.1',
               '17.3', '14.6', '16.0', '13.3', '11.2', '15.1', '10.7', '7.8',
               '690', '560', '670', '580', '600', '590', '960', '13.59', '1.32',
               '13.52', '13.67', '0.96', '2.04', '13.80', '1.24', '13.72', '0.51',
```



'13.87', '0.97', '1.95', '13.66', '1.08', '13.58', '13.73', '0.94',  
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'0.78', '13.65', '1.20', '1.14', '13.01', '1.33', '12.94', '13.08',  
'1.51', '12.16', '1.62', '12.10', '1.45', '12.22', '1.77', '0.84',  
'11.19', '11.13', '1.81', '11.24', '2.09', '0.75', '9.08', '2.28',  
'9.04', '2.14', '9.11', '2.41', '0.74', '6.27', '2.42', '6.24',  
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'61.6', '58.3', '55.2', '52.6', '51.0', '45.7', '45.0', '43.5',  
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'1.93', '1.89', '1.84', '1.80', '1.71', '1.72', '1.57', '1.56',  
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'0.87', '1.31', '0.83', '0.80', '44.4', '41.8', '40.2', '38.9',  
'37.8', '35.9', '34.3', '32.1', '27.8', '25.0', '22.8', '22.1',  
'21.2', '17.9', '16.6', '15.5', '14.7', '15.7', '28.4', '23.9',  
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'1.52', '7.15', '7.25', '1.76', '7.37', '7.32', '7.42', '2.35',  
'7.38', '7.47', '1.19', '7.11', '2.25', '7.07', '1.63', '2.21',  
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'10.6', '11.0', '11.4', '12.0', '12.7', '10.1', '10.5', '14.3',  
'11.9', '11.3', '8.4', '1.7', '2.0', '1.6', '1.4', '41.6', '43.7',  
'44.1', '40.5', '38.2', '37.0', '37.6', '39.1', '38.1', '37.9',  
'36.5', '38.0', '38.5', '29.9', '27.4', '26.2', '13.5', '10.4',  
'8.8', '7.7', '6.0', '5.3', '4.7', '4.2', '1.8', '1.9', '49,000',  
'30,000', '47,000', '29,000', '45,000', '43,000', '39,000',  
'36,000', '34,000', '32,000', '31,000', '26.52', '4.31', '26.19',

```
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'21.99', '4.29', '2.83', '20.69', '3.68', '3.88', '23.23', '4.88',
'18.04', '4.35', '2.17', '16.76', '19.25', '5.04', '15.16',
'13.79', '3.66', '2.52', '16.45', '5.72', '13.29', '11.92',
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'9.14', '5.55', '7.64', '3.84', '10.55', '7.19', '7.13', '4.73',
'6.22', '3.71', '7.98', '5.70', '6.56', '4.47', '2.26', '5.49',
'5.54', '4.59', '3.46', '6.36', '5.66', '4.36', '4.76', '3.17',
'3.45', '3.57', '5.23', '5.89', '3.93', '4.58', '3.52', '3.48',
'4.72', '5.58', '3.44', '4.32', '3.60', '3.69', '4.14', '5.19',
'3.51', '3.02', '3.97', '3.54', '2.38', '3.19', '3.62', '3.32',
'3.43', '2.98', '3.10', '2.53', '3.85', '2.97', '2.81', '2.62',
'2.75', '2.16', '2.36', '2.82'], dtype=object)
```

```
In [8]: # clean the values in the column name, values. using a function
def clean_value(val):
    if isinstance(val, str):
        val = val.replace(',', '') #remove ,
        val = val.replace('<', '').strip() #remove <
        return float(val)
    return val

# apply the function to the dataframe
new_df['Value'] = new_df['Value'].apply(clean_value)

new_df['Value'] = new_df['Value'].astype(float).map('{:.6f}'.format)

new_df['Value'].unique()
```

```
Out[8]: array(['0.010000', '0.120000', '0.050000', '0.190000', '0.020000',
               '0.230000', '0.070000', '0.370000', '0.030000', '0.280000',
               '0.110000', '0.450000', '0.040000', '0.140000', '0.410000',
               '0.060000', '0.300000', '0.170000', '0.420000', '0.320000',
               '0.440000', '0.090000', '0.210000', '0.430000', '0.100000',
               '0.310000', '0.220000', '0.400000', '0.380000', '0.130000',
               '0.290000', '0.150000', '0.360000', '0.270000', '0.340000',
               '0.260000', '0.250000', '0.180000', '0.160000', '0.200000',
               '0.240000', '48.800000', '48.900000', '48.400000', '45.600000',
               '43.100000', '41.100000', '39.000000', '37.300000', '36.100000',
               '34.800000', '34.100000', '33.400000', '32.900000', '32.200000',
               '31.500000', '30.900000', '30.200000', '29.600000', '29.300000',
               '29.400000', '30.000000', '29.800000', '4000.000000',
               '15000.000000', '11000.000000', '1900.000000', '5500.000000',
               '3500.000000', '2100.000000', '9300.000000', '7200.000000',
               '4400.000000', '5600.000000', '2200.000000', '9500.000000',
               '4700.000000', '2300.000000', '5700.000000', '2400.000000',
               '9600.000000', '200.000000', '100.000000', '500.000000',
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               '840.000000', '940.000000', '830.000000', '510.000000',
               '1100.000000', '1200.000000', '1000.000000', '540.000000',
               '620.000000', '530.000000', '1300.000000', '1400.000000',
               '610.000000', '660.000000', '730.000000', '1500.000000',
               '1600.000000', '760.000000', '710.000000', '770.000000',
               '750.000000', '1700.000000', '1800.000000', '810.000000',
               '780.000000', '800.000000', '860.000000', '930.000000',
               '850.000000', '870.000000', '900.000000', '990.000000',
               '880.000000', '920.000000', '2000.000000', '980.000000',
               '970.000000', '2500.000000', '950.000000', '890.000000',
               '2900.000000', '2600.000000', '5400.000000', '4900.000000',
               '4100.000000', '720.000000', '6800.000000', '6100.000000',
               '5300.000000', '7000.000000', '6000.000000', '5000.000000',
               '4500.000000', '7600.000000', '6400.000000', '4600.000000',
               '8400.000000', '2800.000000', '4800.000000', '8800.000000',
               '6900.000000', '3100.000000', '8900.000000', '6600.000000',
               '3400.000000', '9000.000000', '6500.000000', '3600.000000',
               '3700.000000', '3000.000000', '3900.000000', '3300.000000',
               '9800.000000', '5800.000000', '6300.000000', '3800.000000',
               '9200.000000', '8500.000000', '5100.000000', '8100.000000',
               '3200.000000', '7700.000000', '7300.000000', '4300.000000',
               '7100.000000', '4200.000000', '2700.000000', '6200.000000',
               '790.000000', '8000.000000', '680.000000', '12000.000000',
```

'10000.000000', '570.000000', '8600.000000', '14000.000000',  
'9700.000000', '16000.000000', '13000.000000', '17000.000000',  
'5200.000000', '19000.000000', '20000.000000', '630.000000',  
'5900.000000', '21000.000000', '910.000000', '22000.000000',  
'9900.000000', '8200.000000', '23000.000000', '9100.000000',  
'820.000000', '24000.000000', '25000.000000', '9400.000000',  
'26000.000000', '7900.000000', '27000.000000', '6700.000000',  
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'2.750000', '2.160000', '2.360000', '2.820000'], dtype=object)
```

```
In [9]: print(new_df.dtypes)
```

```
Country    object
Year       int64
Value      object
dtype: object
```

```
In [22]: new_df["Value"] = new_df["Value"].round(0).astype(int)
```

```
In [23]: print(new_df.dtypes)
```

```
Country    object
Year       int64
Value      int32
dtype: object
```

```
In [24]: new_df = new_df.groupby(["Country", "Year"])["Value"].sum().reset_index()
new_df.Value.unique()
```

```
Out[24]: array([ 69105,  68983,  69421,  70479,  70469,  70306,  69531,  68244,
  66876,  65586,  63911,  62084,  62291,  61899,  60647,  57955,
  55394,  52030,  49269,  45705,  58491,  55895,  51840,  49526,
  51780,  90741, 119962, 138080, 153459, 172638, 189557, 200366,
 209516, 221216, 234425, 246516, 257447, 264077, 269566, 270505,
 272695, 273634, 272313, 271013, 268593, 327764, 325163, 321934,
   7567,   8067,   9164,   9162,   9360,  10559,  10683,  11123,
  11563,  12092,  12231,  12869,  12909,  12958,  13620,  14309,
  14525,  15235,  15704,  15456,  15504,  18811,  18889,  19587,
  11701,  12262,  12312,  12962,  13003,  13053,  13114,  13194,
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 162197, 144785, 126851, 111037,  98824, 127561, 114158, 101106,
  89334])
```

```
In [25]: new_df.to_csv("C:/Users/Personal Computer/Downloads/cleaned_hiv_dataset.csv", index=False)
```

```
In [21]: new_df.Year.unique()
```

```
Out[21]: array([2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010,  
                2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021,  
                2022, 2023], dtype=int64)
```

```
In [ ]:
```