**Readme file for programming code**

These notes describe the procedure for using the code files when one conducts the analysis. Explanations for specific decisions, such as the diagnosis codes used to identify trauma-related injuries, are provided elsewhere in the main manuscript and supplementary materials.

**Software**

We used python 3.8 and Stata/MP 16.0 for this analysis.

**Step 1: Create files for Medicaid and Medicare**

There are two python scripts (see below). One file in the MAX folder will create the files needed for the 2011-2014 MAX sample (FFS and managed-care), by year and state, and the other will create the files needed for the Medicare sample (FFS), by year. Two separate scripts under the same names but in the TAF folder will do the same for 2016 TAF and Medicare data. In TAF, we created unique inpatient stays. The summary of the macro contents is provided at the top within each python file.

|  |  |  |
| --- | --- | --- |
| Macro name | Input files | Output files |
| step1\_create\_medicaid\_files (python) | 1. Inpatient claims  2. Other therapy file  3. Personal Summary file | 1. Inpatient claims  2. Outpatient claims a  2. Mileage information  2,3. Medicaid FFS ambulance claims  2,3. Medicaid managed-care ambulance claims |
| step1\_create\_medicare\_files (python) | 1. MedPAR  2. Carrier base file  3. Carrier line file  4. Outpatient base file  5. Master Beneficiary Summary File | 1. Inpatient claims  2,3,5. Medicare FFS ambulance claims  3. Mileage information  4. Outpatient claims a |

Notes: The numbers indicate which input files were used to create the output files. (e.g. the other therapy file (2) was used to create the outpatient, mileage, and ambulance files (2))

aSince the outpatient file was large, we created a subset of the outpatient file which only consisted of op claims that matched with the ambulance claims.

**Step 2: Link ambulance claims with mileage information and hospital claims.**

There are two python scripts (see below). One file within the MAX folder will merge the MAX ambulance claims with the corresponding mileage information. This same file will also link the Medicaid ambulance claims with the hospital claims (inpatient and outpatient) for both FFS and managed-care, by state and year. The other will merge Medicare ambulance claims with the corresponding mileage information. This same file will also link the Medicare ambulance claims with the hospital claims (inpatient and outpatient), by year. Two separate scripts under the same names but within the TAF folder will do the same for 2016 TAF and Medicare data. The summary of the macro contents is provided at the top within each python file.

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| --- | --- | --- |
| Macro name | Input files | Output files |
| step2\_linkage\_medicaid (python) | 1. Medicaid FFS ambulance claims  2. Medicaid managed-care ambulance claims  3. Mileage information  4. Inpatient claims  5. Outpatient claimsa | 1,3. Merged Medicaid FFS ambulance and mileage  2,3. Merged Medicaid managed-care ambulance and mileage  1,4,5. Linked FFS ambulance and hospital claims  2,4,5. Linked managed-care ambulance and hospital claims |
| step2\_linkage\_medicare (python) | 1. Medicare FFS ambulance claims  2. Mileage information  3. Inpatient claims  4. Outpatient claims a | 1,2. Merged Medicare FFS ambulance and mileage  1,3,4. Linked Medicare FFS ambulance and hospital claims |

Notes: The numbers indicate which input files were used to create the output files. (e.g. the Medicaid FFS ambulance claims (1) and mileage information (3) files were used to create the linked Medicaid FFS ambulance and mileage file (1,3))

aWe used the outpatient subset file which only consisted of op claims that matched with ambulance claims for faster computations.

**Step 3: Calculate the results for table 2**

There is one python script in the MAX folder (see below) that will pool together data from 2011 to 2014 for MAX FFS, MAX managed-care, and Medicare FFS and create the results for the first five indicators, by states: (1) pickup/drop-off code, (2) ambulance claims with mileage information, (3) linked ambulance and hospital claims, (4) admission visits with an external cause of injury code, and (5) outpatient claims with an external cause of injury code. A separate code with the same name within the TAF folder will repeat the process using 2016 TAF and Medicare FFS. The summary within the macro content is provided at the top of each python file.

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| --- | --- | --- |
| Macro name | Input files | Output files |
| step3\_table\_2 (python) | 1. Medicaid FFS ambulance claims  2. Merged Medicaid FFS ambulance and mileage  3. Linked Medicaid FFS ambulance and hospital claims  4. Medicaid managed-care ambulance claims  5. Merged Medicaid managed-care ambulance and mileage  6. Linked managed-care ambulance and hospital claims  7. Medicare FFS ambulance claims  8. Merged Medicare FFS ambulance and mileage  9. Linked Medicare FFS ambulance and hospital claims | 7. Medicare results table for pickup/drop-off indicator  9. Medicare results table for linked ambulance and hospital claims  9. Medicare results table for admission visits with an external cause of injury code  9. Medicare results table for outpatient claims with an external cause of injury code  No Medicaid files were exported. The results for both Medicaid FFS and managed-care were calculated for table 2. |

Notes: A, Since Medicare files are large, we exported separate files listed in the output files above to easily view the results. B, The numbers indicate which input files were used to create the output files. (e.g. the Medicare FFS ambulance claims file (7) was used to create the Medicare results table for pickup/drop-off indicator mileage file (7))

**Step 4: Create Medicaid and Medicare files for ICDPIC software to calculate the new injury severity scores**

There is one python script in the MAX folder (see below) that will pool 2011-2014 together and create the csv files of the linked ambulance and admission cases for MAX FFS, MAX managed-care, and Medicare FFS. There is another file using the same name in the TAF folder that will perform the same task for 2016 TAF FFS, TAF managed-care, and Medicare FFS. The csv files are needed for Stata or R to calculate the new injury severity scores. To use the ICDPIC software in Stata, one must install the ICDPIC software (see <https://ideas.repec.org/c/boc/bocode/s457028.html>). The ICDPIC software will map ICD-9CM discharge diagnosis codes to AIS scores to obtain New Injury Severity Score (NISS) for each trauma episode. We specified the software to convert any AIS score of 6 to a 5 before calculating the NISS. To map ICD-10CM to AIS scores to obtain the NISS, we need to use the ICDPIC R version (<https://injepijournal.biomedcentral.com/articles/10.1186/s40621-018-0149-8>). You may also use ICDPIC R to map ICD-9CM diagnosis codes to AIS and NISS. The summary of the macro content is provided at the top within each python file.

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| --- | --- | --- |
| Macro name | Input files | Output files |
| step4\_create\_medicaid\_medicare\_csv\_files (python) | 1. Linked Medicaid FFS ambulance and hospital claims  2. Linked Medicaid managed-care ambulance and hospital claims  3. Linked Medicare FFS ambulance and hospital claims | 1. Linked Medicaid FFS ambulance and admission cases  2. Linked Medicaid managed-care ambulance and admission cases  3. Linked Medicare FFS ambulance and admission cases |

Notes: The numbers indicate which input files were used to create the output files. (e.g. the linked Medicaid FFS ambulance and hospital claims (1) was used to create the linked Medicaid FFS ambulance and admission cases (1))

**Step 5: Use the output files from ICDPIC to create files for the out-of-sample predictions in Stata**

There is one python script (see below) in each MAX and TAF folder. Step 5 will create files for the out-of-sample predictions. The summary of the macro content is provided at the top within each python file.

|  |  |  |
| --- | --- | --- |
| Macro name | Input files | Output files |
| step5\_prepare\_data\_for\_stata\_and\_to\_produce\_figures (python) | 1. ICDPIC output for Medicaid FFS linked ambulance and admission cases  2. ICDPIC output for Medicaid managed-care linked ambulance and admission cases  3. ICDPIC output for Medicare FFS linked ambulance and admission cases | 1. Cleaned Medicaid FFS linked ambulance and admission cases (.dta)  2. Cleaned Medicaid managed-care linked ambulance and admission cases (.dta)  3. Cleaned Medicare FFS linked ambulance and admission cases (.dta) |

Notes: The numbers indicate which input files were used to create the output files. (e.g. the ICDPIC output for Medicaid FFS linked ambulance and admission cases (1) was one of the files used in order to create a .dta file. This file will be used when we create out-of-sample predictions using Stata.)

**Step 6: Use the output files from step 5 to perform out-of-sample predictions for Medicaid FFS and managed-care**

There are two do-files (see below) in each MAX and TAF folder that will perform out-of-sample predictions for Medicaid FFS and managed-care using the logistic model. The summary of the macro content is provided at the top within each do-file.

|  |  |  |
| --- | --- | --- |
| Macro name | Input files | Output files |
| step6\_prediction\_model\_FFS\_logit (Stata) | 1. Cleaned Medicaid FFS linked ambulance and admission cases  2. Cleaned Medicare FFS linked ambulance and admission cases | 1,2. Prediction results for Medicaid FFS linked ambulance and admission cases |
| step6\_prediction\_model\_encounter\_logit (Stata) | 1. Cleaned Medicaid managed-care linked ambulance and admission cases  2. Cleaned Medicare FFS linked ambulance and admission cases | 1,2. Prediction results for Medicaid managed-care linked ambulance and admission cases |

Notes: The numbers indicate which input files were used to create the output files. (e.g. the ICDPIC output for Medicaid FFS linked ambulance and admission cases (1) was one of the files used to create the prediction results for Medicaid FFS linked ambulance and admission cases (1,2))

**Step 7: Use the output files from the logistic model to create figures 1 and 2 for both Medicaid FFS and managed-care**

There is one python script (see below) in the “figures” folder that will create figures 1 and 2. The summary of the macro content is provided at the top within each python file.

|  |  |  |
| --- | --- | --- |
| Macro name | Input files | Output files |
| step8\_figures\_1\_2 (python) | 1. Cleaned Medicaid FFS linked ambulance and admission cases  2. Cleaned Medicaid managed-care linked ambulance and admission cases  3. Prediction results for Medicaid FFS linked ambulance and admission cases  4. Prediction results for Medicaid managed-care linked ambulance and admission cases | 1,3. Figure 1 for Medicaid FFS (TAF and MAX on one graph)  2,4. Figure 2 for Medicaid managed-care (TAF and MAX on one graph) |

Notes: The numbers indicate which input files were used to create the output files. (e.g. Medicaid FFS linked ambulance and admission cases (1) was one of the files used to create figure 1 for Medicaid FFS (1,3))