This is an overview of SAS and Stata programs used in the analysis for “Medicare’s Annual Wellness Visit and Diagnoses of Dementias and Cognitive Impairment,” by Johanna Thunell, Patricia Ferido, and Julie Zissimopoulos published in *Alzheimer’s & Dementia* in 2022. The programs are meant to run in order, with later programs relying on data created by earlier ones. A header program, not included, held most librefs so users will have to replace with their own.

**Contextual Data**

**AHRF**

urban\_rural\_measures.sas

* Source data: arf.ahrf2012, arf.ahrf2015
* creates: urbanruralcont
* Uses the American Health and Resource Files to create an urban/rural indicator

**ACS**

read\_in\_s1501\_1114.mac, read\_in\_s1501\_1517.mac, clean\_s1501.mac, 1a\_read\_in\_data\_1117.sas, 2a\_clean\_educ\_data\_1117.sas

* Source data: Census table S1501
* creates: acs.educ\_65up\_1117
* Creates variables of percent high school graduates over 65 years old from the ACS

read\_in\_s1903\_1112.mac, read\_in\_s1903\_1316.mac, read\_in\_s1930\_1717.mac, clean\_s1903.mac, 1a\_read\_in\_data\_1117.sas, 2a\_clean\_inc\_data\_1117.sas

* Source data: Census table S1903
* creates: acs.medinc\_117
* Creates a median income variable from the ACS

**Geography**

zip\_zcta\_xwlk0719.sas

* Source data: Census shapefiles and SAS zip code files, UDS mapper ZIP to ZCTA crosswalk from 2010 to 2019
* creates: zip.ziptozcta0719
* Brings in data from the Census, the HUD UDS mapper and SAS zip code files to create a Zip to ZCTA crosswalk

**Medicare Harmonized Data**

bsfall.mac, bsfall\_allyrs.sas

* Source data: raw bsf files
* creates: bene.bsfall2006-2014
* Brings together the BSF AB and BSF D files as they are separate for these years

climds.sas, clmids2015\_2016.sas

* Source data: raw files
* creates: benestat.clmid2006-2016
* Flags whether or not a beneficiary has a claim in any of the claim types in each year

bene\_demog2016.sas

* Source data:
  + raw bsf files
  + benestat.clmid2006-2016
  + bene.bsfall2006-bene.bsfall2014
* creates:
  + bene.bene\_demog2016
* Creates a harmonized beneficiary summary characteristics file bringing together BSF information across years and flagging any discrepancies

bene\_geo.sas

* Source data:
  + bene.bsfall2006-2014
  + bsf.bsfab2015-2016
  + bene.bene\_demog2014
* creates:
  + bene.bene\_geo\_2006-2014
* Harmonize all geographic identifiers from the raw BSF files

bene\_status\_year, bene\_status\_year2014, bene\_status\_year2015\_2016.sas, statyr.mac, statyr\_2015on.mac

* Source data:
  + raw bsf files
  + bene.bsfall2006-2014
* creates:
  + bene.bene\_status\_year2009-bene.bene\_status\_month2016
* Create an annual file summarizing enrollment and demographic information from the BSF files

bene\_status\_month, bene\_status\_month2014, bene\_status\_month2015\_2016.sas, statmo.mac, statmo\_2015on.mac

* Source data:
  + raw bsf files
  + bene.bsfall2006-2014
  + bene.bene\_status\_year2009-bene.bene\_status\_year2016
* creates:
  + bene.bene\_status\_month2009-bene.bene\_status\_month2016
* Create monthly files summarizing enrollment and demographic information from the BSF files

geoses\_2016\_zipupdate

* Source data:
  + geo.bene\_geo\_2007-geo.bene\_geo2016
  + zip.ziptozcta0719
  + acs.educ\_65up\_1117
  + acs.medinc\_1117
* creates:
  + geoses\_long0716\_zipupdate
* Create a beneficiary-zip code level file with information from the ACS

diag\_pta02\_06.sas, diag\_pta06\_09.sas, diag\_pta10\_11.sas, diag\_pta2012.sas, diag\_pta2013.sas, diag\_pta2014.sas, diag\_pta2015\_2016.sas,

diag\_ptb02\_05.sas, diag\_ptb06\_09.sas, diag\_ptb10\_11.sas, diag\_ptb2012.sas, diag\_ptb2013.sas, diag\_ptb2015.sas, diag\_ptb2015\_2016.sas,

runpta, runptb

* Source data: raw claim files
* creates: dx.[ctyp]\_diag[year]
* Creates a clean extract of harmonized diagnosis variables from the claims files

hcpcs\_outp[year].sas, hcpcs\_pta[year].sas

* Source data: raw claim files
* Creates: dx.[ctyp]\_hcpcs[year]
* Creates a clean extract of harmonized HCPCS variables from the claims files

build\_cc.sas

* Source data:
  + raw bsfcc files
* creates:
  + demdx.cc\_0216
* Harmonizes information from the BSF chronic conditions files

**Dementia**

dementia\_dx.sas, dementia\_dx2015\_2016.sas

* Source data:
  + dx.[ctyp]\_diag[year]
* creates:
  + demdx.adrd\_dx\_[ctyp]\_2002\_2016
* Pull dementia diagnoses from the claims

dementia\_dxdt\_typ2015\_2016.sas

* Source data:
  + demdx.adrd\_dx\_[ctyp]\_2002\_2016
* creates:
  + demdx.adrd\_dxdt\_[ctyp]\_2002\_2016
* Make the dementia diagnoses unique on a beneficiary-date level by claim type

dementia\_dxdate2015\_2016.sas

* Source data: demdx.adrd\_dxdt\_[ctyp]\_2002\_2016
* creates: demdx.adrd\_dxdate\_2002\_2016
* Merge together all the dementia diagnoses across claim types and create a unique beneficiary-date level dataset

pull\_ADdrugs\_dts.sas

* Source data: fdb.fdb\_ndc\_extract, pde.opt1pde2006-2016
* creates: addrugs.ADdrugs\_0616, addrugs.ADdrugs\_dts\_0616
* Pull dementia drug claims from the Part D files, uses proprietary FDB data to identify relevant NDCs

dem\_symptoms.sas

* Source data: extracts.[ctyp]\_diag2002-2016
* creates: exp.dem\_symptoms2002\_2016
* Pull dementia symptoms diagnoses from the claims

ADRDinc\_numscens2016.sas

* Source data: demdx.adrd\_dxdate\_2002\_2016, addrugs.addrugs\_dts\_0616, exp.dem\_symptoms2002\_2016, bene.bene\_demog2016
* creates: exp.ADRDinc\_scens\_0216
* Create a verified dementia measure using diagnosis, drugs and symptoms. Dementia is verified in two-years by a second dx, drug use or symptom, or death in 1 year

clean\_ADRDinc2016.sas

* Source data: exp.ADRDinc\_scens\_0216
* creates: exp.ADRDinc\_verified0216
* Clean up an incident verified dementia dataset

**Build**

awv\_procedure\_codes.sas

* Source data: procedure code extracts
* Creates: awv.preventive\_procedures2002\_2016
* Pulls claims with procedure codes for preventive dementia care

build\_analytical\_dataset

* Source data: exp.demsymptoms\_[ctyp]\_2002\_2016, demdx.adrd\_dx\_[ctyp]\_2002\_2016, awv.preventive\_procedures\_2002\_2016
* creates: awv.analytical2016
* Bring together dementia diagnoses, dementia symptom diagnoses, and preventive procedure claims

modelprep

* Source data: awv.analytical0216, exp.ffsptd\_samp\_0416, bene.bene\_status\_month2009-bene.bene\_status\_month2016, repbase.geoses\_long0716\_zipupdate, hcc.bene\_hccscores2008-bene\_hccscores2016, demdx.cc\_0216,
* creates: awv.analytical\_benemo\_prev2016, awv.analytical\_benemo\_inc20191216
* Merges together all covariates, sample information, and outcomes to create an analytical file. HCC scores are built from CMS released HCC programs

**Analysis**

awv\_master\_vars.do

* Source data:
  + adrdinc\_verified0216
  + analytical\_benemo\_inc\_20191216
  + urbanruralcont
* creates: awv\_yrly
* Cleans up covariates for the model and brings in urban/rural indicator

awv\_master\_analysis\_post.do

* Source data: awv\_yrly
* Runs statistical models and tests looking at impact of AWV on dementia diagnoses