In [3]:

**import** pandas **as** pd  
**import** matplotlib.pyplot **as** plt  
**import** os  
**from** matplotlib.pyplot **import** figure  
**import** numpy **as** np

In [4]:

cancer\_csv\_file **=** "death\_cancer.csv"  
cancer\_df **=** pd**.**read\_csv(cancer\_csv\_file)  
cancer\_df **=** cancer\_df[cancer\_df["YEAR"]**==**2019]**.**sort\_values(by**=**['RATE'])**.**set\_index("STATE")  
cancer\_df

Out[4]:

|  | **YEAR** | **RATE** | **DEATHS** | **URL** |
| --- | --- | --- | --- | --- |
| **STATE** |  |  |  |  |
| **UT** | 2019.0 | 117.2 | 3289 | /nchs/pressroom/states/utah/ut.htm |
| **CO** | 2019.0 | 125.9 | 7986 | /nchs/pressroom/states/colorado/co.htm |
| **HI** | 2019.0 | 127.3 | 2500 | /nchs/pressroom/states/hawaii/hi.htm |
| **AZ** | 2019.0 | 131.1 | 12503 | /nchs/pressroom/states/arizona/az.htm |
| **CA** | 2019.0 | 131.6 | 59512 | /nchs/pressroom/states/california/ca.htm |
| **CT** | 2019.0 | 131.9 | 6496 | /nchs/pressroom/states/connecticut/ct.htm |
| **NM** | 2019.0 | 131.9 | 3614 | /nchs/pressroom/states/newmexico/nm.htm |
| **NY** | 2019.0 | 132.9 | 33655 | /nchs/pressroom/states/newyork/ny.htm |
| **NJ** | 2019.0 | 136.5 | 15698 | /nchs/pressroom/states/newjersey/nj.htm |
| **ID** | 2019.0 | 138.1 | 2928 | /nchs/pressroom/states/idaho/id.htm |
| **WY** | 2019.0 | 138.9 | 1016 | /nchs/pressroom/states/wyoming/wy.htm |
| **FL** | 2019.0 | 139.1 | 45583 | /nchs/pressroom/states/florida/fl.htm |
| **MA** | 2019.0 | 139.9 | 12582 | /nchs/pressroom/states/massachusetts/ma.htm |
| **ND** | 2019.0 | 140.7 | 1316 | /nchs/pressroom/states/northdakota/nd.htm |
| **MT** | 2019.0 | 140.9 | 2099 | /nchs/pressroom/states/montana/mt.htm |
| **TX** | 2019.0 | 141.4 | 41489 | /nchs/pressroom/states/texas/tx.htm |
| **MN** | 2019.0 | 142.2 | 10042 | /nchs/pressroom/states/minnesota/mn.htm |
| **WA** | 2019.0 | 143.4 | 12960 | /nchs/pressroom/states/washington/wa.htm |
| **MD** | 2019.0 | 144.4 | 10743 | /nchs/pressroom/states/maryland/md.htm |
| **VA** | 2019.0 | 144.9 | 15045 | /nchs/pressroom/states/virginia/va.htm |
| **OR** | 2019.0 | 145.0 | 8080 | /nchs/pressroom/states/oregon/or.htm |
| **AK** | 2019.0 | 146.9 | 1021 | /nchs/pressroom/states/alaska/ak.htm |
| **NE** | 2019.0 | 147.4 | 3482 | /nchs/pressroom/states/nebraska/ne.htm |
| **NH** | 2019.0 | 147.4 | 2819 | /nchs/pressroom/states/newhampshire/nh.htm |
| **NV** | 2019.0 | 149.0 | 5434 | /nchs/pressroom/states/nevada/nv.htm |
| **WI** | 2019.0 | 149.6 | 11505 | /nchs/pressroom/states/wisconsin/wi.htm |
| **VT** | 2019.0 | 150.4 | 1378 | /nchs/pressroom/states/vermont/vt.htm |
| **IA** | 2019.0 | 150.9 | 6335 | /nchs/pressroom/states/iowa/ia.htm |
| **GA** | 2019.0 | 151.4 | 17756 | /nchs/pressroom/states/georgia/ga.htm |
| **IL** | 2019.0 | 151.9 | 23902 | /nchs/pressroom/states/illinois/il.htm |
| **DE** | 2019.0 | 151.9 | 2074 | /nchs/pressroom/states/delaware/de.htm |
| **NC** | 2019.0 | 152.0 | 19951 | /nchs/pressroom/states/northcarolina/nc.htm |
| **SD** | 2019.0 | 153.4 | 1737 | /nchs/pressroom/states/southdakota/sd.htm |
| **PA** | 2019.0 | 153.5 | 27746 | /nchs/pressroom/states/pennsylvania/pa.htm |
| **RI** | 2019.0 | 153.6 | 2210 | /nchs/pressroom/states/rhodeisland/ri.htm |
| **KS** | 2019.0 | 153.8 | 5619 | /nchs/pressroom/states/kansas/ks.htm |
| **SC** | 2019.0 | 154.0 | 10487 | /nchs/pressroom/states/southcarolina/sc.htm |
| **MI** | 2019.0 | 157.1 | 20923 | /nchs/pressroom/states/michigan/mi.htm |
| **MO** | 2019.0 | 159.7 | 12873 | /nchs/pressroom/states/missouri/mo.htm |
| **AL** | 2019.0 | 160.8 | 10266 | /nchs/pressroom/states/alabama/al.htm |
| **OH** | 2019.0 | 163.0 | 25170 | /nchs/pressroom/states/ohio/oh.htm |
| **IN** | 2019.0 | 163.4 | 13515 | /nchs/pressroom/states/indiana/in.htm |
| **ME** | 2019.0 | 164.2 | 3413 | /nchs/pressroom/states/maine/me.htm |
| **AR** | 2019.0 | 165.7 | 6482 | /nchs/pressroom/states/arkansas/ar.htm |
| **TN** | 2019.0 | 167.0 | 14382 | /nchs/pressroom/states/tennessee/tn.htm |
| **LA** | 2019.0 | 168.1 | 9485 | /nchs/pressroom/states/louisiana/la.htm |
| **OK** | 2019.0 | 173.0 | 8309 | /nchs/pressroom/states/oklahoma/ok.htm |
| **WV** | 2019.0 | 175.0 | 4604 | /nchs/pressroom/states/westvirginia/wv.htm |
| **KY** | 2019.0 | 176.4 | 9975 | /nchs/pressroom/states/kentucky/ky.htm |
| **MS** | 2019.0 | 179.1 | 6587 | /nchs/pressroom/states/mississippi/ms.htm |

In [5]:

alzheimer\_csv\_file **=** "death\_alzheimer.csv"  
alzheimer\_df **=** pd**.**read\_csv(alzheimer\_csv\_file)  
alzheimer\_df **=** alzheimer\_df[alzheimer\_df["YEAR"]**==**2019]**.**sort\_values(by**=**['RATE'])**.**set\_index("STATE")  
alzheimer\_df

Out[5]:

|  | **YEAR** | **RATE** | **DEATHS** | **URL** |
| --- | --- | --- | --- | --- |
| **STATE** |  |  |  |  |
| **NY** | 2019.0 | 13.7 | 3753 | /nchs/pressroom/states/newyork/ny.htm |
| **MD** | 2019.0 | 13.8 | 1012 | /nchs/pressroom/states/maryland/md.htm |
| **MA** | 2019.0 | 17.7 | 1663 | /nchs/pressroom/states/massachusetts/ma.htm |
| **CT** | 2019.0 | 18.1 | 967 | /nchs/pressroom/states/connecticut/ct.htm |
| **FL** | 2019.0 | 18.3 | 6539 | /nchs/pressroom/states/florida/fl.htm |
| **HI** | 2019.0 | 19.1 | 471 | /nchs/pressroom/states/hawaii/hi.htm |
| **PA** | 2019.0 | 21.2 | 4150 | /nchs/pressroom/states/pennsylvania/pa.htm |
| **NM** | 2019.0 | 21.3 | 568 | /nchs/pressroom/states/newmexico/nm.htm |
| **NV** | 2019.0 | 21.6 | 678 | /nchs/pressroom/states/nevada/nv.htm |
| **NJ** | 2019.0 | 21.7 | 2629 | /nchs/pressroom/states/newjersey/nj.htm |
| **KS** | 2019.0 | 21.9 | 839 | /nchs/pressroom/states/kansas/ks.htm |
| **MT** | 2019.0 | 22.6 | 326 | /nchs/pressroom/states/montana/mt.htm |
| **IL** | 2019.0 | 24.5 | 3954 | /nchs/pressroom/states/illinois/il.htm |
| **AK** | 2019.0 | 25.3 | 128 | /nchs/pressroom/states/alaska/ak.htm |
| **DE** | 2019.0 | 25.9 | 339 | /nchs/pressroom/states/delaware/de.htm |
| **ME** | 2019.0 | 25.9 | 544 | /nchs/pressroom/states/maine/me.htm |
| **VA** | 2019.0 | 26.9 | 2631 | /nchs/pressroom/states/virginia/va.htm |
| **NH** | 2019.0 | 27.8 | 511 | /nchs/pressroom/states/newhampshire/nh.htm |
| **RI** | 2019.0 | 28.9 | 456 | /nchs/pressroom/states/rhodeisland/ri.htm |
| **IA** | 2019.0 | 29.2 | 1344 | /nchs/pressroom/states/iowa/ia.htm |
| **NE** | 2019.0 | 30.3 | 768 | /nchs/pressroom/states/nebraska/ne.htm |
| **WI** | 2019.0 | 30.5 | 2390 | /nchs/pressroom/states/wisconsin/wi.htm |
| **IN** | 2019.0 | 31.6 | 2561 | /nchs/pressroom/states/indiana/in.htm |
| **KY** | 2019.0 | 32.1 | 1684 | /nchs/pressroom/states/kentucky/ky.htm |
| **WV** | 2019.0 | 32.3 | 832 | /nchs/pressroom/states/westvirginia/wv.htm |
| **AZ** | 2019.0 | 32.3 | 3047 | /nchs/pressroom/states/arizona/az.htm |
| **ID** | 2019.0 | 33.2 | 650 | /nchs/pressroom/states/idaho/id.htm |
| **CO** | 2019.0 | 33.4 | 1909 | /nchs/pressroom/states/colorado/co.htm |
| **OH** | 2019.0 | 33.6 | 5234 | /nchs/pressroom/states/ohio/oh.htm |
| **MI** | 2019.0 | 33.9 | 4467 | /nchs/pressroom/states/michigan/mi.htm |
| **MO** | 2019.0 | 34.1 | 2782 | /nchs/pressroom/states/missouri/mo.htm |
| **WY** | 2019.0 | 34.4 | 238 | /nchs/pressroom/states/wyoming/wy.htm |
| **MN** | 2019.0 | 34.9 | 2552 | /nchs/pressroom/states/minnesota/mn.htm |
| **VT** | 2019.0 | 35.1 | 315 | /nchs/pressroom/states/vermont/vt.htm |
| **NC** | 2019.0 | 36.9 | 4508 | /nchs/pressroom/states/northcarolina/nc.htm |
| **CA** | 2019.0 | 37.0 | 16859 | /nchs/pressroom/states/california/ca.htm |
| **OR** | 2019.0 | 37.2 | 1992 | /nchs/pressroom/states/oregon/or.htm |
| **ND** | 2019.0 | 37.6 | 403 | /nchs/pressroom/states/northdakota/nd.htm |
| **OK** | 2019.0 | 37.9 | 1775 | /nchs/pressroom/states/oklahoma/ok.htm |
| **SC** | 2019.0 | 37.9 | 2323 | /nchs/pressroom/states/southcarolina/sc.htm |
| **TX** | 2019.0 | 38.6 | 10101 | /nchs/pressroom/states/texas/tx.htm |
| **UT** | 2019.0 | 39.0 | 980 | /nchs/pressroom/states/utah/ut.htm |
| **AR** | 2019.0 | 39.5 | 1507 | /nchs/pressroom/states/arkansas/ar.htm |
| **SD** | 2019.0 | 40.5 | 495 | /nchs/pressroom/states/southdakota/sd.htm |
| **TN** | 2019.0 | 41.1 | 3252 | /nchs/pressroom/states/tennessee/tn.htm |
| **LA** | 2019.0 | 41.4 | 2165 | /nchs/pressroom/states/louisiana/la.htm |
| **GA** | 2019.0 | 41.9 | 4221 | /nchs/pressroom/states/georgia/ga.htm |
| **WA** | 2019.0 | 42.2 | 3585 | /nchs/pressroom/states/washington/wa.htm |
| **AL** | 2019.0 | 44.6 | 2659 | /nchs/pressroom/states/alabama/al.htm |
| **MS** | 2019.0 | 48.8 | 1662 | /nchs/pressroom/states/mississippi/ms.htm |

In [6]:

obesity\_csv\_file **=** "obesity\_percentage.csv"  
obesity\_df **=** pd**.**read\_csv(obesity\_csv\_file)  
obesity\_df **=** obesity\_df**.**set\_index("state")  
obesity\_df

Out[6]:

|  | **year** | **%** |
| --- | --- | --- |
| **state** |  |  |
| **AL** | 2019 | 36.1 |
| **AK** | 2019 | 30.5 |
| **AZ** | 2019 | 31.4 |
| **AR** | 2019 | 37.4 |
| **CA** | 2019 | 26.2 |
| **CO** | 2019 | 23.8 |
| **CT** | 2019 | 29.1 |
| **DE** | 2019 | 34.4 |
| **DC** | 2019 | 23.8 |
| **FL** | 2019 | 27.0 |
| **GA** | 2019 | 33.1 |
| **HI** | 2019 | 25.0 |
| **ID** | 2019 | 29.5 |
| **IL** | 2019 | 31.6 |
| **IN** | 2019 | 35.3 |
| **IA** | 2019 | 33.9 |
| **KS** | 2019 | 35.2 |
| **KY** | 2019 | 36.5 |
| **LA** | 2019 | 35.9 |
| **ME** | 2019 | 31.7 |
| **MD** | 2019 | 32.3 |
| **MA** | 2019 | 25.2 |
| **MI** | 2019 | 36.0 |
| **MN** | 2019 | 30.1 |
| **MS** | 2019 | 40.8 |
| **MO** | 2019 | 34.8 |
| **MT** | 2019 | 28.3 |
| **NE** | 2019 | 34.1 |
| **NV** | 2019 | 30.6 |
| **NH** | 2019 | 31.8 |
| **NJ** | 2019 | NaN |
| **NM** | 2019 | 31.7 |
| **NY** | 2019 | 27.1 |
| **NC** | 2019 | 34.0 |
| **ND** | 2019 | 34.8 |
| **OH** | 2019 | 34.8 |
| **OK** | 2019 | 36.8 |
| **OR** | 2019 | 29.0 |
| **PA** | 2019 | 33.2 |
| **RI** | 2019 | 30.0 |
| **SC** | 2019 | 35.4 |
| **SD** | 2019 | 33.0 |
| **TN** | 2019 | 36.5 |
| **TX** | 2019 | 34.0 |
| **UT** | 2019 | 29.2 |
| **VT** | 2019 | 26.6 |
| **VA** | 2019 | 31.9 |
| **WA** | 2019 | 28.3 |
| **WV** | 2019 | 39.7 |
| **WI** | 2019 | 34.2 |
| **WY** | 2019 | 29.7 |

In [7]:

obesity\_states **=** obesity\_df**.**index  
obesity\_states

Out[7]:

Index(['AL', 'AK', 'AZ', 'AR', 'CA', 'CO', 'CT', 'DE', 'DC', 'FL', 'GA', 'HI',  
 'ID', 'IL', 'IN', 'IA', 'KS', 'KY', 'LA', 'ME', 'MD', 'MA', 'MI', 'MN',  
 'MS', 'MO', 'MT', 'NE', 'NV', 'NH', 'NJ', 'NM', 'NY', 'NC', 'ND', 'OH',  
 'OK', 'OR', 'PA', 'RI', 'SC', 'SD', 'TN', 'TX', 'UT', 'VT', 'VA', 'WA',  
 'WV', 'WI', 'WY'],  
 dtype='object', name='state')

In [8]:

obesity\_rate **=** obesity\_df["%"]  
obesity\_rate

Out[8]:

state  
AL 36.1  
AK 30.5  
AZ 31.4  
AR 37.4  
CA 26.2  
CO 23.8  
CT 29.1  
DE 34.4  
DC 23.8  
FL 27.0  
GA 33.1  
HI 25.0  
ID 29.5  
IL 31.6  
IN 35.3  
IA 33.9  
KS 35.2  
KY 36.5  
LA 35.9  
ME 31.7  
MD 32.3  
MA 25.2  
MI 36.0  
MN 30.1  
MS 40.8  
MO 34.8  
MT 28.3  
NE 34.1  
NV 30.6  
NH 31.8  
NJ NaN  
NM 31.7  
NY 27.1  
NC 34.0  
ND 34.8  
OH 34.8  
OK 36.8  
OR 29.0  
PA 33.2  
RI 30.0  
SC 35.4  
SD 33.0  
TN 36.5  
TX 34.0  
UT 29.2  
VT 26.6  
VA 31.9  
WA 28.3  
WV 39.7  
WI 34.2  
WY 29.7  
Name: %, dtype: float64

In [9]:

cancer\_states **=** cancer\_df**.**index  
cancer\_states

Out[9]:

Index(['UT', 'CO', 'HI', 'AZ', 'CA', 'CT', 'NM', 'NY', 'NJ', 'ID', 'WY', 'FL',  
 'MA', 'ND', 'MT', 'TX', 'MN', 'WA', 'MD', 'VA', 'OR', 'AK', 'NE', 'NH',  
 'NV', 'WI', 'VT', 'IA', 'GA', 'IL', 'DE', 'NC', 'SD', 'PA', 'RI', 'KS',  
 'SC', 'MI', 'MO', 'AL', 'OH', 'IN', 'ME', 'AR', 'TN', 'LA', 'OK', 'WV',  
 'KY', 'MS'],  
 dtype='object', name='STATE')

In [10]:

cancer\_death\_rate **=** cancer\_df["RATE"]  
cancer\_death\_rate

Out[10]:

STATE  
UT 117.2  
CO 125.9  
HI 127.3  
AZ 131.1  
CA 131.6  
CT 131.9  
NM 131.9  
NY 132.9  
NJ 136.5  
ID 138.1  
WY 138.9  
FL 139.1  
MA 139.9  
ND 140.7  
MT 140.9  
TX 141.4  
MN 142.2  
WA 143.4  
MD 144.4  
VA 144.9  
OR 145.0  
AK 146.9  
NE 147.4  
NH 147.4  
NV 149.0  
WI 149.6  
VT 150.4  
IA 150.9  
GA 151.4  
IL 151.9  
DE 151.9  
NC 152.0  
SD 153.4  
PA 153.5  
RI 153.6  
KS 153.8  
SC 154.0  
MI 157.1  
MO 159.7  
AL 160.8  
OH 163.0  
IN 163.4  
ME 164.2  
AR 165.7  
TN 167.0  
LA 168.1  
OK 173.0  
WV 175.0  
KY 176.4  
MS 179.1  
Name: RATE, dtype: float64

In [11]:

alzheimer\_states **=** alzheimer\_df**.**index  
alzheimer\_states

Out[11]:

Index(['NY', 'MD', 'MA', 'CT', 'FL', 'HI', 'PA', 'NM', 'NV', 'NJ', 'KS', 'MT',  
 'IL', 'AK', 'DE', 'ME', 'VA', 'NH', 'RI', 'IA', 'NE', 'WI', 'IN', 'KY',  
 'WV', 'AZ', 'ID', 'CO', 'OH', 'MI', 'MO', 'WY', 'MN', 'VT', 'NC', 'CA',  
 'OR', 'ND', 'OK', 'SC', 'TX', 'UT', 'AR', 'SD', 'TN', 'LA', 'GA', 'WA',  
 'AL', 'MS'],  
 dtype='object', name='STATE')

In [12]:

alzheimer\_death\_rate **=** alzheimer\_df["RATE"]  
alzheimer\_death\_rate

Out[12]:

STATE  
NY 13.7  
MD 13.8  
MA 17.7  
CT 18.1  
FL 18.3  
HI 19.1  
PA 21.2  
NM 21.3  
NV 21.6  
NJ 21.7  
KS 21.9  
MT 22.6  
IL 24.5  
AK 25.3  
DE 25.9  
ME 25.9  
VA 26.9  
NH 27.8  
RI 28.9  
IA 29.2  
NE 30.3  
WI 30.5  
IN 31.6  
KY 32.1  
WV 32.3  
AZ 32.3  
ID 33.2  
CO 33.4  
OH 33.6  
MI 33.9  
MO 34.1  
WY 34.4  
MN 34.9  
VT 35.1  
NC 36.9  
CA 37.0  
OR 37.2  
ND 37.6  
OK 37.9  
SC 37.9  
TX 38.6  
UT 39.0  
AR 39.5  
SD 40.5  
TN 41.1  
LA 41.4  
GA 41.9  
WA 42.2  
AL 44.6  
MS 48.8  
Name: RATE, dtype: float64

Relationship Between Cancer and Obesity[¶](#gjdgxs)

In [13]:

fig, ax1 **=** plt**.**subplots()  
  
ax2 **=** ax1**.**twinx()  
  
ax1**.**scatter(cancer\_states, cancer\_death\_rate, color**=**"green")  
  
  
ax2**.**scatter(obesity\_states, obesity\_rate, color**=**"blue")  
  
ax1**.**set\_xlabel('States in the US')  
ax1**.**set\_ylabel('Cancer Death Rate (The number of deaths per 100,000 total population)', color**=**'g')  
ax2**.**set\_ylabel('Percent of adults aged 18 years and older who have obesity (%)', color**=**'b')  
  
*#fig.xticks(rotation=90)*  
*#plt.xticks(fontsize=7)*  
**for** tick **in** ax1**.**get\_xticklabels():  
 tick**.**set\_rotation(90)  
 tick**.**set\_fontsize(7)  
  
  
plt**.**show()  
fig**.**savefig("cancer\_obesity.png")

Relationship between Alzheimer's Disease and Obesity[¶](#30j0zll)

In [14]:

fig, ax1 **=** plt**.**subplots()  
  
ax2 **=** ax1**.**twinx()  
  
ax1**.**scatter(alzheimer\_states, alzheimer\_death\_rate, color**=**"green")  
  
  
ax2**.**scatter(obesity\_states, obesity\_rate, color**=**"blue")  
  
ax1**.**set\_xlabel('States in the US')  
ax1**.**set\_ylabel('Alzheimer\'s Disease Mortality (The number of deaths per 100,000 total population)', color**=**'g')  
ax2**.**set\_ylabel('Percent of adults aged 18 years and older who have obesity (%)', color**=**'b')  
  
*#fig.xticks(rotation=90)*  
*#plt.xticks(fontsize=7)*  
**for** tick **in** ax1**.**get\_xticklabels():  
 tick**.**set\_rotation(90)  
 tick**.**set\_fontsize(7)  
  
  
plt**.**show()  
fig**.**savefig("alzheimer\_obesity.png")

In [18]:

cancer\_rate **=** cancer\_df[cancer\_df["YEAR"]**==**2019]**.**sort\_values(by**=**['STATE'])[["RATE"]]  
cancer\_rate

Out[18]:

|  | **RATE** |
| --- | --- |
| **STATE** |  |
| **AK** | 146.9 |
| **AL** | 160.8 |
| **AR** | 165.7 |
| **AZ** | 131.1 |
| **CA** | 131.6 |
| **CO** | 125.9 |
| **CT** | 131.9 |
| **DE** | 151.9 |
| **FL** | 139.1 |
| **GA** | 151.4 |
| **HI** | 127.3 |
| **IA** | 150.9 |
| **ID** | 138.1 |
| **IL** | 151.9 |
| **IN** | 163.4 |
| **KS** | 153.8 |
| **KY** | 176.4 |
| **LA** | 168.1 |
| **MA** | 139.9 |
| **MD** | 144.4 |
| **ME** | 164.2 |
| **MI** | 157.1 |
| **MN** | 142.2 |
| **MO** | 159.7 |
| **MS** | 179.1 |
| **MT** | 140.9 |
| **NC** | 152.0 |
| **ND** | 140.7 |
| **NE** | 147.4 |
| **NH** | 147.4 |
| **NJ** | 136.5 |
| **NM** | 131.9 |
| **NV** | 149.0 |
| **NY** | 132.9 |
| **OH** | 163.0 |
| **OK** | 173.0 |
| **OR** | 145.0 |
| **PA** | 153.5 |
| **RI** | 153.6 |
| **SC** | 154.0 |
| **SD** | 153.4 |
| **TN** | 167.0 |
| **TX** | 141.4 |
| **UT** | 117.2 |
| **VA** | 144.9 |
| **VT** | 150.4 |
| **WA** | 143.4 |
| **WI** | 149.6 |
| **WV** | 175.0 |
| **WY** | 138.9 |

In [19]:

alzheimer\_rate **=** alzheimer\_df[alzheimer\_df["YEAR"]**==**2019]**.**sort\_values(by**=**['STATE'])[["RATE"]]  
alzheimer\_rate

Out[19]:

|  | **RATE** |
| --- | --- |
| **STATE** |  |
| **AK** | 25.3 |
| **AL** | 44.6 |
| **AR** | 39.5 |
| **AZ** | 32.3 |
| **CA** | 37.0 |
| **CO** | 33.4 |
| **CT** | 18.1 |
| **DE** | 25.9 |
| **FL** | 18.3 |
| **GA** | 41.9 |
| **HI** | 19.1 |
| **IA** | 29.2 |
| **ID** | 33.2 |
| **IL** | 24.5 |
| **IN** | 31.6 |
| **KS** | 21.9 |
| **KY** | 32.1 |
| **LA** | 41.4 |
| **MA** | 17.7 |
| **MD** | 13.8 |
| **ME** | 25.9 |
| **MI** | 33.9 |
| **MN** | 34.9 |
| **MO** | 34.1 |
| **MS** | 48.8 |
| **MT** | 22.6 |
| **NC** | 36.9 |
| **ND** | 37.6 |
| **NE** | 30.3 |
| **NH** | 27.8 |
| **NJ** | 21.7 |
| **NM** | 21.3 |
| **NV** | 21.6 |
| **NY** | 13.7 |
| **OH** | 33.6 |
| **OK** | 37.9 |
| **OR** | 37.2 |
| **PA** | 21.2 |
| **RI** | 28.9 |
| **SC** | 37.9 |
| **SD** | 40.5 |
| **TN** | 41.1 |
| **TX** | 38.6 |
| **UT** | 39.0 |
| **VA** | 26.9 |
| **VT** | 35.1 |
| **WA** | 42.2 |
| **WI** | 30.5 |
| **WV** | 32.3 |
| **WY** | 34.4 |

In [23]:

data **=** {  
 "cancer mortality": cancer\_rate["RATE"],  
 "alzheimer mortality": alzheimer\_rate["RATE"],  
 "obesity rate": obesity\_rate  
}

In [25]:

data\_df **=** pd**.**DataFrame(data)  
data\_df

Out[25]:

|  | **cancer mortality** | **alzheimer mortality** | **obesity rate** |
| --- | --- | --- | --- |
| **AK** | 146.9 | 25.3 | 30.5 |
| **AL** | 160.8 | 44.6 | 36.1 |
| **AR** | 165.7 | 39.5 | 37.4 |
| **AZ** | 131.1 | 32.3 | 31.4 |
| **CA** | 131.6 | 37.0 | 26.2 |
| **CO** | 125.9 | 33.4 | 23.8 |
| **CT** | 131.9 | 18.1 | 29.1 |
| **DC** | NaN | NaN | 23.8 |
| **DE** | 151.9 | 25.9 | 34.4 |
| **FL** | 139.1 | 18.3 | 27.0 |
| **GA** | 151.4 | 41.9 | 33.1 |
| **HI** | 127.3 | 19.1 | 25.0 |
| **IA** | 150.9 | 29.2 | 33.9 |
| **ID** | 138.1 | 33.2 | 29.5 |
| **IL** | 151.9 | 24.5 | 31.6 |
| **IN** | 163.4 | 31.6 | 35.3 |
| **KS** | 153.8 | 21.9 | 35.2 |
| **KY** | 176.4 | 32.1 | 36.5 |
| **LA** | 168.1 | 41.4 | 35.9 |
| **MA** | 139.9 | 17.7 | 25.2 |
| **MD** | 144.4 | 13.8 | 32.3 |
| **ME** | 164.2 | 25.9 | 31.7 |
| **MI** | 157.1 | 33.9 | 36.0 |
| **MN** | 142.2 | 34.9 | 30.1 |
| **MO** | 159.7 | 34.1 | 34.8 |
| **MS** | 179.1 | 48.8 | 40.8 |
| **MT** | 140.9 | 22.6 | 28.3 |
| **NC** | 152.0 | 36.9 | 34.0 |
| **ND** | 140.7 | 37.6 | 34.8 |
| **NE** | 147.4 | 30.3 | 34.1 |
| **NH** | 147.4 | 27.8 | 31.8 |
| **NJ** | 136.5 | 21.7 | NaN |
| **NM** | 131.9 | 21.3 | 31.7 |
| **NV** | 149.0 | 21.6 | 30.6 |
| **NY** | 132.9 | 13.7 | 27.1 |
| **OH** | 163.0 | 33.6 | 34.8 |
| **OK** | 173.0 | 37.9 | 36.8 |
| **OR** | 145.0 | 37.2 | 29.0 |
| **PA** | 153.5 | 21.2 | 33.2 |
| **RI** | 153.6 | 28.9 | 30.0 |
| **SC** | 154.0 | 37.9 | 35.4 |
| **SD** | 153.4 | 40.5 | 33.0 |
| **TN** | 167.0 | 41.1 | 36.5 |
| **TX** | 141.4 | 38.6 | 34.0 |
| **UT** | 117.2 | 39.0 | 29.2 |
| **VA** | 144.9 | 26.9 | 31.9 |
| **VT** | 150.4 | 35.1 | 26.6 |
| **WA** | 143.4 | 42.2 | 28.3 |
| **WI** | 149.6 | 30.5 | 34.2 |
| **WV** | 175.0 | 32.3 | 39.7 |
| **WY** | 138.9 | 34.4 | 29.7 |

Correlation among Three Factors (Cancer, Alzheimer's, and Obesity)[¶](#1fob9te)

In [30]:

corr\_df **=** data\_df**.**corr()  
corr\_df

Out[30]:

|  | **cancer mortality** | **alzheimer mortality** | **obesity rate** |
| --- | --- | --- | --- |
| **cancer mortality** | 1.000000 | 0.386556 | 0.803682 |
| **alzheimer mortality** | 0.386556 | 1.000000 | 0.442926 |
| **obesity rate** | 0.803682 | 0.442926 | 1.000000 |

In [38]:

plt**.**plot(corr\_df**.**index, corr\_df["cancer mortality"])  
plt**.**title("Correlation Coefficient between Cancer Disease and Other Factors")  
plt**.**xlabel("Factors")  
plt**.**ylabel("Correlation Coefficient")  
plt**.**savefig("Correlation\_Data.png")

In [ ]: