covid_status

November 23, 2020

[55]:
```
import pandas as pd
import numpy as np
import csv
import sys
import os

my_dump = False  # if True, dump to pickle files in directory pickle/
my_pickle = True # if True, read from pickle files in directory pickle/

if my_dump == True and my_pickle == True:
    print("You can't dump while pickling.  You should dump before you pickle.")
    sys.exit()

if my_dump == True:
    try:
        os.mkdir('pickle')
    except:
        print("pickle directory already exists")
```

1 Load data.

[56]:
```
if my_pickle == False:
    allergies = pd.read_csv("train/allergies.csv",
                            parse_dates=["START", "STOP"])
    care_plans = pd.read_csv("train/careplans.csv",
                             parse_dates=["START", "STOP"])
    conditions = pd.read_csv("train/conditions.csv",
                             parse_dates=["START", "STOP"])
    devices = pd.read_csv("train/devices.csv",
                          parse_dates=["START","STOP"])
    encounters = pd.read_csv("train/encounters.csv",
                             parse_dates=["START", "STOP"])
    imaging_studies = pd.read_csv("train/imaging_studies.csv",
                                  parse_dates=["DATE"])
    immunizations = pd.read_csv("train/immunizations.csv",
                                parse_dates=["DATE"])
```

```
    medications = pd.read_csv("train/medications.csv",
                              parse_dates=["START","STOP"])
    observations = pd.read_csv("train/observations.csv",
                               parse_dates=["DATE"])
    #organizations = pd.read_csv("train/organizations.csv")

    #payers = pd.read_csv("train/payers.csv")
    #payer_transitions = pd.read_csv("train/payer_transitions.csv")
    procedures = pd.read_csv("train/procedures.csv",
                             parse_dates=["DATE"])
    #providers = pd.read_csv("train/providers.csv")
    #supplies = pd.read_csv("train/supplies.csv",
    #                       parse_dates=["DATE"])
```

[57]:
```
if my_pickle == False:
    patients = pd.read_csv("train/patients.csv",
                           parse_dates=["BIRTHDATE","DEATHDATE"])
```

[58]:
```
if my_dump == True:
    import pickle
    pickle.dump(allergies, open("pickle/allergies.p","wb"))
    pickle.dump(care_plans, open("pickle/care_plans.p","wb"))
    pickle.dump(conditions, open("pickle/conditions.p","wb"))
    pickle.dump(devices, open("pickle/devices.p","wb"))
    pickle.dump(encounters, open("pickle/encounters.p","wb"))
    pickle.dump(imaging_studies, open("pickle/imaging_studies.p","wb"))
    pickle.dump(immunizations, open("pickle/immunizations.p","wb"))
    pickle.dump(medications, open("pickle/medications.p","wb"))
    pickle.dump(observations, open("pickle/observations.p","wb"))
    pickle.dump(procedures, open("pickle/procedures.p","wb"))
    pickle.dump(patients, open("pickle/patients.p","wb"))
```

[59]:
```
if my_pickle == True:
    import pickle
    try:
        allergies = pickle.load(open("pickle/allergies.p","rb"))
        care_plans = pickle.load(open("pickle/care_plans.p","rb"))
        conditions = pickle.load(open("pickle/conditions.p","rb"))
        devices = pickle.load(open("pickle/devices.p","rb"))
        encounters = pickle.load(open("pickle/encounters.p","rb"))
        imaging_studies = pickle.load(open("pickle/imaging_studies.p","rb"))
        immunizations = pickle.load(open("pickle/immunizations.p","rb"))
        medications = pickle.load(open("pickle/medications.p","rb"))
        observations = pickle.load(open("pickle/observations.p","rb"))
        procedures = pickle.load(open("pickle/procedures.p","rb"))
        patients = pickle.load(open("pickle/patients.p","rb"))
    except:
```

```
        print("You need to dump before you pickle.  Did you dump first?")
```

2 IDs for Target

[60]:
```
#diagnosed patients
covid_patient_ids = conditions[conditions.CODE == 840539006].PATIENT.unique()

# negative tests
negative_covid_patient_ids = frozenset(observations[(observations.
 ↪CODE=='94531-1') &
                                                    (observations.VALUE == 'Not detected␣
 ↪(qualifier value)')].PATIENT.unique())
#hospitalized patients
inpatient_ids = frozenset(encounters[(encounters.REASONCODE == 840539006) &
                           (encounters.CODE==1505002)].PATIENT)
# deceased patients
deceased_ids = frozenset(np.intersect1d(covid_patient_ids, patients[patients.
 ↪DEATHDATE.notna()].Id))
# ventilated patients
vent_ids = frozenset(procedures[(procedures.CODE == 26763009) &
                     (procedures.PATIENT.isin(covid_patient_ids))].PATIENT)
# ICU patients
icu_ids = frozenset(encounters[(encounters.CODE == 305351004) &
                    (encounters.PATIENT.isin(covid_patient_ids))].PATIENT)

covid_patient_ids = frozenset(covid_patient_ids)
```

Calculate days hospitalized and days in ICU.

[61]:
```
encounters["STOP_NEW"] = encounters["STOP"]
encounters["LENGTH"] = (encounters["STOP_NEW"] - encounters["START"]) / np.
 ↪timedelta64(int(1), "D")

hospital_days = (
    encounters[["PATIENT","LENGTH","REASONCODE","CODE"]]
    .loc[(encounters.REASONCODE == 840539006) &
        (encounters.CODE==1505002)]
    .groupby("PATIENT")["LENGTH"]
    .sum()
).to_dict()

icu_days = (
    encounters[["PATIENT","LENGTH","REASONCODE","CODE"]]
    .loc[(encounters.CODE == 305351004) &
        (encounters.PATIENT.isin(covid_patient_ids))]
```

```
    .groupby("PATIENT")["LENGTH"]
    .sum()
).to_dict()
```

3 Data Prep

3.1 Patients

Calculate current age (for deceased, age if they were alive)

[62]:
```
current_age = pd.to_datetime('2020-01-01') - patients["BIRTHDATE"]
patients["Age"] = current_age
patients["Age"] = patients["Age"] / np.timedelta64(int(1),'Y')
```

Remove people who died before January 1st, 2020.

[63]:
```
dead_patients = patients.loc[patients["DEATHDATE"] < pd.
 ↪to_datetime('2020-01-01'),
                              "Id"]


patients = patients.drop(
    patients.loc[patients["DEATHDATE"] < pd.to_datetime('2020-01-01'),
                 "Id"]
    .index
)

patients_dict = patients.copy()
patients_dict = patients_dict.set_index("Id")
patients_dict = patients_dict.to_dict()
```

3.2 Allergies

Drop allergies that start after 2020.

[64]:
```
allergies = allergies.drop(
    allergies[allergies["START"] >= pd.to_datetime('2020-01-01')]
    .index
)

allergies = allergies.drop(
    allergies[allergies["PATIENT"].isin(dead_patients)]
    .index
)
```

Number of allergies for a patient.

[65]:
```
num_allergies = allergies[["PATIENT", "START"]].groupby(["PATIENT"]).count()
vets_with_allergies = allergies["PATIENT"].unique()

num_allergies_dict = num_allergies.to_dict()
```

3.3 Care Plans

Remove COVID-related care plans from care plans.

[66]:
```
care_plans = care_plans.drop(
    care_plans[care_plans["REASONCODE"]
               .isin(["840544004","840539006"])]
    .index
)
```

Remove care plans that start after 2020.

[67]:
```
care_plans = care_plans.drop(
    care_plans[care_plans["START"] >= pd.to_datetime('2020-01-01')]
    .index
)

care_plans = care_plans.drop(
    care_plans[care_plans["PATIENT"].isin(dead_patients)]
    .index
)
```

Number of active care plans. Time on active care plans. Lifetime care plans. Total length of time on care plans.

[68]:
```
active_care_plans = (
  care_plans[["PATIENT","CODE","STOP"]]
    .loc[care_plans["STOP"].isnull()]
    .groupby("PATIENT")
    .count()
    .loc[:,"CODE"]
)

lifetime_care_plans = (
    care_plans[["PATIENT", "CODE", "STOP"]]
    .groupby("PATIENT")
    .count()
    .loc[:,"CODE"]
)
```

```
care_plans["STOP_NEW"] = care_plans["STOP"]
care_plans.loc[care_plans["STOP"].isnull(),"STOP_NEW"] = pd.
 ↪to_datetime('2020-01-01')
care_plans["LENGTH"] = (care_plans["STOP_NEW"] - care_plans["START"]) / np.
 ↪timedelta64(int(1), "Y")

active_care_plan_length = (
care_plans[["PATIENT","CODE","STOP","START","LENGTH"]]
    .loc[care_plans["STOP"].isnull()]
    .groupby("PATIENT")["LENGTH"]
    .max()
)

lifetime_care_plan_length = (
    care_plans[["PATIENT","LENGTH"]]
    .groupby("PATIENT")["LENGTH"]
    .sum()
)
```

3.4 Conditions

Drop COVID-related conditions.

[69]:
```
conditions = conditions.drop(
    conditions[conditions["DESCRIPTION"]
               .isin(["840544004","840539006"])]
    .index
)
```

Drop conditions beginning in 2020.

[70]:
```
conditions = conditions.drop(
    conditions[conditions["START"] >= pd.to_datetime('2020-01-01')]
    .index
)

conditions = conditions.drop(
    conditions[conditions["PATIENT"].isin(dead_patients)]
    .index
)
```

Active and lifetime conditions.

[71]:
```
active_conditions = (
  conditions[["PATIENT","CODE","STOP"]]
    .loc[conditions["STOP"].isnull()]
    .groupby("PATIENT")
```

```
    .count()
    .loc[:,"CODE"]
)

lifetime_conditions = (
    conditions[["PATIENT", "CODE", "STOP"]]
    .groupby("PATIENT")
    .count()
    .loc[:,"CODE"]
)

conditions["STOP_NEW"] = conditions["STOP"]
conditions.loc[conditions["STOP"].isnull(),"STOP_NEW"] = pd.
↪to_datetime('2020-01-01')
conditions["LENGTH"] = (
    conditions["STOP_NEW"] - conditions["START"]) / np.timedelta64(int(1), "Y")

active_condition_length = (
conditions[["PATIENT","CODE","STOP","START","LENGTH"]]
    .loc[conditions["STOP"].isnull()]
    .groupby("PATIENT")["LENGTH"]
    .max()
)

lifetime_condition_length = (
    conditions[["PATIENT","LENGTH"]]
    .groupby("PATIENT")["LENGTH"]
    .sum()
)
```

3.5 Devices

Drop devices before 2020. Calculate time spent on a device in lifetime.

[72]:
```
devices["STOP_NEW"] = devices["STOP"]
devices.loc[devices["STOP"].isnull(),"STOP_NEW"] = pd.to_datetime('2020-01-01')
devices["LENGTH"] = (
    devices["STOP_NEW"] - devices["START"]) / np.timedelta64(int(1), "Y")
devices = devices.drop(
    devices[devices["START"] >= pd.to_datetime('2020-01-01')]
    .index
)

device_lifetime_length = (
    devices[["PATIENT","LENGTH"]]
    .groupby("PATIENT")["LENGTH"]
```

```
    .sum()
)

devices = devices.drop(
    devices[devices["PATIENT"].isin(dead_patients)]
    .index
)
```

3.6 Encounters

Drop encounters after 2020. Calculate number of encounters, lifetime total cost of encounters, lifetime base cost, lifetime payer coverage.

[73]:
```
if my_pickle == False:
    encounters = encounters.drop(
        encounters[encounters["START"] >= pd.to_datetime('2020-01-01T00:00Z')]
        .index
    )

    encounters = encounters.drop(
        encounters[encounters["PATIENT"].isin(dead_patients)]
        .index
    )

    encounters_count = (
        encounters[["PATIENT", "CODE"]]
        .groupby("PATIENT")
        .count()
        .loc[:,"CODE"]
    )

    encounters_lifetime_total_cost = (
        encounters[["PATIENT","TOTAL_CLAIM_COST"]]
        .groupby("PATIENT")["TOTAL_CLAIM_COST"]
        .sum()
    )

    encounters_lifetime_base_cost = (
        encounters[["PATIENT","BASE_ENCOUNTER_COST"]]
        .groupby("PATIENT")["BASE_ENCOUNTER_COST"]
        .sum()
    )

    encounters_lifetime_payer_coverage = (
        encounters[["PATIENT","PAYER_COVERAGE"]]
        .groupby("PATIENT")["PAYER_COVERAGE"]
```

```
        .sum()
    )

    def divide_sum_enc(df_sub):
        return df_sub["PAYER_COVERAGE"].sum()/float(df_sub["TOTAL_CLAIM_COST"].
↪sum())

    encounters_lifetime_perc_covered = (
        encounters[["PATIENT", "PAYER_COVERAGE", "TOTAL_CLAIM_COST"]]
        .groupby("PATIENT").apply(divide_sum_enc)
    )
```

[74]:
```
if my_dump == True:
    pickle.dump(encounters_count, open("pickle/encounters_count.p","wb"))
    pickle.dump(encounters_lifetime_total_cost, open("pickle/
↪encounters_lifetime_total_cost.p","wb"))
    pickle.dump(encounters_lifetime_base_cost, open("pickle/
↪encounters_lifetime_base_cost.p","wb"))
    pickle.dump(encounters_lifetime_payer_coverage, open("pickle/
↪encounters_lifetime_payer_coverage.p","wb"))
    pickle.dump(encounters_lifetime_perc_covered, open("pickle/
↪encounters_lifetime_perc_covered.p","wb"))
```

[75]:
```
if my_pickle == True:
    encounters_count = pickle.load(open("pickle/encounters_count.p", "rb"))
    encounters_lifetime_total_cost = pickle.load(open("pickle/
↪encounters_lifetime_total_cost.p", "rb"))
    encounters_lifetime_base_cost = pickle.load(open("pickle/
↪encounters_lifetime_base_cost.p", "rb"))
    encounters_lifetime_payer_coverage = pickle.load(open("pickle/
↪encounters_lifetime_payer_coverage.p", "rb"))
    encounters_lifetime_perc_covered = pickle.load(open("pickle/
↪encounters_lifetime_perc_covered.p", "rb"))
```

3.7 Imaging Studies

Drop imaging studies after 2020. Lifetime number of imaging studies.

[76]:
```
imaging_studies = imaging_studies.drop(
    imaging_studies[imaging_studies["DATE"] >= pd.to_datetime('2020-01-01')]
    .index
)

imaging_studies = imaging_studies.drop(
    imaging_studies[imaging_studies["PATIENT"].isin(dead_patients)]
    .index
```

```
)


imaging_studies_lifetime = (
    imaging_studies[["PATIENT", "ENCOUNTER"]]
    .groupby("PATIENT")
    .count()
    .loc[:,"ENCOUNTER"]
)
```

3.8 Immunizations

Drop immunizations after 2020. Lifetime number of immunizations and cost.

[77]:
```
immunizations = immunizations.drop(
    immunizations[immunizations["DATE"] >= pd.to_datetime('2020-01-01')]
    .index
)

immunizations = immunizations.drop(
    immunizations[immunizations["PATIENT"].isin(dead_patients)]
    .index
)

immunizations_lifetime = (
    immunizations[["PATIENT", "CODE"]]
    .groupby("PATIENT")
    .count()
    .loc[:,"CODE"]
)

immunizations_lifetime_cost = (
    immunizations[["PATIENT", "BASE_COST"]]
    .groupby("PATIENT")["BASE_COST"]
    .sum()
)
```

3.9 Medications

Remove medications after 2020. Calculate lifetime medications, cost, and length.

[78]:
```
if my_pickle == False:
    medications["STOP_NEW"] = medications["STOP"]
    medications.loc[medications["STOP"].isnull(),"STOP_NEW"] = pd.
 ↪to_datetime('2020-01-01')
```

```
    medications["LENGTH"] = (
        medications["STOP_NEW"] - medications["START"]) / np.
↪timedelta64(int(1), "W")
    medications = medications.drop(
        medications[medications["START"] >= pd.to_datetime('2020-01-01')]
        .index
    )

    medications = medications.drop(
        medications[medications["PATIENT"].isin(dead_patients)]
        .index
    )

    medications_lifetime = (
        medications[["PATIENT", "CODE"]]
        .groupby("PATIENT")
        .count()
        .loc[:,"CODE"]
    )

    medications_lifetime_cost = (
        medications[["PATIENT", "TOTALCOST"]]
        .groupby("PATIENT")["TOTALCOST"]
        .sum()
    )

    def divide_sum_med(df_sub):
        return df_sub["PAYER_COVERAGE"].sum()/float(df_sub["BASE_COST"].sum())

    medications_lifetime_perc_covered = (
        medications[["PATIENT", "PAYER_COVERAGE", "BASE_COST"]]
        .groupby("PATIENT").apply(divide_sum_med)
    )


    medications_lifetime_length = (
        medications[["PATIENT", "LENGTH"]]
        .groupby("PATIENT")["LENGTH"]
        .sum()
    )

    medications_lifetime_dispenses = (
        medications[["PATIENT", "DISPENSES"]]
        .groupby("PATIENT")["DISPENSES"]
        .sum()
    )
    medications_active = (
```

```
    medications[["PATIENT","CODE","STOP"]]
      .loc[medications["STOP"].isnull()]
      .groupby("PATIENT")
      .count()
      .loc[:,"CODE"]
  )
```

[79]:
```
if my_dump == True:
    pickle.dump(medications_lifetime, open("pickle/medications_lifetime.p",␣
↪"wb"))
    pickle.dump(medications_lifetime_cost, open("pickle/
↪medications_lifetime_cost.p", "wb"))
    pickle.dump(medications_lifetime_perc_covered, open("pickle/
↪medications_lifetime_perc_covered.p", "wb"))
    pickle.dump(medications_lifetime_length, open("pickle/
↪medications_lifetime_length.p", "wb"))
    pickle.dump(medications_lifetime_dispenses, open("pickle/
↪medications_lifetime_dispenses.p", "wb"))
    pickle.dump(medications_active, open("pickle/medications_active.p", "wb"))
```

[80]:
```
if my_pickle == True:
    medications_lifetime = pickle.load(open("pickle/medications_lifetime.p",␣
↪"rb"))
    medications_lifetime_cost = pickle.load(open("pickle/
↪medications_lifetime_cost.p", "rb"))
    medications_lifetime_perc_covered = pickle.load(open("pickle/
↪medications_lifetime_perc_covered.p", "rb"))
    medications_lifetime_length = pickle.load(open("pickle/
↪medications_lifetime_length.p", "rb"))
    medications_lifetime_dispenses = pickle.load(open("pickle/
↪medications_lifetime_dispenses.p", "rb"))
    medications_active = pickle.load(open("pickle/medications_active.p", "rb"))
```

3.10 Observations

Remove observations after 2020.

[81]:
```
observations = observations.drop(
    observations[observations["DATE"] >= pd.to_datetime('2020-01-01')]
    .index)

observations = observations.drop(
    observations[observations["PATIENT"].isin(dead_patients)]
    .index
)
```

[82]:
```
# get most recent observation
obs_nominal_data = (
    observations[["DATE", "PATIENT", "CODE", "VALUE", "DESCRIPTION","TYPE"]]
    .loc[observations["TYPE"] == 'text',:]
    .sort_values("DATE")
    .groupby(["PATIENT", "DESCRIPTION"])
    .tail(1)
)
obs_nominal_data["DESC"] = (
    obs_nominal_data["DESCRIPTION"].str
    .replace(" ", "_", regex=True)
    .replace(r"\[", "_", regex=True)
    .replace(r"\.", "_", regex=True)
    .replace(r"\(","_", regex=True)
    .replace(r"-","_", regex=True)
    .replace(r"\/","_", regex=True)
    .replace(r"\]","_", regex=True)
    .replace(r"\)","_", regex=True)
    .replace(r"\+","_", regex=True)
    .replace(r"\#","_", regex=True)
)
obs_nominal_data["VALUE"] = (
    obs_nominal_data["VALUE"].str
    .replace(" ", "_", regex=True)
    .replace(r"\[", "_", regex=True)
    .replace(r"\.", "_", regex=True)
    .replace(r"\(","_", regex=True)
    .replace(r"-","_", regex=True)
    .replace(r"\/","_", regex=True)
    .replace(r"\]","_", regex=True)
    .replace(r"\)","_", regex=True)
    .replace(r"\+","_", regex=True)
    .replace(r"\#","_", regex=True)
)
obs_nominal_data["PROPS"] = obs_nominal_data["DESC"].astype(str) +␣
 ↪obs_nominal_data["VALUE"].astype(str)
obs_props = list(obs_nominal_data["PROPS"].unique())
obs_tuples = frozenset(zip(obs_nominal_data["PATIENT"],␣
 ↪obs_nominal_data["PROPS"]))

print(len(obs_props))

#####
obs_nominal_names = list(obs_nominal_data["DESC"].unique())
obs_nominal_dict = (
    obs_nominal_data
    .pivot(index="PATIENT", columns="DESC", values="VALUE")
```

```
    .stack()
    .to_dict()
)
#######

# use get_dummies to convert to one-hot
#obs_nominal_data = pd.get_dummies(obs_nominal_data, dummy_na=True)

#obs_nominal_data.to_csv("train_nominal_dummies.csv",quoting=csv.
↪QUOTE_NONNUMERIC)
#obs_nominal_data.head()
```

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[83]:
```
if my_pickle == False:
    # get most recent observation
    obs_data = (
        observations[["DATE", "PATIENT", "CODE", "VALUE", "DESCRIPTION","TYPE"]]
        .loc[observations["TYPE"] == 'numeric',:]
        .sort_values("DATE")
        .groupby(["PATIENT", "DESCRIPTION"])
        .tail(1)
    )
```

[84]:
```
 if my_pickle == False:
    # get lifetime average of continuous observations
    obs_mean_data = (
        observations[["PATIENT", "CODE", "VALUE", "DESCRIPTION", "TYPE"]]
        .loc[observations["TYPE"] == "numeric", :]
        .groupby(["PATIENT", "DESCRIPTION"])
        .apply(lambda x: x["VALUE"].astype(float).mean())
        .reset_index()
        .rename(columns={0:"VALUE"})
    )
```

[85]:
```
if my_pickle == False:
    # use eligible descriptions
    obs_data["DESC"] = (
        obs_data["DESCRIPTION"].str
        .replace(" ", "_", regex=True)
        .replace(r"\[", "_", regex=True)
        .replace(r"\.", "_", regex=True)
        .replace(r"\(","_", regex=True)
        .replace(r"-","_", regex=True)
        .replace(r"\/","_", regex=True)
        .replace(r"\]","_", regex=True)
        .replace(r"\)","_", regex=True)
```

```
        .replace(r"\+","_", regex=True)
        .replace(r"\#","_", regex=True)
    )
    obs_numeric = list(obs_data["DESC"].unique())
    obs_mean_data["DESC"] = (
        obs_mean_data["DESCRIPTION"].str
        .replace(" ", "_", regex=True)
        .replace(r"\[", "_", regex=True)
        .replace(r"\.", "_", regex=True)
        .replace(r"\(","_", regex=True)
        .replace(r"-","_", regex=True)
        .replace(r"\/","_", regex=True)
        .replace(r"\]","_", regex=True)
        .replace(r"\)","_", regex=True)
        .replace(r"\+","_", regex=True)
        .replace(r"\#","_", regex=True)
    )
    obs_mean_data["DESC"] = "mean_" + obs_mean_data["DESC"].astype(str)
    obs_numeric_mean = list(obs_mean_data["DESC"].unique())
```

[86]:
```
if my_dump == True:
    pickle.dump(obs_data, open("pickle/obs_data.p","wb"))
    pickle.dump(obs_mean_data, open("pickle/obs_mean_data.p","wb"))
    pickle.dump(obs_numeric, open("pickle/obs_numeric.p","wb"))
    pickle.dump(obs_numeric_mean, open("pickle/obs_numeric_mean.p","wb"))
```

[87]:
```
if my_pickle == True:
    obs_data = pickle.load(open("pickle/obs_data.p","rb"))
    obs_mean_data = pickle.load(open("pickle/obs_mean_data.p","rb"))
    obs_numeric = pickle.load(open("pickle/obs_numeric.p","rb"))
    obs_numeric_mean = pickle.load(open("pickle/obs_numeric_mean.p","rb"))
print(len(obs_numeric))
print(len(obs_numeric_mean))
```

```
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139
```

[88]:
```
 if my_pickle == True:
    obs_dict = (
        obs_data[["PATIENT", "DESC", "VALUE"]]
        .pivot(index="PATIENT", columns="DESC", values="VALUE")
        .stack()
        .to_dict()
    )

    obs_mean_dict = (
        obs_mean_data[["PATIENT", "DESC", "VALUE"]]
```

```
        .pivot(index="PATIENT", columns="DESC", values="VALUE")
        .stack()
        .to_dict()
    )
```

[89]:
```
if my_dump == True:
    pickle.dump(obs_dict, open("pickle/obs_dict.p","wb"))
    pickle.dump(obs_mean_dict, open("pickle/obs_mean_dict.p","wb"))
```

[90]:
```
obs_dict = pickle.load(open("pickle/obs_dict.p","rb"))
obs_mean_dict = pickle.load(open("pickle/obs_mean_dict.p","rb"))
```

3.11 Procedures

Drop procedures from 2020. Count lifetime procedures. Add procedure cost.

[91]:
```
procedures = procedures.drop(
    procedures[procedures["DATE"] >= pd.to_datetime('2020-01-01')]
    .index
)

procedures = procedures.drop(
    procedures[procedures["PATIENT"].isin(dead_patients)]
    .index
)

procedures_lifetime = (
    procedures[["PATIENT", "CODE"]]
    .groupby("PATIENT")
    .count()
    .loc[:,"CODE"]
)

procedures_lifetime_cost = (
    procedures[["PATIENT", "BASE_COST"]]
    .groupby("PATIENT")["BASE_COST"]
    .sum()
)
```

4 Properties

4.1 Allergies

[92]:
```
allergy_data = (
    allergies[["STOP", "PATIENT", "DESCRIPTION"]]
    .loc[allergies["STOP"].isnull(),:]
)

# Create legible names
allergy_data["DESC"] = (
    allergy_data["DESCRIPTION"].str[:25]
    .replace(" ", "_", regex=True)
    .replace(r"\[", "_", regex=True)
    .replace(r"\.", "_", regex=True)
    .replace(r"\(","_", regex=True)
    .replace(r"-","_", regex=True)
    .replace(r"\/","_", regex=True)
    .replace(r"\]","_", regex=True)
    .replace(r"\)","_", regex=True)
    .replace(r"\+","_", regex=True)
    .replace(r"\#","_", regex=True)
)
allergy_names = list(allergy_data["DESC"].unique())
allergy_tuples = frozenset(zip(allergy_data["PATIENT"], allergy_data["DESC"]))
print(len(allergy_names))
```

```
15
```

4.2 Devices

[93]:
```
device_data = (
    devices[["STOP", "PATIENT", "DESCRIPTION"]]
    .loc[devices["STOP"].isnull(),:]
)

# Create legible names
device_data["DESC"] = (
    device_data["DESCRIPTION"].str[:25]
    .replace(" ", "_", regex=True)
    .replace(r"\[", "_", regex=True)
    .replace(r"\.", "_", regex=True)
    .replace(r"\(","_", regex=True)
    .replace(r"-","_", regex=True)
    .replace(r"\/","_", regex=True)
    .replace(r"\]","_", regex=True)
```

```
    .replace(r"\)","_", regex=True)
    .replace(r"\+","_", regex=True)
    .replace(r"\#","_", regex=True)
)
device_names = list(device_data["DESC"].unique())
device_tuples = frozenset(zip(device_data["PATIENT"], device_data["DESC"]))
print(len(device_names))
```

3

4.3 Active Conditions

[94]:
```
# Check active conditions in test file
conditions_test = pd.read_csv("test/conditions.csv",
                          parse_dates=["START","STOP"])

cond_count = (
    conditions_test[["STOP", "DESCRIPTION","CODE"]]
        .loc[conditions_test["STOP"].isnull()]
        .groupby("CODE")
        .count()
        .reset_index()
        .sort_values(by="DESCRIPTION", ascending=False)
)

# keep active conditions where there are at least 1 patients in the test set
cond_keep = cond_count.loc[cond_count["DESCRIPTION"] >= 1,"CODE"]

cond_data = (
    conditions[["STOP", "PATIENT", "CODE", "DESCRIPTION"]]
    .loc[conditions["CODE"].isin(cond_keep) &
         conditions["STOP"].isnull(),:]
)

# Create legible names
cond_data["DESC"] = (
    cond_data["DESCRIPTION"].str[:25]
    .replace(" ", "_", regex=True)
    .replace(r"\[", "_", regex=True)
    .replace(r"\.", "_", regex=True)
    .replace(r"\(","_", regex=True)
    .replace(r"-","_", regex=True)
    .replace(r"\/","_", regex=True)
    .replace(r"\]","_", regex=True)
    .replace(r"\)","_", regex=True)
    .replace(r"\+","_", regex=True)
```

```
    .replace(r"\#","_", regex=True)
)
cond_names = list(cond_data["DESC"].unique())

cond_tuples = frozenset(zip(cond_data["PATIENT"], cond_data["DESC"]))

print(len(cond_names))
```

```
103
```

[ ]:

4.4 Immunizations

[95]:
```
# Create legible names
immunizations["DESC"] = (
    immunizations["DESCRIPTION"].str[:25]
    .replace(" ", "_", regex=True)
    .replace(r"\[", "_", regex=True)
    .replace(r"\.", "_", regex=True)
    .replace(r"\(","_", regex=True)
    .replace(r"-","_", regex=True)
    .replace(r"\/","_", regex=True)
    .replace(r"\]","_", regex=True)
    .replace(r"\)","_", regex=True)
    .replace(r"\+","_", regex=True)
    .replace(r"\#","_", regex=True)

)
immunization_names = list(immunizations["DESC"].unique())
immunization_tuples = frozenset(zip(immunizations["PATIENT"],␣
 ↪immunizations["DESC"]))
print(len(immunization_names))
```

```
8
```

4.5 Procedures

[96]:
```
# Create legible names
procedures["DESC"] = (
    procedures["DESCRIPTION"].str[:25]
    .replace(" ", "_", regex=True)
    .replace(r"\[", "_", regex=True)
    .replace(r"\.", "_", regex=True)
    .replace(r"\(","_", regex=True)
```

```
    .replace(r"-","_", regex=True)
    .replace(r"\/","_", regex=True)
    .replace(r"\]","_", regex=True)
    .replace(r"\)","_", regex=True)
    .replace(r"\+","_", regex=True)
    .replace(r"\#","_", regex=True)
)
procedure_names = list(procedures["DESC"].unique())
procedure_tuples = frozenset(zip(procedures["PATIENT"], procedures["DESC"]))
```

[97]:
```
print(len(procedure_names))
```

```
161
```

Utilities

[98]:
```
def convert_name(name):
    for i in range(26):
        name = name.replace('({})'.format(chr(ord('a') + i)), '')
    name = name.replace(' ', '_')
    textform_first = {
        '^2': '_squared',
        '^3': '_cubed',
        '1/': 'inverse_of_',
        '<=': '_leq_',
        '>=': '_geq_'
    }
    textform = {
        '<': '_lt_',
        '>': '_gt_',
        '+': '_plus_',
        '-': '_minus_',
        '*': '_times_',
        '/': '_divided_by_',
        '^': '_to_the_power_',
        '(': 'open_bracket_',
        ')': '_close_bracket',
        ',': '_or_', # added by Paul
        '\'': '', # added by Paul
        '=': '_equal_' # added by Paul
                }
    for op in textform_first:
        name = name.replace(op, textform_first[op])
    for op in textform:
        name = name.replace(op, textform[op])
    return name

def convert_name_back(name):
```

```
    for i in range(26):
        name = name.replace('({})'.format(chr(ord('a') + i)), '')
    # name = name.replace('_', ' ')
    textform_first = {
        '_squared': '^2',
        '_cubed': '^3',
        'inverse_of_': '1/',
         '_leq_': '<=',
         '_geq_': '>='
    }
    textform = {
        '_lt_': '<',
        '_gt_': '>',
        '_plus_': '+',
        '_minus_': '-',
        '_times_': '*',
        '_divided_by_': '/',
        '_to_the_power_': '^',
        'open_bracket_': '(',
        '_close_bracket': ')',
        '_or_': ',', # added by Paul
        '_equal_': '=' # added by Paul
              }
    for op in textform_first:
        name = name.replace(op, textform_first[op])
    for op in textform:
        name = name.replace(op, textform[op])
    return name

def convert_conjecture_names(conjectures):
    for conj in conjectures:
        conj.__name__ = convert_name(conj.__name__)

def convert_names_back(conjectures): #note the plural name(s)
    for conj in conjectures:
        conj.__name__ = convert_name_back(conj.__name__)
```

5 Define Patient class.

[99]:
```
class Patient():
    def __init__(self, row):
        self.Id = row.Id
    ###################
    # target-related #
    ###################
```

```
    def hospitalized_status(self):
        if self.Id in inpatient_ids:
            return(True)
        return(False)
    def icu_status(self):
        if self.Id in icu_ids:
            return(True)
        return(False)
    ######################
    # target properties and invariants #
    ######################
    def covid_status(self):
        if self.Id in covid_patient_ids:
            return(True)
        return(False)
    def vent_status(self):
        if self.Id in vent_ids:
            return(True)
        return(False)
    def covid_death_status(self):
        if self.Id in deceased_ids:
            return(True)
        return(False)
    def hospital_days(self):
        if self.Id in hospital_days:
            return(float(hospital_days[self.Id]))
        return(float(0))
    def icu_days(self):
        if self.Id in icu_days:
            return(float(icu_days[self.Id]))
        return(float(0))
    ################
    # invariants   #
    ################
    def healthcare_expenses(self):
        return(float(patients_dict["HEALTHCARE_EXPENSES"][self.Id]))
    def healthcare_coverage(self):
        return(float(patients_dict["HEALTHCARE_COVERAGE"][self.Id]))
    def latitude(self):
        return(float(patients_dict["LAT"][self.Id]))
    def longitude(self):
        return(float(patients_dict["LON"][self.Id]))
    def age(self):
        return(float(patients_dict["Age"][self.Id]))
    def num_allergies(self):
        if self.Id in vets_with_allergies:
            return(float(num_allergies_dict["START"][self.Id]))
```

```
        return(float(0))
    def active_care_plans(self):
        if self.Id in active_care_plans:
            return(float(active_care_plans[self.Id]))
        return(float(0))
    def lifetime_care_plans(self):
        if self.Id in lifetime_care_plans:
            return(float(lifetime_care_plans[self.Id]))
        return(float(0))
    def active_care_plan_length(self):
        if self.Id in active_care_plan_length:
            return(float(active_care_plan_length[self.Id]))
        return(float(0))
    def lifetime_care_plan_length(self):
        if self.Id in lifetime_care_plan_length:
            return(float(lifetime_care_plan_length[self.Id]))
        return(float(0))
    def active_conditions(self):
        if self.Id in active_conditions:
            return(float(active_conditions[self.Id]))
        return(float(0))
    def lifetime_conditions(self):
        if self.Id in lifetime_conditions:
            return(float(lifetime_conditions[self.Id]))
        return(float(0))
    def active_condition_length(self):
        if self.Id in active_condition_length:
            return(float(active_condition_length[self.Id]))
        return(float(0))
    def lifetime_condition_length(self):
        if self.Id in lifetime_condition_length:
            return lifetime_condition_length[self.Id]
        return(float(0))
    def device_lifetime_length(self):
        if self.Id in device_lifetime_length:
            return(float(device_lifetime_length[self.Id]))
        return(float(0))
    def encounters_count(self):
        if self.Id in encounters_count:
            return(float(encounters_count[self.Id]))
        return(float(0))
    def encounters_lifetime_total_cost(self):
        if self.Id in encounters_lifetime_total_cost:
            return(float(encounters_lifetime_total_cost[self.Id]))
        return(float(0))
    def encounters_lifetime_base_cost(self):
        if self.Id in encounters_lifetime_base_cost:
```

```
            return(float(encounters_lifetime_base_cost[self.Id]))
        return(float(0))
    def encounters_lifetime_payer_coverage(self):
        if self.Id in encounters_lifetime_payer_coverage:
            return(float(encounters_lifetime_payer_coverage[self.Id]))
        return(float(0))
    def encounters_lifetime_perc_covered(self):
        if self.Id in encounters_lifetime_perc_covered:
            return(float(encounters_lifetime_perc_covered[self.Id]))
        return(float(0))
    def imaging_studies_lifetime(self):
        if self.Id in imaging_studies_lifetime:
            return(float(imaging_studies_lifetime[self.Id]))
        return(float(0))
    def immunizations_lifetime(self):
        if self.Id in immunizations_lifetime:
            return(float(immunizations_lifetime[self.Id]))
        return(float(0))
    def immunizations_lifetime_cost(self):
        if self.Id in immunizations_lifetime_cost:
            return(float(immunizations_lifetime_cost[self.Id]))
        return(float(0))
    def medications_lifetime(self):
        if self.Id in medications_lifetime:
            return(float(medications_lifetime[self.Id]))
        return(float(0))
    def medications_lifetime_cost(self):
        if self.Id in medications_lifetime_cost:
            return(float(medications_lifetime_cost[self.Id]))
        return(float(0))
    def medications_lifetime_perc_covered(self):
        if self.Id in medications_lifetime_perc_covered:
            return(float(medications_lifetime_perc_covered[self.Id]))
        return(float(0))
    def medications_lifetime_length(self):
        if self.Id in medications_lifetime_length:
            return(float(medications_lifetime_length[self.Id]))
        return(float(0))
    def medications_lifetime_dispenses(self):
        if self.Id in medications_lifetime_dispenses:
            return(float(medications_lifetime_dispenses[self.Id]))
        return(float(0))
    def medications_active(self):
        if self.Id in medications_active:
            return(float(medications_active[self.Id]))
        return(float(0))
    def procedures_lifetime(self):
```

```
        if self.Id in procedures_lifetime:
            return(float(procedures_lifetime[self.Id]))
        return(float(0))
    def procedures_lifetime_cost(self):
        if self.Id in procedures_lifetime_cost:
            return(float(procedures_lifetime_cost[self.Id]))
        return(float(0))

target_properties_names = ["covid_status",
                           "vent_status",
                           "covid_death_status",
                           "hospitalized_status",
                           "icu_status"]
target_invariants_names = ["hospital_days", "icu_days"]

properties_names= (
    allergy_names+
    cond_names+
    device_names+
    immunization_names+
    obs_props+
    procedure_names
)

invariants_names =  ["healthcare_expenses",
                     "healthcare_coverage",
                     "latitude",
                     "longitude",
                     "age",
                     "num_allergies",
                     "active_care_plans",
                     "lifetime_care_plans",
                     "active_care_plan_length",
                     "lifetime_care_plan_length",
                     "active_conditions",
                     "lifetime_conditions",
                     "active_condition_length",
                     "lifetime_condition_length",
                     "device_lifetime_length",
                     "encounters_count",
                     "encounters_lifetime_total_cost",
                     "encounters_lifetime_base_cost",
                     "encounters_lifetime_payer_coverage",
                     "encounters_lifetime_perc_covered ",
                     "imaging_studies_lifetime",
                     "immunizations_lifetime",
                     "immunizations_lifetime_cost",
```

```
                    "medications_lifetime",
                    "medications_lifetime_cost",
                    "medications_lifetime_perc_covered",
                    "medications_lifetime_length",
                    "medications_lifetime_dispenses",
                    "medications_active",
                    "procedures_lifetime",
                    "procedures_lifetime_cost"]

for name in obs_numeric:
    invariants_names.append(name)
for name in obs_numeric_mean:
    invariants_names.append(name)

# Build allergy properties
def build_allergy_prop(i):
    def prop(self):
        if (self.Id, allergy_names[i]) in allergy_tuples:
            return(True)
        return(False)
    prop.__name__ = convert_name(allergy_names[i])
    return prop

for i, name in enumerate(allergy_names):
    prop = build_allergy_prop(i)
    setattr(Patient, prop.__name__, prop)

# Build device properties
def build_device_prop(i):
    def prop(self):
        if (self.Id, device_names[i]) in device_tuples:
            return(True)
        return(False)
    prop.__name__ = convert_name(device_names[i])
    return prop

for i, name in enumerate(device_names):
    prop = build_device_prop(i)
    setattr(Patient, prop.__name__, prop)

# Build condition properties
def build_cond_prop(i):
    def prop(self):
        if (self.Id, cond_names[i]) in cond_tuples:
            return(True)
        return(False)
    prop.__name__ = convert_name(cond_names[i])
```

```
    return prop

for i, name in enumerate(cond_names):
    prop = build_cond_prop(i)
    setattr(Patient, prop.__name__, prop)

# Build immunization properties
def build_immunization_prop(i):
    def prop(self):
        if (self.Id, immunization_names[i]) in immunization_tuples:
            return(True)
        return(False)
    prop.__name__ = convert_name(immunization_names[i])
    return prop

for i, name in enumerate(immunization_names):
    prop = build_immunization_prop(i)
    setattr(Patient, prop.__name__, prop)

# Build observation properties
def build_obs_prop(i):
    def prop(self):
        if (self.Id, obs_props[i]) in obs_tuples:
            return(True)
        return(False)
    prop.__name__ = convert_name(obs_props[i])
    return prop

for i, name in enumerate(obs_props):
    prop = build_obs_prop(i)
    setattr(Patient, prop.__name__, prop)

# Build procedure properties
def build_procedure_prop(i):
    def prop(self):
        if (self.Id, procedure_names[i]) in procedure_tuples:
            return(True)
        return(False)
    prop.__name__ = convert_name(procedure_names[i])
    return prop

for i, name in enumerate(procedure_names):
    prop = build_procedure_prop(i)
    setattr(Patient, prop.__name__, prop)

# Build observation invariants
def build_obs_inv(i):
```

```
    def inv(self):
        try:
            return(float(obs_dict[self.Id,obs_numeric[i]]))
        except:
            return(float("NaN"))
    inv.__name__ = convert_name(obs_numeric[i])
    return inv

for i, name in enumerate(obs_numeric):
    inv = build_obs_inv(i)
    setattr(Patient, inv.__name__, inv)

def build_obs_mean_inv(i):
    def inv(self):
        try:
            return(float(obs_mean_dict[self.Id,obs_numeric_mean[i]]))
        except:
            return(float("NaN"))
    inv.__name__ = convert_name(obs_numeric_mean[i])
    return inv

for i, name in enumerate(obs_numeric_mean):
    inv = build_obs_mean_inv(i)
    setattr(Patient, inv.__name__, inv)

# Build observation nominal properties
def build_obs_nom_prop(i):
    def prop(self):
        try:
            return(str(obs_nominal_dict[self.Id, obs_nominal_names[i]]))
        except:
            return(float("NaN"))
    prop.__name__ = convert_name(obs_nominal_names[i])
    return prop

for i, name in enumerate(obs_nominal_names):
    prop = build_obs_nom_prop(i)
    setattr(Patient, prop.__name__, prop)

# remove special characters from property names; invariants and targets should␣
 ↪be okay
for i, name in enumerate(properties_names):
    properties_names[i] = convert_name(properties_names[i])
```

Define examples - one for each patient.

[100]:
```
p_examples = patients.apply(func=Patient,
                            axis='columns')
```

6 Write data.

Get list of invariants.

[101]:
```
target_invariants = []
target_properties = []
invariants = []
properties = []


for i in target_invariants_names:
    target_invariants.append(Patient.__dict__[i])
for i in target_properties_names:
    target_properties.append(Patient.__dict__[i])
for i in invariants_names:
    invariants.append(Patient.__dict__[i])
for i in properties_names:
    properties.append(Patient.__dict__[i])
print(len(invariants))
print(len(properties))
```

```
309
362
```

[102]:
```
# out_data = []

# out_data_names = ["Id"]
# for j in target_properties:
#     out_data_names.append(j.__name__)
# for j in target_invariants:
#     out_data_names.append(j.__name__)
# for j in properties:
#     out_data_names.append(j.__name__)
# for j in invariants:
#     out_data_names.append(j.__name__)

# out_data.append(out_data_names)
# for i in range(len(patients)):
#     if i % 1000 == 0:
#         sys.stdout.write("%d " % int(i))
#     this_out = [p_examples.iloc[int(i)].Id]
#     for j in target_properties:
#         this_out.append(j(p_examples.iloc[int(i)]))
```

```
#     for j in target_invariants:
#         this_out.append(j(p_examples.iloc[int(i)]))
#     for j in properties:
#         this_out.append(j(p_examples.iloc[int(i)]))
#     for j in invariants:
#         this_out.append(j(p_examples.iloc[int(i)]))
#     sys.stdout.flush()
#     out_data.append(this_out)

# with open("train.csv", "w", newline="") as trainfile:
#     writer = csv.writer(trainfile)
#     writer.writerows(out_data)
# trainfile.close()
```

Write data with nominal features.

[103]:
```
# properties_nom_names= (
#     allergy_names+
#     cond_names+
#     device_names+
#     immunization_names+
#     obs_nominal_names+
#     procedure_names
# )

# properties_nom = []

# for i in properties_nom_names:
#     for j in Patient.__dict__:
#         if i == j:
#             properties_nom.append(Patient.__dict__[j])

# out_data = []

# out_data_names = ["Id"]
# for j in target_properties:
#     out_data_names.append(j.__name__)
# for j in target_invariants:
#     out_data_names.append(j.__name__)
# for j in properties_nom:
#     out_data_names.append(j.__name__)
# for j in invariants:
#     out_data_names.append(j.__name__)

# out_data.append(out_data_names)
# for i in range(len(patients)):
#     if i % 1000 == 0:
```

```
#         sys.stdout.write("%d " % int(i))
#     this_out = [p_examples.iloc[int(i)].Id]
#     for j in target_properties:
#         this_out.append(j(p_examples.iloc[int(i)]))
#     for j in target_invariants:
#         this_out.append(j(p_examples.iloc[int(i)]))
#     for j in properties_nom:
#         this_out.append(j(p_examples.iloc[int(i)]))
#     for j in invariants:
#         this_out.append(j(p_examples.iloc[int(i)]))
#     sys.stdout.flush()
#     out_data.append(this_out)

# with open("train_nom.csv", "w", newline="") as trainfile:
#     writer = csv.writer(trainfile)
#     writer.writerows(out_data)
# trainfile.close()
```

7 Conjecturing

[104]:
```
load("conjecturing.py")
```

7.1 Covid Death Status among the Entire Population

[105]:
```
p_examples_list = list(p_examples)

# only pick people with covid
covid_dead = [patient for patient in p_examples_list if (patient.
 ↪covid_death_status())]
covid_alive= [patient for patient in p_examples_list if (not patient.
 ↪covid_death_status())]

covid_invariants = invariants


set_random_seed(12345)
covid_dead_properties = []
covid_alive_properties = []
use_operators =  { '-1', '+1', '*2', '/2', '^2', '-()', '1/', 'sqrt', 'ln',␣
 ↪'log10', 'exp', '10^', 'ceil', 'floor', 'abs', '+', '*', 'max', 'min', '-',␣
 ↪'/', '^'}
```

```
# not dead patients
print("Alive")
for inv in covid_invariants:
    print(inv.__name__)
    inv_of_interest = covid_invariants.index(inv)
    for i in range(3):
        # upper bounds
        conjs = conjecture(sample(covid_alive, 10),
                           covid_invariants,
                           inv_of_interest,
                           operators=use_operators,
                           upperBound=True,
                           debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_alive_properties += conjs
        # lower bounds
        conjs = conjecture(sample(covid_alive, 10),
                           covid_invariants,
                           inv_of_interest,
                           operators=use_operators,
                           upperBound=False,
                           debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_alive_properties += conjs
count = 0
for conj in covid_alive_properties:
    count +=1
    #print(count, convert_name_back(conj.__name__))

#  dead patients
print("Dead")
for inv in covid_invariants:
    print(inv.__name__)
    inv_of_interest = covid_invariants.index(inv)
    for i in range(3):
        # upper bounds
        conjs = conjecture(sample(covid_dead, 10),
                           covid_invariants,
                           inv_of_interest,
                           operators=use_operators,
```

```
                        upperBound=True,
                        debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_dead_properties += conjs
        # lower bounds
        conjs = conjecture(sample(covid_dead, 10),
                        covid_invariants,
                        inv_of_interest,
                        operators=use_operators,
                        upperBound=False,
                        debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_dead_properties += conjs
count = 0
for conj in covid_dead_properties:
    count +=1
    #print(count, convert_name_back(conj.__name__))
```

```
Alive
healthcare_expenses
healthcare_coverage
latitude
longitude
age
num_allergies
active_care_plans
lifetime_care_plans
active_care_plan_length
lifetime_care_plan_length
active_conditions
lifetime_conditions
active_condition_length
lifetime_condition_length
device_lifetime_length
encounters_count
encounters_lifetime_total_cost
encounters_lifetime_base_cost
encounters_lifetime_payer_coverage
encounters_lifetime_perc_covered
imaging_studies_lifetime
immunizations_lifetime
immunizations_lifetime_cost
medications_lifetime
```

medications_lifetime_cost
medications_lifetime_perc_covered
medications_lifetime_length
medications_lifetime_dispenses
medications_active
procedures_lifetime
procedures_lifetime_cost
QOLS
QALY
DALY
Respiratory_rate
Heart_rate
Systolic_Blood_Pressure
Diastolic_Blood_Pressure
Body_Mass_Index
Body_Weight
Pain_severity___0_10_verbal_numeric_rating__Score____Reported
Body_Height
Triglycerides
Low_Density_Lipoprotein_Cholesterol
High_Density_Lipoprotein_Cholesterol
Creatinine
Sodium
Potassium
Hemoglobin_A1c_Hemoglobin_total_in_Blood
Glucose
Chloride
Carbon_Dioxide
Total_Cholesterol
Urea_Nitrogen
Calcium
Glomerular_filtration_rate_1_73_sq_M_predicted
Globulin__Mass_volume__in_Serum_by_calculation
Albumin__Mass_volume__in_Serum_or_Plasma
Protein__Mass_volume__in_Serum_or_Plasma
Aspartate_aminotransferase__Enzymatic_activity_volume__in_Serum_or_Plasma
Alanine_aminotransferase__Enzymatic_activity_volume__in_Serum_or_Plasma
Alkaline_phosphatase__Enzymatic_activity_volume__in_Serum_or_Plasma
Bilirubin_total__Mass_volume__in_Serum_or_Plasma
Body_temperature
Prostate_specific_Ag__Mass_volume__in_Serum_or_Plasma
Platelet_distribution_width__Entitic_volume__in_Blood_by_Automated_count
Platelet_mean_volume__Entitic_volume__in_Blood_by_Automated_count
Platelets____volume__in_Blood_by_Automated_count
Leukocytes____volume__in_Blood_by_Automated_count
Erythrocytes____volume__in_Blood_by_Automated_count
Hemoglobin__Mass_volume__in_Blood
Hematocrit__Volume_Fraction__of_Blood_by_Automated_count

MCV__Entitic_volume__by_Automated_count
MCH__Entitic_mass__by_Automated_count
MCHC__Mass_volume__by_Automated_count
Erythrocyte_distribution_width__Entitic_volume__by_Automated_count
pH_of_Urine_by_Test_strip
Specific_gravity_of_Urine_by_Test_strip
Bilirubin_total__Mass_volume__in_Urine_by_Test_strip
Ketones__Mass_volume__in_Urine_by_Test_strip
Protein__Mass_volume__in_Urine_by_Test_strip
Estimated_Glomerular_Filtration_Rate
Microalbumin_Creatinine_Ratio
Glucose__Mass_volume__in_Urine_by_Test_strip
Total_score__MMSE_
FEV1_FVC
DXA__T_score__Bone_density
NT_proBNP
Polyp_size_greatest_dimension_by_CAP_cancer_protocols
Hemoglobin_gastrointestinal__Presence__in_Stool_by_Immunologic_method
RBC_Auto__Bld_____Vol_
WBC_Auto__Bld_____Vol_
Hematocrit__Volume_Fraction__of_Blood
RDW___Erythrocyte_distribution_width_Auto__RBC___Entitic_vol_
Left_ventricular_Ejection_fraction
Albumin
Globulin
Alkaline_Phosphatase
Anion_Gap
Protein
White_Blood_Cell__Elevated_
Red_Blood_Cell
RBC_Distribution_Width
Platelet_Count
Total_Bilirubin__Elevated_
ALT__Elevated_
MCV
AST__Elevated_
Hematocrit
Hemoglobin
Size_maximum_dimension_in_Tumor
Lymph_nodes_with_micrometastases_____in_Cancer_specimen_by_Light_microscopy
History_of_Hospitalizations_Outpatient_visits
Mental_health_Outpatient_Note
Mental_health_Telehealth_Note
Oxygen_saturation_in_Arterial_blood
Thyroxine__T4__free__Mass_volume__in_Serum_or_Plasma
Thyrotropin__Units_volume__in_Serum_or_Plasma
Egg_white_IgE_Ab_in_Serum
Wheat_IgE_Ab_in_Serum

Shrimp_IgE_Ab_in_Serum
Codfish_IgE_Ab_in_Serum
Latex_IgE_Ab_in_Serum
Honey_bee_IgE_Ab_in_Serum
Cladosporium_herbarum_IgE_Ab_in_Serum
American_house_dust_mite_IgE_Ab_in_Serum
Cat_dander_IgE_Ab_in_Serum
Common_Ragweed_IgE_Ab_in_Serum
Cow_milk_IgE_Ab_in_Serum
Soybean_IgE_Ab_in_Serum
White_oak_IgE_Ab_in_Serum
Peanut_IgE_Ab_in_Serum
Walnut_IgE_Ab_in_Serum
Lymph_nodes_with_macrometastases_____in_Cancer_specimen_by_Light_microscopy
Percentage_area_affected_by_eczema_Head_and_Neck
Percentage_area_affected_by_eczema_Upper_extremitiy___bilateral
Percentage_area_affected_by_eczema_Trunk
Percentage_area_affected_by_eczema_Lower_extremitiy___bilateral
Lymph_nodes_with_isolated_tumor_cells_____in_Cancer_specimen_by_Light_microscopy
PROMIS_10_Global_Mental_Health__GMH__score
PROMIS_10_Global_Physical_Health__GPH__score
PROMIS_29_Fatigue_score
PROMIS_29_Depression_score
PROMIS_29_Anxiety_score
PROMIS_29_Pain_interference_score
PROMIS_29_Physical_function_score
PROMIS_29_Satisfaction_with_participation_in_social_roles_score
PROMIS_29_Sleep_disturbance_score
VR_36_Bodily_pain__BP__score___oblique_method
VR_36_General_health__GH__score___oblique_method
VR_36_Vitality__VT__score___oblique_method
VR_36_Social_functioning__SF__score___oblique_method
VR_36_Role_emotion__RE__score___oblique_method
VR_36_Mental_health__MH__score___oblique_method
VR_36_Role_physical__RP__score___oblique_method
VR_36_Physical_functioning__PF__score___oblique_method
VR_12_Physical_functioning__PF__score___oblique_method
VR_12_Role_physical__RP__score___oblique_method
VR_12_Bodily_pain__BP__score___oblique_method
VR_12_General_health__GH__score___oblique_method
VR_12_Vitality__VT__score___oblique_method
VR_12_Social_functioning__SF__score___oblique_method
VR_12_Role_emotion__RE__score___oblique_method
VR_12_Mental_health__MH__score___oblique_method
Quality_of_life_score__KOOS_
Sport_recreation_score__KOOS_
Activities_of_daily_living_score__KOOS_
Pain_score__KOOS_

Symptoms_score__KOOS_
Weight_difference__Mass_difference____pre_dialysis___post_dialysis
mean_Body_Height
mean_Body_Mass_Index
mean_Body_Weight
mean_Calcium
mean_Carbon_Dioxide
mean_Chloride
mean_Creatinine
mean_DALY
mean_Diastolic_Blood_Pressure
mean_Estimated_Glomerular_Filtration_Rate
mean_Glucose
mean_Heart_rate
mean_Hemoglobin_A1c_Hemoglobin_total_in_Blood
mean_High_Density_Lipoprotein_Cholesterol
mean_Low_Density_Lipoprotein_Cholesterol
mean_Microalbumin_Creatinine_Ratio
mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported
mean_Potassium
mean_QALY
mean_QOLS
mean_Respiratory_rate
mean_Sodium
mean_Systolic_Blood_Pressure
mean_Total_Cholesterol
mean_Triglycerides
mean_Urea_Nitrogen
mean_Erythrocyte_distribution_width__Entitic_volume__by_Automated_count
mean_Erythrocytes____volume__in_Blood_by_Automated_count
mean_Hematocrit__Volume_Fraction__of_Blood_by_Automated_count
mean_Hemoglobin__Mass_volume__in_Blood
mean_Leukocytes____volume__in_Blood_by_Automated_count
mean_MCH__Entitic_mass__by_Automated_count
mean_MCHC__Mass_volume__by_Automated_count
mean_MCV__Entitic_volume__by_Automated_count
mean_Platelet_distribution_width__Entitic_volume__in_Blood_by_Automated_count
mean_Platelet_mean_volume__Entitic_volume__in_Blood_by_Automated_count
mean_Platelets____volume__in_Blood_by_Automated_count
mean_Body_temperature
mean_Prostate_specific_Ag__Mass_volume__in_Serum_or_Plasma
mean_Alanine_aminotransferase__Enzymatic_activity_volume__in_Serum_or_Plasma
mean_Albumin__Mass_volume__in_Serum_or_Plasma
mean_Alkaline_phosphatase__Enzymatic_activity_volume__in_Serum_or_Plasma
mean_Aspartate_aminotransferase__Enzymatic_activity_volume__in_Serum_or_Plasma
mean_Bilirubin_total__Mass_volume__in_Serum_or_Plasma
mean_Globulin__Mass_volume__in_Serum_by_calculation
mean_Glomerular_filtration_rate_1_73_sq_M_predicted

mean_Protein__Mass_volume__in_Serum_or_Plasma
mean_Total_score__MMSE_
mean_Hematocrit__Volume_Fraction__of_Blood
mean_RBC_Auto__Bld_____Vol_
mean_RDW___Erythrocyte_distribution_width_Auto__RBC___Entitic_vol_
mean_WBC_Auto__Bld_____Vol_
mean_FEV1_FVC
mean_Bilirubin_total__Mass_volume__in_Urine_by_Test_strip
mean_Glucose__Mass_volume__in_Urine_by_Test_strip
mean_Ketones__Mass_volume__in_Urine_by_Test_strip
mean_Protein__Mass_volume__in_Urine_by_Test_strip
mean_Specific_gravity_of_Urine_by_Test_strip
mean_pH_of_Urine_by_Test_strip
mean_DXA__T_score__Bone_density
mean_Weight_difference__Mass_difference____pre_dialysis___post_dialysis
mean_History_of_Hospitalizations_Outpatient_visits
mean_Hemoglobin_gastrointestinal__Presence__in_Stool_by_Immunologic_method
mean_Polyp_size_greatest_dimension_by_CAP_cancer_protocols
mean_Percentage_area_affected_by_eczema_Head_and_Neck
mean_Percentage_area_affected_by_eczema_Lower_extremitiy___bilateral
mean_Percentage_area_affected_by_eczema_Trunk
mean_Percentage_area_affected_by_eczema_Upper_extremitiy___bilateral
mean_Left_ventricular_Ejection_fraction
mean_NT_proBNP
mean_Oxygen_saturation_in_Arterial_blood
mean_Mental_health_Outpatient_Note
mean_Mental_health_Telehealth_Note
mean_Lymph_nodes_with_isolated_tumor_cells_____in_Cancer_specimen_by_Light_micro
scopy
mean_Size_maximum_dimension_in_Tumor
mean_ALT__Elevated_
mean_AST__Elevated_
mean_Albumin
mean_Alkaline_Phosphatase
mean_Anion_Gap
mean_Globulin
mean_Hematocrit
mean_Hemoglobin
mean_MCV
mean_Platelet_Count
mean_Protein
mean_RBC_Distribution_Width
mean_Red_Blood_Cell
mean_Total_Bilirubin__Elevated_
mean_White_Blood_Cell__Elevated_
mean_Thyrotropin__Units_volume__in_Serum_or_Plasma
mean_Thyroxine__T4__free__Mass_volume__in_Serum_or_Plasma
mean_American_house_dust_mite_IgE_Ab_in_Serum

mean_Cat_dander_IgE_Ab_in_Serum
mean_Cladosporium_herbarum_IgE_Ab_in_Serum
mean_Codfish_IgE_Ab_in_Serum
mean_Common_Ragweed_IgE_Ab_in_Serum
mean_Cow_milk_IgE_Ab_in_Serum
mean_Egg_white_IgE_Ab_in_Serum
mean_Honey_bee_IgE_Ab_in_Serum
mean_Latex_IgE_Ab_in_Serum
mean_Peanut_IgE_Ab_in_Serum
mean_Shrimp_IgE_Ab_in_Serum
mean_Soybean_IgE_Ab_in_Serum
mean_Walnut_IgE_Ab_in_Serum
mean_Wheat_IgE_Ab_in_Serum
mean_White_oak_IgE_Ab_in_Serum
mean_Lymph_nodes_with_micrometastases_____in_Cancer_specimen_by_Light_microscopy
mean_Lymph_nodes_with_macrometastases_____in_Cancer_specimen_by_Light_microscopy
mean_VR_12_Bodily_pain__BP__score___oblique_method
mean_VR_12_General_health__GH__score___oblique_method
mean_VR_12_Mental_health__MH__score___oblique_method
mean_VR_12_Physical_functioning__PF__score___oblique_method
mean_VR_12_Role_emotion__RE__score___oblique_method
mean_VR_12_Role_physical__RP__score___oblique_method
mean_VR_12_Social_functioning__SF__score___oblique_method
mean_VR_12_Vitality__VT__score___oblique_method
mean_PROMIS_10_Global_Mental_Health__GMH__score
mean_PROMIS_10_Global_Physical_Health__GPH__score
mean_PROMIS_29_Anxiety_score
mean_PROMIS_29_Depression_score
mean_PROMIS_29_Fatigue_score
mean_PROMIS_29_Pain_interference_score
mean_PROMIS_29_Physical_function_score
mean_PROMIS_29_Satisfaction_with_participation_in_social_roles_score
mean_PROMIS_29_Sleep_disturbance_score
mean_Activities_of_daily_living_score__KOOS_
mean_Pain_score__KOOS_
mean_Quality_of_life_score__KOOS_
mean_Sport_recreation_score__KOOS_
mean_Symptoms_score__KOOS_
mean_VR_36_Bodily_pain__BP__score___oblique_method
mean_VR_36_General_health__GH__score___oblique_method
mean_VR_36_Mental_health__MH__score___oblique_method
mean_VR_36_Physical_functioning__PF__score___oblique_method
mean_VR_36_Role_emotion__RE__score___oblique_method
mean_VR_36_Role_physical__RP__score___oblique_method
mean_VR_36_Social_functioning__SF__score___oblique_method
mean_VR_36_Vitality__VT__score___oblique_method
Dead
healthcare_expenses

healthcare_coverage
latitude
longitude
age
num_allergies
active_care_plans
lifetime_care_plans
active_care_plan_length
lifetime_care_plan_length
active_conditions
lifetime_conditions
active_condition_length
lifetime_condition_length
device_lifetime_length
encounters_count
encounters_lifetime_total_cost
encounters_lifetime_base_cost
encounters_lifetime_payer_coverage
encounters_lifetime_perc_covered
imaging_studies_lifetime
immunizations_lifetime
immunizations_lifetime_cost
medications_lifetime
medications_lifetime_cost
medications_lifetime_perc_covered
medications_lifetime_length
medications_lifetime_dispenses
medications_active
procedures_lifetime
procedures_lifetime_cost
QOLS
QALY
DALY
Respiratory_rate
Heart_rate
Systolic_Blood_Pressure
Diastolic_Blood_Pressure
Body_Mass_Index
Body_Weight
Pain_severity___0_10_verbal_numeric_rating__Score____Reported
Body_Height
Triglycerides
Low_Density_Lipoprotein_Cholesterol
High_Density_Lipoprotein_Cholesterol
Creatinine
Sodium
Potassium
Hemoglobin_A1c_Hemoglobin_total_in_Blood

Glucose
Chloride
Carbon_Dioxide
Total_Cholesterol
Urea_Nitrogen
Calcium
Glomerular_filtration_rate_1_73_sq_M_predicted
Globulin__Mass_volume__in_Serum_by_calculation
Albumin__Mass_volume__in_Serum_or_Plasma
Protein__Mass_volume__in_Serum_or_Plasma
Aspartate_aminotransferase__Enzymatic_activity_volume__in_Serum_or_Plasma
Alanine_aminotransferase__Enzymatic_activity_volume__in_Serum_or_Plasma
Alkaline_phosphatase__Enzymatic_activity_volume__in_Serum_or_Plasma
Bilirubin_total__Mass_volume__in_Serum_or_Plasma
Body_temperature
Prostate_specific_Ag__Mass_volume__in_Serum_or_Plasma
Platelet_distribution_width__Entitic_volume__in_Blood_by_Automated_count
Platelet_mean_volume__Entitic_volume__in_Blood_by_Automated_count
Platelets____volume__in_Blood_by_Automated_count
Leukocytes____volume__in_Blood_by_Automated_count
Erythrocytes____volume__in_Blood_by_Automated_count
Hemoglobin__Mass_volume__in_Blood
Hematocrit__Volume_Fraction__of_Blood_by_Automated_count
MCV__Entitic_volume__by_Automated_count
MCH__Entitic_mass__by_Automated_count
MCHC__Mass_volume__by_Automated_count
Erythrocyte_distribution_width__Entitic_volume__by_Automated_count
pH_of_Urine_by_Test_strip
Specific_gravity_of_Urine_by_Test_strip
Bilirubin_total__Mass_volume__in_Urine_by_Test_strip
Ketones__Mass_volume__in_Urine_by_Test_strip
Protein__Mass_volume__in_Urine_by_Test_strip
Estimated_Glomerular_Filtration_Rate
Microalbumin_Creatinine_Ratio
Glucose__Mass_volume__in_Urine_by_Test_strip
Total_score__MMSE_
FEV1_FVC
DXA__T_score__Bone_density
NT_proBNP
Polyp_size_greatest_dimension_by_CAP_cancer_protocols
Hemoglobin_gastrointestinal__Presence__in_Stool_by_Immunologic_method
RBC_Auto__Bld_____Vol_
WBC_Auto__Bld_____Vol_
Hematocrit__Volume_Fraction__of_Blood
RDW___Erythrocyte_distribution_width_Auto__RBC___Entitic_vol_
Left_ventricular_Ejection_fraction
Albumin
Globulin

Alkaline_Phosphatase
Anion_Gap
Protein
White_Blood_Cell__Elevated_
Red_Blood_Cell
RBC_Distribution_Width
Platelet_Count
Total_Bilirubin__Elevated_
ALT__Elevated_
MCV
AST__Elevated_
Hematocrit
Hemoglobin
Size_maximum_dimension_in_Tumor
Lymph_nodes_with_micrometastases_____in_Cancer_specimen_by_Light_microscopy
History_of_Hospitalizations_Outpatient_visits
Mental_health_Outpatient_Note
Mental_health_Telehealth_Note
Oxygen_saturation_in_Arterial_blood
Thyroxine__T4__free__Mass_volume__in_Serum_or_Plasma
Thyrotropin__Units_volume__in_Serum_or_Plasma
Egg_white_IgE_Ab_in_Serum
Wheat_IgE_Ab_in_Serum
Shrimp_IgE_Ab_in_Serum
Codfish_IgE_Ab_in_Serum
Latex_IgE_Ab_in_Serum
Honey_bee_IgE_Ab_in_Serum
Cladosporium_herbarum_IgE_Ab_in_Serum
American_house_dust_mite_IgE_Ab_in_Serum
Cat_dander_IgE_Ab_in_Serum
Common_Ragweed_IgE_Ab_in_Serum
Cow_milk_IgE_Ab_in_Serum
Soybean_IgE_Ab_in_Serum
White_oak_IgE_Ab_in_Serum
Peanut_IgE_Ab_in_Serum
Walnut_IgE_Ab_in_Serum
Lymph_nodes_with_macrometastases_____in_Cancer_specimen_by_Light_microscopy
Percentage_area_affected_by_eczema_Head_and_Neck
Percentage_area_affected_by_eczema_Upper_extremitiy___bilateral
Percentage_area_affected_by_eczema_Trunk
Percentage_area_affected_by_eczema_Lower_extremitiy___bilateral
Lymph_nodes_with_isolated_tumor_cells_____in_Cancer_specimen_by_Light_microscopy
PROMIS_10_Global_Mental_Health__GMH__score
PROMIS_10_Global_Physical_Health__GPH__score
PROMIS_29_Fatigue_score
PROMIS_29_Depression_score
PROMIS_29_Anxiety_score
PROMIS_29_Pain_interference_score

PROMIS_29_Physical_function_score
PROMIS_29_Satisfaction_with_participation_in_social_roles_score
PROMIS_29_Sleep_disturbance_score
VR_36_Bodily_pain__BP__score___oblique_method
VR_36_General_health__GH__score___oblique_method
VR_36_Vitality__VT__score___oblique_method
VR_36_Social_functioning__SF__score___oblique_method
VR_36_Role_emotion__RE__score___oblique_method
VR_36_Mental_health__MH__score___oblique_method
VR_36_Role_physical__RP__score___oblique_method
VR_36_Physical_functioning__PF__score___oblique_method
VR_12_Physical_functioning__PF__score___oblique_method
VR_12_Role_physical__RP__score___oblique_method
VR_12_Bodily_pain__BP__score___oblique_method
VR_12_General_health__GH__score___oblique_method
VR_12_Vitality__VT__score___oblique_method
VR_12_Social_functioning__SF__score___oblique_method
VR_12_Role_emotion__RE__score___oblique_method
VR_12_Mental_health__MH__score___oblique_method
Quality_of_life_score__KOOS_
Sport_recreation_score__KOOS_
Activities_of_daily_living_score__KOOS_
Pain_score__KOOS_
Symptoms_score__KOOS_
Weight_difference__Mass_difference____pre_dialysis___post_dialysis
mean_Body_Height
mean_Body_Mass_Index
mean_Body_Weight
mean_Calcium
mean_Carbon_Dioxide
mean_Chloride
mean_Creatinine
mean_DALY
mean_Diastolic_Blood_Pressure
mean_Estimated_Glomerular_Filtration_Rate
mean_Glucose
mean_Heart_rate
mean_Hemoglobin_A1c_Hemoglobin_total_in_Blood
mean_High_Density_Lipoprotein_Cholesterol
mean_Low_Density_Lipoprotein_Cholesterol
mean_Microalbumin_Creatinine_Ratio
mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported
mean_Potassium
mean_QALY
mean_QOLS
mean_Respiratory_rate
mean_Sodium
mean_Systolic_Blood_Pressure

mean_Total_Cholesterol
mean_Triglycerides
mean_Urea_Nitrogen
mean_Erythrocyte_distribution_width__Entitic_volume__by_Automated_count
mean_Erythrocytes____volume__in_Blood_by_Automated_count
mean_Hematocrit__Volume_Fraction__of_Blood_by_Automated_count
mean_Hemoglobin__Mass_volume__in_Blood
mean_Leukocytes____volume__in_Blood_by_Automated_count
mean_MCH__Entitic_mass__by_Automated_count
mean_MCHC__Mass_volume__by_Automated_count
mean_MCV__Entitic_volume__by_Automated_count
mean_Platelet_distribution_width__Entitic_volume__in_Blood_by_Automated_count
mean_Platelet_mean_volume__Entitic_volume__in_Blood_by_Automated_count
mean_Platelets____volume__in_Blood_by_Automated_count
mean_Body_temperature
mean_Prostate_specific_Ag__Mass_volume__in_Serum_or_Plasma
mean_Alanine_aminotransferase__Enzymatic_activity_volume__in_Serum_or_Plasma
mean_Albumin__Mass_volume__in_Serum_or_Plasma
mean_Alkaline_phosphatase__Enzymatic_activity_volume__in_Serum_or_Plasma
mean_Aspartate_aminotransferase__Enzymatic_activity_volume__in_Serum_or_Plasma
mean_Bilirubin_total__Mass_volume__in_Serum_or_Plasma
mean_Globulin__Mass_volume__in_Serum_by_calculation
mean_Glomerular_filtration_rate_1_73_sq_M_predicted
mean_Protein__Mass_volume__in_Serum_or_Plasma
mean_Total_score__MMSE_
mean_Hematocrit__Volume_Fraction__of_Blood
mean_RBC_Auto__Bld_____Vol_
mean_RDW___Erythrocyte_distribution_width_Auto__RBC___Entitic_vol_
mean_WBC_Auto__Bld_____Vol_
mean_FEV1_FVC
mean_Bilirubin_total__Mass_volume__in_Urine_by_Test_strip
mean_Glucose__Mass_volume__in_Urine_by_Test_strip
mean_Ketones__Mass_volume__in_Urine_by_Test_strip
mean_Protein__Mass_volume__in_Urine_by_Test_strip
mean_Specific_gravity_of_Urine_by_Test_strip
mean_pH_of_Urine_by_Test_strip
mean_DXA__T_score__Bone_density
mean_Weight_difference__Mass_difference____pre_dialysis___post_dialysis
mean_History_of_Hospitalizations_Outpatient_visits
mean_Hemoglobin_gastrointestinal__Presence__in_Stool_by_Immunologic_method
mean_Polyp_size_greatest_dimension_by_CAP_cancer_protocols
mean_Percentage_area_affected_by_eczema_Head_and_Neck
mean_Percentage_area_affected_by_eczema_Lower_extremitiy___bilateral
mean_Percentage_area_affected_by_eczema_Trunk
mean_Percentage_area_affected_by_eczema_Upper_extremitiy___bilateral
mean_Left_ventricular_Ejection_fraction
mean_NT_proBNP
mean_Oxygen_saturation_in_Arterial_blood

mean_Mental_health_Outpatient_Note
mean_Mental_health_Telehealth_Note
mean_Lymph_nodes_with_isolated_tumor_cells_____in_Cancer_specimen_by_Light_micro
scopy
mean_Size_maximum_dimension_in_Tumor
mean_ALT__Elevated_
mean_AST__Elevated_
mean_Albumin
mean_Alkaline_Phosphatase
mean_Anion_Gap
mean_Globulin
mean_Hematocrit
mean_Hemoglobin
mean_MCV
mean_Platelet_Count
mean_Protein
mean_RBC_Distribution_Width
mean_Red_Blood_Cell
mean_Total_Bilirubin__Elevated_
mean_White_Blood_Cell__Elevated_
mean_Thyrotropin__Units_volume__in_Serum_or_Plasma
mean_Thyroxine__T4__free__Mass_volume__in_Serum_or_Plasma
mean_American_house_dust_mite_IgE_Ab_in_Serum
mean_Cat_dander_IgE_Ab_in_Serum
mean_Cladosporium_herbarum_IgE_Ab_in_Serum
mean_Codfish_IgE_Ab_in_Serum
mean_Common_Ragweed_IgE_Ab_in_Serum
mean_Cow_milk_IgE_Ab_in_Serum
mean_Egg_white_IgE_Ab_in_Serum
mean_Honey_bee_IgE_Ab_in_Serum
mean_Latex_IgE_Ab_in_Serum
mean_Peanut_IgE_Ab_in_Serum
mean_Shrimp_IgE_Ab_in_Serum
mean_Soybean_IgE_Ab_in_Serum
mean_Walnut_IgE_Ab_in_Serum
mean_Wheat_IgE_Ab_in_Serum
mean_White_oak_IgE_Ab_in_Serum
mean_Lymph_nodes_with_micrometastases_____in_Cancer_specimen_by_Light_microscopy
mean_Lymph_nodes_with_macrometastases_____in_Cancer_specimen_by_Light_microscopy
mean_VR_12_Bodily_pain__BP__score___oblique_method
mean_VR_12_General_health__GH__score___oblique_method
mean_VR_12_Mental_health__MH__score___oblique_method
mean_VR_12_Physical_functioning__PF__score___oblique_method
mean_VR_12_Role_emotion__RE__score___oblique_method
mean_VR_12_Role_physical__RP__score___oblique_method
mean_VR_12_Social_functioning__SF__score___oblique_method
mean_VR_12_Vitality__VT__score___oblique_method
mean_PROMIS_10_Global_Mental_Health__GMH__score

```
mean_PROMIS_10_Global_Physical_Health__GPH__score
mean_PROMIS_29_Anxiety_score
mean_PROMIS_29_Depression_score
mean_PROMIS_29_Fatigue_score
mean_PROMIS_29_Pain_interference_score
mean_PROMIS_29_Physical_function_score
mean_PROMIS_29_Satisfaction_with_participation_in_social_roles_score
mean_PROMIS_29_Sleep_disturbance_score
mean_Activities_of_daily_living_score__KOOS_
mean_Pain_score__KOOS_
mean_Quality_of_life_score__KOOS_
mean_Sport_recreation_score__KOOS_
mean_Symptoms_score__KOOS_
mean_VR_36_Bodily_pain__BP__score___oblique_method
mean_VR_36_General_health__GH__score___oblique_method
mean_VR_36_Mental_health__MH__score___oblique_method
mean_VR_36_Physical_functioning__PF__score___oblique_method
mean_VR_36_Role_emotion__RE__score___oblique_method
mean_VR_36_Role_physical__RP__score___oblique_method
mean_VR_36_Social_functioning__SF__score___oblique_method
mean_VR_36_Vitality__VT__score___oblique_method
```

[106]:
```
print(len(covid_dead_properties), len(covid_alive_properties))
print(len(covid_alive), len(covid_dead))
```

```
1421 1244
80376 5568
```

[107]:
```
load("conjecturing.py")
set_random_seed(12345)
all_covid_properties = properties + covid_alive_properties +␣
 ↪covid_dead_properties
all_covid_properties.append(Patient.covid_death_status)

target_prop = len(all_covid_properties)-1
for i in range(100):
    alive_conjs =␣
 ↪propertyBasedConjecture(objects=sample(covid_alive,10)+sample(covid_dead,10),
                                    properties = all_covid_properties,
                                    mainProperty=target_prop,
                                    sufficient=False)

    dead_conjs =␣
 ↪propertyBasedConjecture(objects=sample(covid_alive,10)+sample(covid_dead,10),
                                    properties = all_covid_properties,
                                    mainProperty=target_prop,
                                    sufficient=True)
```

```
count = 0
for p in alive_conjs:
    #print(count, ".", convert_name_back(p.__name__))
    count += 1
for p in dead_conjs:
    #print(count, ".", convert_name_back(p.__name__))
    count += 1
```

```
/Users/jpbrooks/opt/anaconda3/envs/sage/lib/python3.7/site-
packages/sage/misc/functional.py:1558: ComplexWarning: Casting complex values to
real discards the imaginary part
  x = float(x)
/Users/jpbrooks/opt/anaconda3/envs/sage/lib/python3.7/site-
packages/sage/repl/ipython_kernel/__main__.py:85: RuntimeWarning: overflow
encountered in double_scalars
/Users/jpbrooks/opt/anaconda3/envs/sage/lib/python3.7/site-
packages/sage/repl/ipython_kernel/__main__.py:187: RuntimeWarning: overflow
encountered in double_scalars
```

[108]:
```
load("prop_conjecturing.py")
print(len(alive_conjs))
for p in alive_conjs:
    my_conclusion = get_conclusion(p)
    num_false = 0
    num_alive = 0
    for patient in p_examples_list:
        try:# deal with missing values
            if my_conclusion(patient) == False:
                num_false += 1
                if patient.covid_death_status() == False:
                    num_alive += 1
        except:
            continue
    print(convert_name_back(p.__name__))
    print(num_alive/float(num_false))

print(len(dead_conjs))
for p in dead_conjs:
    my_premise = get_premise(p)
    num_true = 0
    num_dead = 0
    for patient in p_examples_list:
        try:# deal with missing values
            if my_premise(patient) == True:
                num_true += 1
                if patient.covid_death_status() == True:
                    num_dead += 1
```

```
        except:
            continue
    print(convert_name_back(p.__name__))
    print(num_dead/float(num_true))
```

```
5
healthcare_expenses_leq_10_to_the_power_medications_active_divided_by_num_allerg
ies
(covid_death_status)->(healthcare_expenses<=10^medications_active/num_allergies)
0.9559652418976045
healthcare_expenses_leq_e_to_the_power_active_care_plan_length_divided_by_encoun
ters_lifetime_perc_covered
(covid_death_status)->(healthcare_expenses<=e^active_care_plan_length/encounters
_lifetime_perc_covered)
0.9854176573149469
healthcare_expenses_leq_e_to_the_power_active_condition_length_divided_by_medica
tions_lifetime_length
(covid_death_status)->(healthcare_expenses<=e^active_condition_length/medication
s_lifetime_length)
0.9882517972996668
latitude_geq_flooropen_bracket_maximumopen_bracket_Hematocrit__Volume_Fraction__
of_Blood_by_Automated_count_or_mean_DALY_close_bracket_close_bracket
(covid_death_status)->(latitude>=floor(maximum(Hematocrit__Volume_Fraction__of_B
lood_by_Automated_count,mean_DALY)))
0.8996275935449548
encounters_count_leq_encounters_lifetime_payer_coverage_divided_by_latitude_minu
s_1
(covid_death_status)->(encounters_count<=encounters_lifetime_payer_coverage/lati
tude-1)
0.9593801935673086
6
Major_depression_disorder
(Major_depression_disorder)->(covid_death_status)
0.04621188305564288
Allergy_to_peanuts
(Allergy_to_peanuts)->(covid_death_status)
0.042948345908299476
Malignant_neoplasm_of_bre
(Malignant_neoplasm_of_bre)->(covid_death_status)
0.13758389261744966
Smokes_tobacco_daily
(Smokes_tobacco_daily)->(covid_death_status)
0.09072327044025157
Hyperlipidemia
(Hyperlipidemia)->(covid_death_status)
0.1208931873133267
```

```
Cardiac_Arrest
(Cardiac_Arrest)->(covid_death_status)
0.08988128886376484
```

7.2 Covid Death Status among Those with Covid

[109]:
```
p_examples_list = list(p_examples)

# only pick people with covid
covid_dead = [patient for patient in p_examples_list if (patient.
 ↪covid_death_status() and patient.covid_status())]
covid_alive= [patient for patient in p_examples_list if (not patient.
 ↪covid_death_status() and patient.covid_status())]

print(len(covid_dead), len(covid_alive))
```

```
5568 68129
```

[110]:
```
covid_invariants = invariants


set_random_seed(12345)
covid_dead_properties = []
covid_alive_properties = []
use_operators =  { '-1', '+1', '*2', '/2', '^2', '-()', '1/', 'sqrt', 'ln',␣
 ↪'log10', 'exp', '10^', 'ceil', 'floor', 'abs', '+', '*', 'max', 'min', '-',␣
 ↪'/', '^'}


# not dead patients
print("Alive")
for inv in covid_invariants:
    #print(inv.__name__)
    inv_of_interest = covid_invariants.index(inv)
    for i in range(3):
        # upper bounds
        conjs = conjecture(sample(covid_alive, 10),
                           covid_invariants,
                           inv_of_interest,
                           operators=use_operators,
                           upperBound=True,
                           debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_alive_properties += conjs
```

```
        # lower bounds
        conjs = conjecture(sample(covid_alive, 10),
                           covid_invariants,
                           inv_of_interest,
                           operators=use_operators,
                           upperBound=False,
                           debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_alive_properties += conjs
count = 0
for conj in covid_alive_properties:
    count +=1
    print(count, convert_name_back(conj.__name__))

#  dead patients
print("Dead")
for inv in covid_invariants:
    #print(inv.__name__)
    inv_of_interest = covid_invariants.index(inv)
    for i in range(3):
        # upper bounds
        conjs = conjecture(sample(covid_dead, 10),
                           covid_invariants,
                           inv_of_interest,
                           operators=use_operators,
                           upperBound=True,
                           debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_dead_properties += conjs
        # lower bounds
        conjs = conjecture(sample(covid_dead, 10),
                           covid_invariants,
                           inv_of_interest,
                           operators=use_operators,
                           upperBound=False,
                           debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_dead_properties += conjs
count = 0
for conj in covid_dead_properties:
    count +=1
```

```
    print(count, convert_name_back(conj.__name__))
print("Number of dead, alive properties")
print(len(covid_dead_properties), len(covid_alive_properties))

load("conjecturing.py")

set_random_seed(12345)
all_covid_properties = properties + covid_alive_properties +␣
 ↪covid_dead_properties
all_covid_properties.append(Patient.covid_death_status)

target_prop = len(all_covid_properties)-1
for i in range(100):
    alive_conjs =␣
 ↪propertyBasedConjecture(objects=sample(covid_alive,10)+sample(covid_dead,10),
                                    properties = all_covid_properties,
                                    mainProperty=target_prop,
                                    sufficient=False)

    dead_conjs =␣
 ↪propertyBasedConjecture(objects=sample(covid_alive,10)+sample(covid_dead,10),
                                    properties = all_covid_properties,
                                    mainProperty=target_prop,
                                    sufficient=True)
count = 0
for p in alive_conjs:
    #print(count, ".", convert_name_back(p.__name__))
    count += 1
for p in dead_conjs:
    #print(count, ".", convert_name_back(p.__name__))
    count += 1


load("prop_conjecturing.py")
print("Property Conjectures")
print(len(alive_conjs))
for p in alive_conjs:
    print(convert_name_back(p.__name__))
    my_conclusion = get_conclusion(p)
    num_false = 0
    num_alive = 0
    for patient in p_examples_list:
        try:  # deal with missing values
            if my_conclusion(patient) == False:
                num_false += 1
                if patient.covid_death_status() == False:
                    num_alive += 1
```

```
        except:
            continue
    print(num_alive/float(num_false))
print(len(dead_conjs))
for p in dead_conjs:
    print(convert_name_back(p.__name__))
    my_premise = get_premise(p)
    num_true = 0
    num_dead = 0
    for patient in p_examples_list:
        try: # deal with missing values
            if my_premise(patient) == True:
                num_true += 1
                if patient.covid_death_status() == True:
                    num_dead += 1
        except:
            continue
    print(num_dead/float(num_true))
```

```
Alive
1 healthcare_expenses<=healthcare_coverage^active_conditions*medications_lifetim
e_dispenses
2 healthcare_expenses<=(medications_lifetime_cost-1)*QALY
3 healthcare_expenses<=(e^QOLS)^QALY
4 healthcare_expenses<=(QOLS+1)^latitude
5 healthcare_expenses<=10^floor(sqrt(age))
6 healthcare_expenses<=1/2*10^sqrt(latitude)
7 healthcare_expenses<=1/16*longitude^4
8
healthcare_expenses>=healthcare_coverage*log(lifetime_condition_length)/log(10)
9 healthcare_expenses>=medications_lifetime_length^2/medications_lifetime^2
10 healthcare_expenses>=(procedures_lifetime_cost+1)/QOLS
11 healthcare_expenses>=encounters_lifetime_payer_coverage^2/active_conditions^2
12 healthcare_expenses>=age^2*medications_lifetime
13 healthcare_expenses>=sqrt(QOLS)*medications_lifetime_cost
14 healthcare_expenses>=10^(active_conditions/medications_lifetime)
15 healthcare_expenses>=(QALY-1)*encounters_lifetime_total_cost
16 healthcare_expenses>=DALY^2*procedures_lifetime_cost
17 healthcare_expenses<=e^QALY/mean_QALY
18 healthcare_expenses<=1/16*longitude^4
19 healthcare_expenses<=healthcare_coverage^(log(latitude)/log(10))
20 healthcare_expenses<=encounters_lifetime_payer_coverage^2/num_allergies
21 healthcare_expenses<=(encounters_lifetime_perc_covered+1)^lifetime_care_plan_
length
22 healthcare_expenses<=QALY^2*age^2
23 healthcare_expenses>=(lifetime_care_plan_length+1)*healthcare_coverage
24 healthcare_expenses>=1/2*healthcare_coverage*latitude
```

```
25 healthcare_expenses>=(latitude-longitude)^2
26 healthcare_expenses>=(1/2*medications_lifetime_cost)^immunizations_lifetime
27 healthcare_expenses>=2*active_care_plan_length*healthcare_coverage
28 healthcare_expenses>=4*medications_lifetime^4
29 healthcare_expenses>=(procedures_lifetime_cost-1)/active_care_plan_length
30 healthcare_expenses>=10^maximum(Hemoglobin_A1c_Hemoglobin_total_in_Blood,mean
_QOLS)
31 healthcare_expenses>=healthcare_coverage*sqrt(medications_lifetime_length)
32 healthcare_expenses>=active_care_plan_length^sqrt(procedures_lifetime)
33 healthcare_expenses<=1/2*encounters_lifetime_total_cost*healthcare_coverage
34 healthcare_expenses<=age^(encounters_count+1)
35
healthcare_expenses<=10^(encounters_lifetime_total_cost^active_care_plan_length)
36 healthcare_expenses<=4*QALY^4
37 healthcare_expenses<=10^sqrt(latitude-1)
38 healthcare_expenses<=e^QALY/procedures_lifetime_cost
39 healthcare_expenses<=healthcare_coverage^2/active_care_plans^2
40 healthcare_expenses<=e^(latitude/medications_active)
41 healthcare_expenses<=minimum(healthcare_coverage,Platelet_distribution_width_
_Entitic_volume__in_Blood_by_Automated_count)^2
42 healthcare_expenses<=encounters_lifetime_total_cost*healthcare_coverage/devic
e_lifetime_length
43 healthcare_expenses>=(Respiratory_rate+1)^immunizations_lifetime
44 healthcare_expenses>=e^(QALY^encounters_lifetime_perc_covered)
45 healthcare_expenses>=immunizations_lifetime_cost^(log(medications_lifetime)/l
og(10))
46 healthcare_expenses>=log(healthcare_coverage)*procedures_lifetime_cost
47 healthcare_expenses>=2*lifetime_care_plan_length^num_allergies
48 healthcare_expenses>=e^(active_condition_length^encounters_lifetime_perc_cove
red)
49 healthcare_expenses>=log(mean_Pain_severity___0_10_verbal_numeric_rating__Sco
re____Reported)^immunizations_lifetime_cost
50 healthcare_expenses>=(-encounters_lifetime_total_cost)^active_care_plans
51 healthcare_expenses>=device_lifetime_length^2*encounters_lifetime_total_cost
52 healthcare_expenses>=QALY^2*lifetime_condition_length
53 healthcare_coverage<=10^active_conditions/active_care_plans
54 healthcare_coverage<=minimum(healthcare_expenses,e^Leukocytes____volume__in_B
lood_by_Automated_count)
55 healthcare_coverage<=longitude^2/medications_lifetime_perc_covered
56 healthcare_coverage<=encounters_count^(1/2*age)
57 healthcare_coverage<=10^(sqrt(age)-1)
58 healthcare_coverage<=healthcare_expenses/sqrt(medications_lifetime_dispenses)
59 healthcare_coverage<=2*healthcare_expenses/active_conditions
60 healthcare_coverage<=1/16*QALY^4
61 healthcare_coverage<=(encounters_lifetime_payer_coverage+medications_lifetime
_dispenses)^2
62 healthcare_coverage<=e^(10^e^procedures_lifetime)
63 healthcare_coverage>=num_allergies
```

```
64 healthcare_coverage>=2*encounters_lifetime_payer_coverage-
medications_lifetime_dispenses
65 healthcare_coverage>=(-Body_Weight)^immunizations_lifetime
66 healthcare_coverage>=healthcare_expenses^encounters_lifetime_perc_covered-
encounters_lifetime_total_cost
67 healthcare_coverage>=healthcare_expenses^encounters_lifetime_perc_covered-
procedures_lifetime_cost
68 healthcare_coverage>=medications_lifetime_cost*medications_lifetime_perc_cove
red^2
69 healthcare_coverage>=e^active_conditions-medications_lifetime_cost
70 healthcare_coverage>=(-lifetime_care_plan_length)^active_care_plans
71
healthcare_coverage>=healthcare_expenses/(encounters_lifetime_payer_coverage-1)
72 healthcare_coverage<=e^(healthcare_expenses-medications_lifetime_cost)
73 healthcare_coverage<=healthcare_expenses/(immunizations_lifetime*medications_
lifetime)
74 healthcare_coverage<=healthcare_expenses^lifetime_care_plans/immunizations_li
fetime_cost
75 healthcare_coverage<=healthcare_expenses/QALY+medications_lifetime_dispenses
76 healthcare_coverage<=1/4*(encounters_lifetime_total_cost+2)^2
77 healthcare_coverage<=(longitude-medications_lifetime_dispenses)^2
78 healthcare_coverage<=encounters_count*healthcare_expenses/immunizations_lifet
ime_cost
79 healthcare_coverage<=healthcare_expenses/lifetime_conditions^2
80 healthcare_coverage<=healthcare_expenses^QOLS+medications_lifetime_length
81 healthcare_coverage>=num_allergies
82 healthcare_coverage>=encounters_lifetime_perc_covered^2*longitude^2
83 healthcare_coverage>=encounters_lifetime_perc_covered*medications_lifetime^2
84 healthcare_coverage>=1/2*active_conditions*encounters_lifetime_payer_coverage
85 healthcare_coverage>=-2*encounters_lifetime_total_cost+2*medications_lifetime
_length
86 healthcare_coverage>=healthcare_expenses*medications_lifetime_perc_covered/ac
tive_condition_length
87 healthcare_coverage>=-medications_lifetime_cost+2*procedures_lifetime_cost
88 healthcare_coverage>=minimum(latitude,encounters_lifetime_payer_coverage)^2
89 healthcare_coverage>=encounters_lifetime_payer_coverage*sqrt(lifetime_conditi
ons)
90 healthcare_coverage<=healthcare_expenses*log(10)/log(QALY)
91 healthcare_coverage<=log(encounters_count)^lifetime_condition_length
92 healthcare_coverage<=e^(1/2*QALY+1)
93 healthcare_coverage<=e^(10^e^procedures_lifetime)
94 healthcare_coverage<=1/2*e^(10^lifetime_care_plans)
95 healthcare_coverage<=healthcare_expenses/(latitude*num_allergies)
96 healthcare_coverage<=healthcare_expenses^lifetime_care_plan_length+encounters
_lifetime_total_cost
97 healthcare_coverage<=10^(encounters_count/immunizations_lifetime)
98 healthcare_coverage<=10^(4*active_conditions)
99 healthcare_coverage<=encounters_lifetime_total_cost^2/device_lifetime_length
```

```
100 healthcare_coverage>=num_allergies
101
healthcare_coverage>=encounters_lifetime_payer_coverage*sqrt(medications_active)
102 healthcare_coverage>=age^2-encounters_lifetime_total_cost
103 healthcare_coverage>=-encounters_lifetime_total_cost+2*medications_lifetime_
length
104
healthcare_coverage>=(procedures_lifetime+1)*encounters_lifetime_payer_coverage
105 healthcare_coverage>=10^(log(DALY)+1)
106 healthcare_coverage>=(-medications_lifetime)^active_care_plans
107
healthcare_coverage>=2*encounters_lifetime_payer_coverage*immunizations_lifetime
108 healthcare_coverage>=healthcare_expenses^medications_lifetime_perc_covered-1
109 healthcare_coverage>=(procedures_lifetime-1)^active_conditions
110 latitude<=1/medications_active+age
111 latitude<=age+log(healthcare_expenses)
112 latitude<=-DALY-longitude
113 latitude<=minimum(healthcare_expenses,floor(High_Density_Lipoprotein_Cholest
erol))
114 latitude<=1/2*healthcare_coverage/QALY
115 latitude<=encounters_count*healthcare_expenses/medications_lifetime_cost
116 latitude<=-log(medications_lifetime)/log(10)+lifetime_condition_length
117 latitude<=2*active_care_plan_length+age
118 latitude<=2*QALY/medications_active
119 latitude<=minimum(healthcare_expenses,2*Alanine_aminotransferase__Enzymatic_
activity_volume__in_Serum,Plasma)
120 latitude>=maximum(Left_ventricular_Ejection_fraction,mean_DALY)+1
121 latitude>=(longitude^2)^(1/log(10))
122 latitude>=log(procedures_lifetime_cost^4)
123 latitude>=sqrt(medications_lifetime_dispenses+1)+1
124 latitude>=e^(e^QOLS+1)
125 latitude>=age*encounters_lifetime_perc_covered-1
126
latitude>=log(encounters_lifetime_total_cost)/encounters_lifetime_perc_covered
127 latitude>=medications_active^sqrt(medications_lifetime)
128 latitude>=minimum(encounters_count,active_care_plan_length-1)
129 latitude<=active_care_plan_length*sqrt(active_conditions)
130 latitude<=QALY+immunizations_lifetime_cost-1
131
latitude<=minimum(healthcare_expenses,1/2*Low_Density_Lipoprotein_Cholesterol)
132 latitude<=medications_lifetime/medications_lifetime_perc_covered
133 latitude<=1/2*healthcare_coverage/medications_lifetime
134 latitude<=active_care_plan_length/encounters_lifetime_perc_covered+1
135 latitude<=log(active_condition_length^2)^2
136 latitude<=sqrt(2)*healthcare_expenses^(1/4)
137 latitude<=10^sqrt(log(encounters_lifetime_payer_coverage)/log(10))
138 latitude<=minimum(healthcare_expenses,1/2*MCV__Entitic_volume__by_Automated_
count)
```

```
139 latitude>=1/2*active_care_plans-1/2*longitude
140 latitude>=encounters_count*encounters_lifetime_perc_covered-1
141 latitude>=1/2*QALY*immunizations_lifetime
142 latitude>=-active_care_plan_length^2+age
143 latitude>=(age+1)*medications_lifetime_perc_covered
144 latitude>=1/2*lifetime_care_plans-1/2*longitude
145 latitude>=10^encounters_lifetime_perc_covered*active_conditions
146 latitude>=log(active_condition_length^active_conditions)
147 latitude>=log(healthcare_expenses)*procedures_lifetime
148 latitude>=age*log(10)/log(device_lifetime_length)
149 latitude<=healthcare_expenses/(immunizations_lifetime*medications_lifetime_l
ength)
150 latitude<=e^active_conditions+lifetime_care_plan_length
151 latitude<=encounters_count^(log(encounters_lifetime_total_cost)/log(10))
152 latitude<=sqrt(healthcare_expenses/active_care_plan_length)
153 latitude<=1/num_allergies+QALY
154 latitude<=e^(age^QOLS)
155 latitude<=(lifetime_condition_length-1)*active_care_plan_length
156 latitude<=minimum(healthcare_expenses,2*Carbon_Dioxide)
157 latitude<=ceil(encounters_lifetime_total_cost/DALY)
158 latitude<=active_conditions^e^active_care_plans
159 latitude>=log(2*healthcare_expenses)^2/log(10)^2
160 latitude>=log(healthcare_expenses)*medications_active
161 latitude>=-DALY^2+active_care_plan_length
162 latitude>=active_care_plans*active_conditions
163 latitude>=procedures_lifetime/sqrt(encounters_lifetime_perc_covered)
164 latitude>=(longitude^2)^(1/log(10))
165 latitude>=2*QALY^encounters_lifetime_perc_covered
166 latitude>=2*e^medications_active+1
167 latitude>=10^e^(medications_lifetime_perc_covered^2)
168 longitude<=-procedures_lifetime_cost^medications_lifetime_perc_covered
169 longitude<=-immunizations_lifetime_cost/lifetime_care_plans
170 longitude<=-QALY+encounters_lifetime_perc_covered-1
171 longitude<=1/immunizations_lifetime-age
172 longitude<=10^DALY-lifetime_condition_length
173 longitude<=-2*QALY+lifetime_care_plan_length
174 longitude<=-sqrt(medications_lifetime_cost)+encounters_lifetime_total_cost
175 longitude<=-2*latitude+2*lifetime_care_plan_length
176 longitude<=-1/4*immunizations_lifetime_cost
177 longitude>=2*active_care_plans-2*latitude
178 longitude>=-e^active_condition_length+medications_lifetime_dispenses
179 longitude>=-encounters_lifetime_payer_coverage+log(encounters_lifetime_perc_
covered)
180 longitude>=log(num_allergies)/log(10)-QALY
181 longitude>=-2*latitude+2*lifetime_care_plans
182 longitude>=-minimum(healthcare_expenses,Diastolic_Blood_Pressure)
183 longitude>=-DALY^lifetime_care_plan_length
184 longitude>=-minimum(healthcare_expenses,Body_Weight)
```

```
185 longitude<=log(lifetime_condition_length)^medications_lifetime_length
186 longitude<=e^encounters_count-medications_lifetime_length
187 longitude<=floor(-1/2*immunizations_lifetime_cost)
188 longitude<=-10^(encounters_lifetime_perc_covered+1)
189 longitude<=-2*encounters_count+procedures_lifetime_cost
190 longitude<=-floor(lifetime_condition_length)+medications_lifetime_cost
191 longitude<=log(10)*procedures_lifetime/log(DALY)
192 longitude<=-age-2
193 longitude>=-2*latitude+2*lifetime_care_plans
194 longitude>=-healthcare_coverage/latitude
195 longitude>=active_conditions-2*latitude
196 longitude>=-2*latitude+procedures_lifetime
197 longitude>=2*immunizations_lifetime-2*latitude
198 longitude>=-minimum(healthcare_expenses,Diastolic_Blood_Pressure)
199 longitude<=-sqrt(medications_lifetime_cost)+encounters_lifetime_total_cost
200 longitude<=-ceil(age)
201 longitude<=age-medications_lifetime-1
202 longitude<=(-active_conditions)^procedures_lifetime
203 longitude<=age/(medications_lifetime_perc_covered-1)
204 longitude<=QALY-2*latitude
205 longitude<=-encounters_lifetime_payer_coverage/lifetime_condition_length
206 longitude<=-QALY-active_conditions
207 longitude<=-sqrt(medications_lifetime_length)+healthcare_coverage
208 longitude<=-immunizations_lifetime_cost/lifetime_conditions
209 longitude>=2*active_conditions-2*latitude
210 longitude>=-healthcare_coverage/age
211 longitude>=-encounters_lifetime_payer_coverage/procedures_lifetime
212 longitude>=(encounters_lifetime_perc_covered-1)*encounters_lifetime_payer_co
verage
213 longitude>=-1/2*e^encounters_count
214 longitude>=-minimum(healthcare_expenses,Diastolic_Blood_Pressure)
215 longitude>=-2*latitude+procedures_lifetime
216 age<=floor(active_condition_length)+latitude
217 age<=2*latitude
218 age<=encounters_count^log(encounters_lifetime_payer_coverage)
219 age<=2*latitude-2*num_allergies
220 age<=sqrt(healthcare_coverage)-encounters_count
221 age<=e^(QALY/procedures_lifetime)
222 age<=-device_lifetime_length+2*latitude
223 age<=lifetime_condition_length-1/2*longitude
224 age<=10^encounters_count/active_care_plan_length
225 age<=2*log(immunizations_lifetime_cost)^2
226 age>=2*QOLS+active_condition_length
227 age>=DALY+QALY+1
228 age>=QALY+1
229 age>=1/2*device_lifetime_length+1/2*medications_lifetime
230 age>=ceil(lifetime_care_plan_length)-lifetime_condition_length
231 age>=ceil(QALY)+1
```

```
age>=1/2*active_conditions+encounters_count
age>=medications_lifetime_length/(lifetime_condition_length+1)
age>=sqrt(medications_lifetime_cost)-medications_lifetime_dispenses
age<=QALY^2/medications_active^2
age<=ceil(DALY)-longitude
age<=10^DALY+lifetime_care_plan_length
age<=(sqrt(QALY)+1)^2
age<=healthcare_expenses/medications_lifetime_length+active_care_plan_length
age<=encounters_lifetime_total_cost/(active_condition_length+1)
age<=latitude+lifetime_care_plan_length
age<=2*encounters_count+lifetime_care_plan_length
age<=1/4*lifetime_condition_length^2
age<=e^(lifetime_condition_length^encounters_lifetime_perc_covered)
age>=DALY+QALY+1
age>=active_condition_length+log(immunizations_lifetime)
age>=medications_lifetime_dispenses/floor(lifetime_care_plan_length)
age>=e^QOLS*procedures_lifetime
age>=sqrt(active_conditions)+QALY
age>=active_care_plan_length+encounters_lifetime_perc_covered
age>=(2*active_care_plan_length)^medications_lifetime_perc_covered
age>=2*QALY-lifetime_condition_length
age>=log(e^encounters_count)/log(10)-1
age>=-10^active_care_plans+latitude
age<=10^medications_lifetime+latitude
age<=minimum(healthcare_expenses,Low_Density_Lipoprotein_Cholesterol+1)
age<=QALY*log(encounters_lifetime_payer_coverage)/log(10)
age<=encounters_count-longitude
age<=sqrt(encounters_lifetime_payer_coverage)/imaging_studies_lifetime
age<=minimum(healthcare_expenses,e^Potassium)
age<=ceil(latitude)+lifetime_care_plan_length
age<=healthcare_expenses/encounters_lifetime_total_cost+latitude
age<=1/2*encounters_lifetime_payer_coverage-lifetime_care_plan_length
age<=encounters_lifetime_payer_coverage/log(latitude)
age>=active_condition_length
age>=active_care_plan_length+2*encounters_lifetime_perc_covered
age>=sqrt(1/2)*sqrt(encounters_lifetime_payer_coverage)+1
age>=DALY+QALY+1
age>=active_care_plans+active_condition_length-1
age>=QALY+1/2*lifetime_conditions
age>=QALY+medications_active
age>=medications_lifetime^2/QALY^2
num_allergies<=active_care_plans
num_allergies<=device_lifetime_length
num_allergies>=device_lifetime_length
num_allergies<=active_care_plans
num_allergies<=procedures_lifetime
num_allergies<=e^device_lifetime_length
num_allergies<=-active_care_plan_length+lifetime_care_plan_length
```

```
num_allergies>=imaging_studies_lifetime
num_allergies>=minimum(active_care_plans,immunizations_lifetime-1)
num_allergies<=active_care_plans
num_allergies<=immunizations_lifetime
num_allergies<=e^device_lifetime_length
num_allergies<=device_lifetime_length^procedures_lifetime
num_allergies>=device_lifetime_length
num_allergies>=-active_conditions+2*procedures_lifetime
active_care_plans<=lifetime_care_plans
active_care_plans<=active_conditions+1
active_care_plans>=imaging_studies_lifetime
active_care_plans>=1/2*immunizations_lifetime
active_care_plans>=medications_active-1
active_care_plans>=lifetime_care_plans-medications_lifetime
active_care_plans>=minimum(lifetime_care_plans,immunizations_lifetime)
active_care_plans>=log(maximum(Alkaline_phosphatase__Enzymatic_activity_volu
me__in_Serum,Plasma,mean_QOLS))
active_care_plans>=lifetime_care_plans-procedures_lifetime_cost
active_care_plans>=minimum(device_lifetime_length,Creatinine)
active_care_plans<=lifetime_care_plans
active_care_plans>=ceil(device_lifetime_length)
active_care_plans>=encounters_lifetime_perc_covered
active_care_plans>=immunizations_lifetime
active_care_plans>=medications_active-1
active_care_plans>=num_allergies-1
active_care_plans>=minimum(lifetime_care_plans,Creatinine)
active_care_plans>=minimum(lifetime_care_plans,procedures_lifetime)
active_care_plans<=lifetime_care_plans
active_care_plans<=10^medications_active
active_care_plans<=2*ceil(DALY)
active_care_plans>=num_allergies
active_care_plans>=immunizations_lifetime
active_care_plans>=sqrt(lifetime_care_plans)
active_care_plans>=ceil(1/2*lifetime_care_plans)
active_care_plans>=medications_active-1
active_care_plans>=minimum(lifetime_care_plans,active_conditions)
active_care_plans>=lifetime_care_plan_length/active_condition_length
lifetime_care_plans<=active_conditions
lifetime_care_plans<=active_care_plans+procedures_lifetime
lifetime_care_plans<=2*active_care_plans
lifetime_care_plans<=floor(sqrt(active_care_plan_length))
lifetime_care_plans<=active_care_plans+immunizations_lifetime
lifetime_care_plans<=active_care_plans+medications_lifetime
lifetime_care_plans<=active_care_plans+medications_active
lifetime_care_plans>=num_allergies
lifetime_care_plans>=active_care_plans
lifetime_care_plans<=active_care_plans
lifetime_care_plans>=num_allergies
```

```
327 lifetime_care_plans>=active_care_plans
328 lifetime_care_plans>=imaging_studies_lifetime
329 lifetime_care_plans>=minimum(lifetime_conditions,procedures_lifetime)
330 lifetime_care_plans>=immunizations_lifetime^2-1
331 lifetime_care_plans<=active_care_plans+1
332 lifetime_care_plans<=active_care_plan_length
333 lifetime_care_plans<=encounters_count
334 lifetime_care_plans<=e^healthcare_coverage
335 lifetime_care_plans<=ceil(log(latitude))
336 lifetime_care_plans<=active_care_plans^2
337 lifetime_care_plans<=minimum(healthcare_expenses,floor(Globulin__Mass_volume
__in_Serum_by_calculation))
338 lifetime_care_plans<=active_care_plans+medications_lifetime
339 lifetime_care_plans>=active_care_plans
340 lifetime_care_plans>=minimum(active_conditions,medications_active)
341 active_care_plan_length<=maximum(latitude,active_condition_length)
342 active_care_plan_length<=lifetime_care_plan_length
343 active_care_plan_length<=maximum(active_condition_length,immunizations_lifet
ime_cost)
344 active_care_plan_length<=lifetime_care_plan_length^sqrt(encounters_count)
345 active_care_plan_length<=-log(procedures_lifetime_cost)/log(10)+QALY
346 active_care_plan_length<=encounters_count-1/2*longitude
347 active_care_plan_length<=-log(healthcare_coverage)/log(10)+age
348 active_care_plan_length>=num_allergies
349 active_care_plan_length>=lifetime_care_plan_length^QOLS
350 active_care_plan_length>=minimum(lifetime_care_plan_length,DALY+1)
351 active_care_plan_length>=QALY*log(active_care_plans)/log(10)
352
active_care_plan_length>=log(medications_active^medications_lifetime)/log(10)
353 active_care_plan_length>=lifetime_care_plan_length-lifetime_condition_length
354 active_care_plan_length>=maximum(Alkaline_phosphatase__Enzymatic_activity_vo
lume__in_Serum,Plasma,-healthcare_expenses)
355 active_care_plan_length<=ceil(age)-medications_lifetime_perc_covered
356 active_care_plan_length<=lifetime_care_plan_length
357 active_care_plan_length<=active_condition_length/procedures_lifetime
358 active_care_plan_length<=latitude^2/device_lifetime_length^2
359 active_care_plan_length<=active_condition_length*e^medications_lifetime_perc
_covered
360 active_care_plan_length<=active_condition_length^medications_lifetime
361 active_care_plan_length<=ceil(latitude)+medications_lifetime
362 active_care_plan_length<=(medications_lifetime_perc_covered+1)*active_condit
ion_length
363 active_care_plan_length<=(DALY+1)*active_condition_length
364 active_care_plan_length>=num_allergies
365 active_care_plan_length>=minimum(active_condition_length,lifetime_care_plan_
length-1)
366 active_care_plan_length>=minimum(active_condition_length,floor(lifetime_care
_plan_length))
```

```
367 active_care_plan_length>=DALY^2*medications_lifetime_perc_covered
368 active_care_plan_length>=active_condition_length*floor(QOLS)
369 active_care_plan_length>=10^num_allergies-active_condition_length
370 active_care_plan_length<=sqrt(medications_lifetime_length-1)+1
371 active_care_plan_length<=10^(2*log(active_care_plans))
372 active_care_plan_length<=active_condition_length
373 active_care_plan_length<=10^(encounters_lifetime_total_cost/medications_life
time_dispenses)
374 active_care_plan_length<=1/2*lifetime_care_plan_length/encounters_lifetime_p
erc_covered
375 active_care_plan_length<=(QALY-age)^2
376 active_care_plan_length<=DALY*e^active_care_plans
377 active_care_plan_length>=num_allergies
378 active_care_plan_length>=lifetime_care_plan_length/(medications_lifetime+1)
379 active_care_plan_length>=log(lifetime_condition_length^medications_active)
380 active_care_plan_length>=lifetime_care_plan_length^QOLS
381 active_care_plan_length>=encounters_count-log(healthcare_expenses)
382 active_care_plan_length>=lifetime_care_plan_length/sqrt(encounters_count)
383
active_care_plan_length>=minimum(active_condition_length,active_care_plans^2)
384
active_care_plan_length>=minimum(active_care_plans,lifetime_care_plan_length)
385 lifetime_care_plan_length<=(active_care_plan_length-1)*lifetime_care_plans
386 lifetime_care_plan_length<=medications_lifetime_cost
387 lifetime_care_plan_length<=e^(sqrt(10^active_care_plans))
388 lifetime_care_plan_length<=minimum(healthcare_expenses,Diastolic_Blood_Press
ure+1)
389
lifetime_care_plan_length<=10^(log(encounters_lifetime_total_cost)/log(10)-1)
390 lifetime_care_plan_length<=lifetime_condition_length/sqrt(encounters_lifetim
e_perc_covered)
391 lifetime_care_plan_length<=healthcare_expenses^DALY/mean_DALY
392 lifetime_care_plan_length<=10^(2*medications_lifetime_perc_covered+2)
393 lifetime_care_plan_length<=healthcare_expenses/(encounters_lifetime_payer_co
verage*immunizations_lifetime)
394 lifetime_care_plan_length>=active_care_plan_length
395 lifetime_care_plan_length>=2*latitude/encounters_count
396 lifetime_care_plan_length>=immunizations_lifetime_cost*log(10)/log(healthcar
e_expenses)
397 lifetime_care_plan_length>=active_condition_length-
log(encounters_lifetime_payer_coverage)
398 lifetime_care_plan_length>=ceil(age)^encounters_lifetime_perc_covered
399
lifetime_care_plan_length>=2*active_care_plan_length-2*active_condition_length
400 lifetime_care_plan_length>=10^floor(log(encounters_count)/log(10))
401 lifetime_care_plan_length>=e^(lifetime_care_plans-1)+1
402 lifetime_care_plan_length>=minimum(lifetime_condition_length,sqrt(medication
s_lifetime_length))
```

```
403 lifetime_care_plan_length>=log(e^encounters_count)/log(10)+1
404 lifetime_care_plan_length<=(age-lifetime_condition_length)^2
405 lifetime_care_plan_length<=active_care_plans*healthcare_expenses
406 lifetime_care_plan_length<=healthcare_coverage/active_condition_length+1
407 lifetime_care_plan_length<=active_care_plan_length^active_care_plans
408 lifetime_care_plan_length<=healthcare_expenses/healthcare_coverage+age
409 lifetime_care_plan_length<=active_care_plan_length+2*encounters_count
410 lifetime_care_plan_length<=1/medications_lifetime_perc_covered-longitude
411 lifetime_care_plan_length>=num_allergies
412 lifetime_care_plan_length>=active_care_plan_length
413 lifetime_care_plan_length>=minimum(lifetime_care_plans,lifetime_condition_le
ngth)
414
lifetime_care_plan_length>=sqrt(medications_lifetime_length)*procedures_lifetime
415 lifetime_care_plan_length>=log(active_care_plans^encounters_count)
416 lifetime_care_plan_length>=sqrt(medications_lifetime_dispenses)/QOLS
417 lifetime_care_plan_length>=-10^encounters_lifetime_perc_covered+medications_
lifetime
418 lifetime_care_plan_length>=active_care_plan_length^2/latitude
419 lifetime_care_plan_length<=sqrt(medications_lifetime_dispenses)-longitude
420 lifetime_care_plan_length<=active_care_plan_length^active_care_plans
421 lifetime_care_plan_length<=10^log(encounters_count+1)
422 lifetime_care_plan_length<=floor(QALY/medications_lifetime_perc_covered)
423
lifetime_care_plan_length<=healthcare_expenses*latitude/procedures_lifetime_cost
424 lifetime_care_plan_length<=e^DALY+latitude
425 lifetime_care_plan_length<=QOLS*medications_lifetime_dispenses+1
426 lifetime_care_plan_length<=e^(-medications_active)*medications_lifetime_disp
enses
427 lifetime_care_plan_length<=minimum(healthcare_expenses,ceil(Glomerular_filtr
ation_rate_1_73_sq_M_predicted))
428 lifetime_care_plan_length>=num_allergies
429 lifetime_care_plan_length>=active_care_plan_length
430 lifetime_care_plan_length>=10^log(procedures_lifetime)-1
431
lifetime_care_plan_length>=active_care_plan_length*log(10)/log(num_allergies)
432 lifetime_care_plan_length>=2*lifetime_conditions*medications_active
433 lifetime_care_plan_length>=lifetime_condition_length*log(10)/log(medications
_lifetime_length)
434
lifetime_care_plan_length>=log(10)^2/log(medications_lifetime_perc_covered)^2
435 lifetime_care_plan_length>=active_care_plans^2*lifetime_care_plans
436 active_conditions<=lifetime_conditions
437 active_conditions<=floor(active_care_plan_length)^2
438 active_conditions>=active_care_plans
439 active_conditions>=medications_active
440 active_conditions>=2*lifetime_conditions/encounters_count
441 active_conditions>=2*QOLS
```

```
442 active_conditions>=floor(device_lifetime_length)^2
443 active_conditions>=2*active_care_plans-1
444 active_conditions>=(active_care_plans-1)^2
445 active_conditions<=lifetime_conditions
446 active_conditions<=active_care_plan_length
447 active_conditions<=10^e^immunizations_lifetime
448 active_conditions<=maximum(lifetime_care_plans,DALY)
449 active_conditions<=sqrt(encounters_count)+active_care_plans
450 active_conditions>=num_allergies
451 active_conditions>=active_care_plans-1
452 active_conditions>=minimum(lifetime_conditions,1/2*medications_lifetime)
453 active_conditions>=2*num_allergies
454 active_conditions>=-encounters_lifetime_payer_coverage+lifetime_conditions
455 active_conditions>=lifetime_conditions-medications_lifetime_cost
456 active_conditions>=minimum(lifetime_conditions,medications_active)
457 active_conditions>=(lifetime_conditions-1)*immunizations_lifetime
458 active_conditions<=lifetime_conditions
459 active_conditions<=10^e^device_lifetime_length
460 active_conditions>=num_allergies
461 active_conditions>=1/2*lifetime_conditions
462 active_conditions>=active_care_plans-1
463 active_conditions>=lifetime_care_plans-1
464 active_conditions>=minimum(device_lifetime_length,lifetime_conditions-1)
465 active_conditions>=minimum(active_care_plans,lifetime_conditions)
466 active_conditions>=lifetime_conditions-procedures_lifetime
467 active_conditions>=1/QOLS-1
468 active_conditions>=minimum(lifetime_conditions,2*medications_active)
469 lifetime_conditions<=active_conditions+procedures_lifetime
470 lifetime_conditions<=active_condition_length
471 lifetime_conditions<=(1/num_allergies)
472 lifetime_conditions<=2*active_care_plans+lifetime_care_plans
473 lifetime_conditions<=2*active_conditions
474 lifetime_conditions<=minimum(healthcare_expenses,Respiratory_rate)
475 lifetime_conditions<=maximum(active_conditions,1/medications_lifetime_perc_c
overed)
476 lifetime_conditions<=maximum(active_conditions,e^procedures_lifetime)
477 lifetime_conditions>=active_conditions
478 lifetime_conditions>=lifetime_care_plans+1
479 lifetime_conditions>=minimum(encounters_count,e^medications_active)
480 lifetime_conditions<=active_conditions+2
481 lifetime_conditions<=e^lifetime_care_plans
482 lifetime_conditions<=2*active_conditions
483 lifetime_conditions<=e^healthcare_coverage
484 lifetime_conditions<=maximum(active_conditions,2*lifetime_care_plans)
485 lifetime_conditions<=encounters_count+1
486
lifetime_conditions<=active_conditions/ceil(medications_lifetime_perc_covered)
487 lifetime_conditions<=ceil(log(healthcare_expenses))
```

```
488 lifetime_conditions<=maximum(active_conditions,lifetime_care_plans+1)
489 lifetime_conditions>=active_conditions
490 lifetime_conditions>=encounters_count-encounters_lifetime_payer_coverage
491 lifetime_conditions<=active_conditions+procedures_lifetime
492 lifetime_conditions<=10^medications_lifetime_perc_covered*active_conditions
493 lifetime_conditions<=maximum(active_care_plan_length,active_conditions)
494 lifetime_conditions<=maximum(active_conditions,immunizations_lifetime_cost)
495 lifetime_conditions<=ceil(1/2*QALY)
496 lifetime_conditions<=2*active_conditions+1
497 lifetime_conditions<=maximum(Triglycerides,ceil(active_conditions))
498 lifetime_conditions>=active_conditions
499 lifetime_conditions>=ceil(sqrt(procedures_lifetime))
500 lifetime_conditions>=lifetime_care_plans-num_allergies
501 active_condition_length<=1/2*maximum(age,lifetime_condition_length)
502 active_condition_length<=lifetime_condition_length
503 active_condition_length<=e^(age/active_conditions)
504 active_condition_length<=age-log(immunizations_lifetime_cost)
505 active_condition_length<=maximum(active_care_plan_length,sqrt(encounters_lif
etime_total_cost))
506 active_condition_length<=2*age-encounters_count
507 active_condition_length<=minimum(healthcare_expenses,MCHC__Mass_volume__by_A
utomated_count)
508 active_condition_length<=sqrt(QALY)*encounters_count
509 active_condition_length>=num_allergies
510 active_condition_length>=device_lifetime_length
511 active_condition_length>=-Body_Weight+ceil(lifetime_care_plan_length)
512 active_condition_length>=1/2*QALY-procedures_lifetime_cost
513 active_condition_length>=minimum(active_care_plans,active_care_plan_length)
514 active_condition_length>=1/2*encounters_lifetime_perc_covered*lifetime_care_
plan_length
515 active_condition_length>=active_care_plan_length-immunizations_lifetime_cost
516 active_condition_length>=QALY/(medications_lifetime-1)
517 active_condition_length>=minimum(active_care_plan_length,encounters_count)
518
active_condition_length>=minimum(active_care_plan_length,e^active_conditions)
519 active_condition_length<=maximum(active_care_plan_length,1/immunizations_lif
etime)
520 active_condition_length<=lifetime_condition_length
521 active_condition_length<=healthcare_expenses/encounters_lifetime_payer_cover
age+QOLS
522
active_condition_length<=maximum(active_care_plan_length,e^lifetime_care_plans)
523 active_condition_length<=-floor(longitude)+medications_lifetime_perc_covered
524 active_condition_length<=maximum(active_care_plan_length,10^DALY)
525 active_condition_length<=maximum(active_care_plan_length,healthcare_expenses
^encounters_lifetime_perc_covered)
526 active_condition_length<=log(10^(lifetime_care_plan_length+1))
527 active_condition_length>=device_lifetime_length
```

```
528 active_condition_length>=log(DALY*encounters_lifetime_total_cost)
529 active_condition_length>=sqrt(medications_lifetime_length*medications_lifeti
me_perc_covered)
530 active_condition_length>=active_care_plan_length-
medications_lifetime_dispenses+1
531
active_condition_length>=minimum(lifetime_care_plans,lifetime_condition_length)
532 active_condition_length>=2*DALY-encounters_count
533 active_condition_length>=sqrt(DALY*medications_lifetime)
534 active_condition_length>=2*QALY-2*latitude
535 active_condition_length>=1/2*QALY*imaging_studies_lifetime
536 active_condition_length<=healthcare_coverage
537 active_condition_length<=maximum(latitude,active_care_plan_length)
538 active_condition_length<=maximum(active_care_plan_length,encounters_count)
539 active_condition_length<=1/encounters_count+lifetime_care_plan_length
540 active_condition_length<=active_care_plan_length^active_care_plans
541 active_condition_length<=maximum(active_care_plan_length,immunizations_lifet
ime_cost)
542 active_condition_length<=medications_lifetime_dispenses^DALY-1
543 active_condition_length>=num_allergies
544 active_condition_length>=lifetime_condition_length^encounters_lifetime_perc_
covered-1
545 active_condition_length>=active_care_plan_length
546
active_condition_length>=log(procedures_lifetime_cost^active_conditions)/log(10)
547 active_condition_length>=ceil(active_care_plan_length)-medications_lifetime
548 lifetime_condition_length<=healthcare_coverage^2/medications_lifetime_dispen
ses^2
549 lifetime_condition_length<=healthcare_expenses/QALY^2
550 lifetime_condition_length<=active_condition_length*active_conditions
551 lifetime_condition_length<=latitude^2/medications_active^2
552 lifetime_condition_length<=-ceil(active_condition_length)+encounters_lifetim
e_payer_coverage
553
lifetime_condition_length<=maximum(Systolic_Blood_Pressure,e^active_conditions)
554
lifetime_condition_length<=healthcare_expenses/medications_lifetime_length+age
555 lifetime_condition_length<=(DALY+1)*age
556 lifetime_condition_length<=(10^encounters_count)^QOLS
557
lifetime_condition_length<=log(encounters_lifetime_total_cost)^active_conditions
558 lifetime_condition_length>=active_conditions/DALY
559 lifetime_condition_length>=DALY*log(lifetime_care_plan_length)
560 lifetime_condition_length>=active_condition_length/QOLS+1
561 lifetime_condition_length>=encounters_lifetime_total_cost^(log(medications_a
ctive)/log(10))
562 lifetime_condition_length>=sqrt(QALY+medications_lifetime_length)
563 lifetime_condition_length>=sqrt(medications_lifetime_cost/QALY)
```

```
564 lifetime_condition_length>=2*log(medications_lifetime_cost)^2/log(10)^2
565 lifetime_condition_length>=(2*medications_lifetime_length)^medications_lifet
ime_perc_covered
566 lifetime_condition_length>=-e^medications_lifetime+medications_lifetime_disp
enses
567 lifetime_condition_length<=encounters_lifetime_total_cost
568
lifetime_condition_length<=maximum(active_condition_length,10^active_conditions)
569 lifetime_condition_length<=minimum(healthcare_expenses,Platelets____volume__
in_Blood_by_Automated_count-1)
570 lifetime_condition_length<=QALY*log(age)
571 lifetime_condition_length<=maximum(Body_Mass_Index,ceil(procedures_lifetime_
cost))
572 lifetime_condition_length<=1/2*healthcare_coverage/latitude
573 lifetime_condition_length<=DALY*sqrt(healthcare_coverage)
574 lifetime_condition_length<=active_condition_length^lifetime_conditions
575 lifetime_condition_length<=1/2*active_condition_length*encounters_count
576 lifetime_condition_length>=log(device_lifetime_length)/log(10)+immunizations
_lifetime_cost
577 lifetime_condition_length>=1/2*active_care_plan_length*active_conditions
578 lifetime_condition_length>=ceil(active_care_plan_length*active_care_plans)
579 lifetime_condition_length>=10^(-lifetime_care_plan_length-1)
580
lifetime_condition_length>=-active_care_plan_length+2*lifetime_care_plan_length
581 lifetime_condition_length>=immunizations_lifetime^sqrt(QALY)
582 lifetime_condition_length>=minimum(immunizations_lifetime_cost,Diastolic_Blo
od_Pressure+1)
583 lifetime_condition_length>=floor(1/2*device_lifetime_length)^2
584 lifetime_condition_length>=sqrt(DALY)*active_care_plan_length
585 lifetime_condition_length>=2*maximum(Glomerular_filtration_rate_1_73_sq_M_pr
edicted,mean_DALY)
586 lifetime_condition_length<=active_condition_length^lifetime_conditions
587 lifetime_condition_length<=encounters_lifetime_total_cost
588 lifetime_condition_length<=healthcare_expenses/(age*lifetime_conditions)
589 lifetime_condition_length<=ceil(active_condition_length)^active_conditions
590 lifetime_condition_length<=10^DALY*latitude
591 lifetime_condition_length<=QALY^2+active_condition_length
592 lifetime_condition_length<=floor(1/2*active_condition_length)^2
593 lifetime_condition_length<=minimum(healthcare_expenses,Platelets____volume__
in_Blood_by_Automated_count-1)
594 lifetime_condition_length<=10^(latitude^(1/4))
595 lifetime_condition_length<=healthcare_expenses/(QOLS*medications_lifetime_di
spenses)
596 lifetime_condition_length>=sqrt(medications_lifetime)+latitude
597 lifetime_condition_length>=sqrt(encounters_lifetime_payer_coverage+medicatio
ns_lifetime_dispenses)
598 lifetime_condition_length>=sqrt(active_conditions)+lifetime_care_plan_length
599
```

```
lifetime_condition_length>=ceil(lifetime_care_plan_length)*medications_active
600 lifetime_condition_length>=-active_care_plan_length+medications_lifetime
601 lifetime_condition_length>=e^(sqrt(1/2)*sqrt(active_care_plan_length))
602 lifetime_condition_length>=e^(active_conditions/lifetime_care_plans)
603 lifetime_condition_length>=log(active_conditions^encounters_count)/log(10)
604 lifetime_condition_length>=(2*active_conditions)^immunizations_lifetime
605 lifetime_condition_length>=2*age-encounters_lifetime_payer_coverage
606 device_lifetime_length<=floor(1/immunizations_lifetime)
607 device_lifetime_length<=active_condition_length
608 device_lifetime_length<=abs(log(medications_active))/log(10)
609
device_lifetime_length<=healthcare_expenses*medications_lifetime_perc_covered
610 device_lifetime_length<=procedures_lifetime_cost^longitude
611 device_lifetime_length<=-active_condition_length+lifetime_condition_length
612 device_lifetime_length<=abs(log(num_allergies))/log(10)
613 device_lifetime_length>=floor(encounters_lifetime_perc_covered)
614 device_lifetime_length>=-healthcare_coverage
615 device_lifetime_length>=-num_allergies
616 device_lifetime_length<=num_allergies
617 device_lifetime_length>=imaging_studies_lifetime
618 device_lifetime_length>=QALY*imaging_studies_lifetime
619 device_lifetime_length<=maximum(Triglycerides,ceil(num_allergies))
620 device_lifetime_length<=lifetime_care_plan_length
621 device_lifetime_length<=active_condition_length
622 device_lifetime_length<=immunizations_lifetime_cost
623 device_lifetime_length<=-active_care_plan_length+lifetime_condition_length
624 device_lifetime_length<=healthcare_expenses*medications_active
625 device_lifetime_length>=num_allergies
626 encounters_count<=-active_conditions+ceil(lifetime_condition_length)
627 encounters_count<=lifetime_conditions^active_conditions
628 encounters_count<=active_conditions/imaging_studies_lifetime
629 encounters_count<=4*age-2
630 encounters_count<=ceil(age)/num_allergies
631 encounters_count<=10^(active_conditions^QOLS)
632 encounters_count<=2*age/QOLS
633 encounters_count<=maximum(mean_Carbon_Dioxide,1/device_lifetime_length)
634
encounters_count<=healthcare_expenses/procedures_lifetime_cost+active_care_plans
635 encounters_count<=maximum(immunizations_lifetime,procedures_lifetime_cost)
636 encounters_count>=-immunizations_lifetime_cost+1/2*lifetime_care_plan_length
637 encounters_count>=sqrt(procedures_lifetime)
638 encounters_count>=ceil(log(immunizations_lifetime_cost))
639 encounters_count>=active_conditions
640 encounters_count>=lifetime_conditions
641 encounters_count>=ceil(log(medications_lifetime_cost)/log(10))
642 encounters_count>=immunizations_lifetime^2
643 encounters_count>=maximum(Aspartate_aminotransferase__Enzymatic_activity_vol
ume__in_Serum,Plasma,mean_QOLS)^2
```

```
644 encounters_count>=minimum(age,medications_lifetime-1)
645 encounters_count>=ceil(DALY)-num_allergies
646 encounters_count<=floor(sqrt(encounters_lifetime_payer_coverage))
647 encounters_count<=ceil(age)+1
648 encounters_count<=ceil(lifetime_condition_length)
649
encounters_count<=healthcare_expenses^medications_lifetime_perc_covered+latitude
650 encounters_count<=floor(1/2*sqrt(healthcare_coverage))
651 encounters_count<=lifetime_care_plan_length^2/DALY^2
652 encounters_count<=10^medications_lifetime/procedures_lifetime
653 encounters_count<=maximum(medications_lifetime_cost,active_conditions+1)
654 encounters_count<=ceil(encounters_lifetime_payer_coverage/active_condition_l
ength)
655 encounters_count<=10^active_care_plans+active_conditions
656 encounters_count>=medications_lifetime-procedures_lifetime_cost+1
657 encounters_count>=minimum(medications_lifetime,2*Respiratory_rate)
658 encounters_count>=floor(lifetime_conditions/QOLS)
659 encounters_count>=log(active_conditions)*procedures_lifetime
660 encounters_count>=immunizations_lifetime+lifetime_conditions
661 encounters_count>=10^num_allergies+lifetime_care_plans
662 encounters_count>=floor(Heart_rate^medications_lifetime_perc_covered)
663 encounters_count>=active_care_plans+medications_active
664 encounters_count>=medications_lifetime_dispenses/10^active_care_plans
665 encounters_count>=-QALY+1/2*medications_lifetime
666 encounters_count<=1/2*10^active_conditions
667 encounters_count<=log(healthcare_expenses)/log(10)+medications_lifetime
668 encounters_count<=floor(1/4*QALY^2)
669 encounters_count<=10^ceil(1/encounters_lifetime_perc_covered)
670 encounters_count<=DALY*sqrt(healthcare_coverage)
671 encounters_count<=maximum(medications_lifetime_cost,2*active_conditions)
672 encounters_count<=maximum(age,e^active_conditions)
673
encounters_count<=1/2*lifetime_condition_length/encounters_lifetime_perc_covered
674 encounters_count<=2*active_care_plan_length+2*age
675
encounters_count<=maximum(immunizations_lifetime_cost,2*medications_lifetime)
676 encounters_count>=active_conditions-1
677 encounters_count>=2*active_care_plans
678 encounters_count>=minimum(latitude,medications_lifetime)
679 encounters_count>=medications_active+procedures_lifetime
680 encounters_count>=-active_conditions+ceil(DALY)
681
encounters_count>=(log(lifetime_care_plan_length)/log(10))^procedures_lifetime
682 encounters_count>=floor(log(medications_lifetime_cost)/log(10))
683 encounters_count>=2*medications_active+1
684 encounters_count>=active_conditions^2+longitude
685 encounters_count>=minimum(medications_lifetime,Glucose+1)
686 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
```

```
687 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
688 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
689 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
690 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
691 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
692 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
693 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
694 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
695 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
696 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
697 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
698 encounters_lifetime_payer_coverage<=healthcare_coverage
699 encounters_lifetime_payer_coverage<=encounters_lifetime_total_cost
700 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
ounters_lifetime_perc_covered
701 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_perc_covered*en
counters_lifetime_total_cost)
702 encounters_lifetime_payer_coverage>=encounters_lifetime_total_cost/encounter
s_count
703 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
704 encounters_lifetime_payer_coverage>=(active_care_plan_length-
lifetime_care_plan_length)^2
705 encounters_lifetime_payer_coverage>=sqrt(1/2*procedures_lifetime_cost+1)
706 encounters_lifetime_payer_coverage<=encounters_lifetime_total_cost
707 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
ounters_lifetime_perc_covered
708 encounters_lifetime_payer_coverage<=encounters_lifetime_perc_covered*healthc
are_expenses
709 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_perc_covered*en
counters_lifetime_total_cost)
710 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
711 encounters_lifetime_payer_coverage>=floor(encounters_lifetime_perc_covered*e
ncounters_lifetime_total_cost)
712 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
ounters_lifetime_perc_covered
713 encounters_lifetime_payer_coverage<=-2*QALY+encounters_lifetime_total_cost
714 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_perc_covered*en
counters_lifetime_total_cost)
715 encounters_lifetime_payer_coverage>=num_allergies
716 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
717 encounters_lifetime_payer_coverage>=floor(encounters_lifetime_perc_covered*e
ncounters_lifetime_total_cost)
718 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/encount
ers_lifetime_total_cost
719 encounters_lifetime_perc_covered>=num_allergies
```

```
720 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/(encoun
ters_lifetime_total_cost+1)
721
encounters_lifetime_perc_covered>=medications_lifetime_perc_covered^(2/log(10))
722 encounters_lifetime_perc_covered>=active_care_plans-medications_lifetime
723 encounters_lifetime_perc_covered<=healthcare_coverage
724 encounters_lifetime_perc_covered<=ceil(encounters_lifetime_payer_coverage)/e
ncounters_lifetime_total_cost
725 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/floor(e
ncounters_lifetime_total_cost)
726 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage
727 encounters_lifetime_perc_covered>=device_lifetime_length
728 encounters_lifetime_perc_covered>=floor(encounters_lifetime_payer_coverage)/
encounters_lifetime_total_cost
729 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/ceil(en
counters_lifetime_total_cost)
730 encounters_lifetime_perc_covered<=ceil(encounters_lifetime_payer_coverage)/e
ncounters_lifetime_total_cost
731 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/floor(e
ncounters_lifetime_total_cost)
732 encounters_lifetime_perc_covered>=num_allergies
733 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/(encoun
ters_lifetime_total_cost+1)
734 imaging_studies_lifetime<=num_allergies
735 imaging_studies_lifetime>=num_allergies
736 imaging_studies_lifetime>=lifetime_care_plans^2-encounters_count
737 imaging_studies_lifetime<=num_allergies
738 imaging_studies_lifetime<=device_lifetime_length
739 imaging_studies_lifetime>=-device_lifetime_length
740 imaging_studies_lifetime>=-num_allergies
741 imaging_studies_lifetime>=-immunizations_lifetime_cost+num_allergies
742
imaging_studies_lifetime>=minimum(device_lifetime_length,immunizations_lifetime)
743 imaging_studies_lifetime<=active_care_plans
744 imaging_studies_lifetime<=active_conditions-1
745 imaging_studies_lifetime<=immunizations_lifetime_cost
746 imaging_studies_lifetime<=medications_lifetime
747 imaging_studies_lifetime<=medications_active+1
748 imaging_studies_lifetime>=device_lifetime_length
749 immunizations_lifetime<=active_care_plans
750 immunizations_lifetime<=immunizations_lifetime_cost
751 immunizations_lifetime<=medications_active
752 immunizations_lifetime<=e^num_allergies
753 immunizations_lifetime>=device_lifetime_length
754 immunizations_lifetime>=imaging_studies_lifetime
755 immunizations_lifetime>=device_lifetime_length^medications_lifetime
756 immunizations_lifetime>=device_lifetime_length^QOLS
757 immunizations_lifetime>=floor(log(lifetime_conditions)/log(10))
```

```
758 immunizations_lifetime>=minimum(immunizations_lifetime_cost,QOLS)
759 immunizations_lifetime<=10^floor(QOLS)
760 immunizations_lifetime<=ceil(log(healthcare_coverage)/log(10))
761 immunizations_lifetime<=immunizations_lifetime_cost
762
immunizations_lifetime<=maximum(medications_lifetime,procedures_lifetime_cost)
763 immunizations_lifetime<=1/medications_active+1
764 immunizations_lifetime>=imaging_studies_lifetime
765 immunizations_lifetime>=ceil(medications_lifetime_perc_covered)
766 immunizations_lifetime>=minimum(num_allergies,procedures_lifetime)
767 immunizations_lifetime>=minimum(immunizations_lifetime_cost,QOLS)
768 immunizations_lifetime<=lifetime_care_plans
769 immunizations_lifetime<=immunizations_lifetime_cost
770 immunizations_lifetime<=medications_lifetime
771 immunizations_lifetime<=10^medications_lifetime_perc_covered
772 immunizations_lifetime<=(1/num_allergies)
773 immunizations_lifetime<=1/2*active_conditions
774 immunizations_lifetime<=(1/ceil(QOLS))
775 immunizations_lifetime>=num_allergies
776 immunizations_lifetime>=num_allergies^medications_lifetime_perc_covered
777 immunizations_lifetime>=num_allergies^lifetime_care_plans
778 immunizations_lifetime>=2*immunizations_lifetime_cost/encounters_lifetime_pa
yer_coverage
779 immunizations_lifetime>=floor(log(1/2*immunizations_lifetime_cost)/log(10))
780 immunizations_lifetime_cost<=encounters_lifetime_total_cost
781 immunizations_lifetime_cost<=medications_lifetime_cost
782 immunizations_lifetime_cost<=log(encounters_count^lifetime_care_plan_length)
783 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
784 immunizations_lifetime_cost<=latitude*log(10)/log(active_care_plans)
785 immunizations_lifetime_cost<=active_care_plan_length^2
786 immunizations_lifetime_cost>=device_lifetime_length
787 immunizations_lifetime_cost>=16*immunizations_lifetime^4
788
immunizations_lifetime_cost>=-healthcare_coverage+2*lifetime_condition_length
789 immunizations_lifetime_cost>=-10^procedures_lifetime+medications_lifetime
790 immunizations_lifetime_cost>=active_conditions^2*immunizations_lifetime
791
immunizations_lifetime_cost>=2*active_condition_length*immunizations_lifetime
792 immunizations_lifetime_cost>=medications_lifetime-procedures_lifetime_cost-1
793
immunizations_lifetime_cost<=1/2*medications_lifetime_length/active_conditions
794 immunizations_lifetime_cost<=e^(1/2*10^immunizations_lifetime)
795 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
796 immunizations_lifetime_cost<=maximum(Sodium,e^medications_lifetime)
797
immunizations_lifetime_cost<=lifetime_condition_length^sqrt(encounters_count)
798 immunizations_lifetime_cost<=active_conditions*healthcare_expenses
799 immunizations_lifetime_cost<=10^medications_active+latitude
```

```
800 immunizations_lifetime_cost<=maximum(Low_Density_Lipoprotein_Cholesterol,hea
lthcare_expenses^encounters_lifetime_perc_covered)
801 immunizations_lifetime_cost>=imaging_studies_lifetime
802 immunizations_lifetime_cost>=2*immunizations_lifetime*latitude
803 immunizations_lifetime_cost>=lifetime_condition_length*log(num_allergies)/lo
g(10)
804 immunizations_lifetime_cost>=2*encounters_count-lifetime_condition_length
805 immunizations_lifetime_cost>=e^(2*immunizations_lifetime)-1
806 immunizations_lifetime_cost<=(medications_lifetime_length-1)/DALY
807 immunizations_lifetime_cost<=-ceil(2*longitude)
808 immunizations_lifetime_cost<=sqrt(2)*sqrt(medications_lifetime_cost)+1
809 immunizations_lifetime_cost<=active_care_plan_length^2
810 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
811 immunizations_lifetime_cost<=e^(-active_care_plans)*healthcare_coverage
812 immunizations_lifetime_cost<=log(healthcare_expenses)^2-1
813 immunizations_lifetime_cost>=device_lifetime_length
814 immunizations_lifetime_cost>=maximum(Low_Density_Lipoprotein_Cholesterol,-he
althcare_expenses)
815 immunizations_lifetime_cost>=2*QALY*immunizations_lifetime
816 immunizations_lifetime_cost>=log(immunizations_lifetime^medications_lifetime
_dispenses)
817
immunizations_lifetime_cost>=sqrt(procedures_lifetime_cost)+procedures_lifetime
818 immunizations_lifetime_cost>=-2*QALY+lifetime_condition_length
819 immunizations_lifetime_cost>=-2*medications_active+medications_lifetime
820 medications_lifetime<=medications_lifetime_dispenses
821 medications_lifetime<=4*lifetime_conditions^2
822 medications_lifetime<=e^(sqrt(encounters_count)-1)
823 medications_lifetime<=(2*active_care_plans)^active_conditions
824 medications_lifetime<=2*e^healthcare_coverage
825 medications_lifetime<=10^(e^QOLS+1)
826 medications_lifetime<=encounters_count+immunizations_lifetime_cost
827 medications_lifetime<=minimum(healthcare_expenses,ceil(Prostate_specific_Ag_
_Mass_volume__in_Serum,Plasma))
828 medications_lifetime<=minimum(healthcare_expenses,1/2*Alkaline_phosphatase__
Enzymatic_activity_volume__in_Serum,Plasma)
829 medications_lifetime<=2*maximum(active_condition_length,encounters_count)
830 medications_lifetime>=num_allergies
831 medications_lifetime>=medications_active
832 medications_lifetime>=ceil(10^medications_lifetime_perc_covered)-1
833 medications_lifetime>=-medications_active+procedures_lifetime
834 medications_lifetime>=lifetime_care_plan_length+longitude+1
835 medications_lifetime>=lifetime_condition_length+2*longitude
836 medications_lifetime>=2*encounters_count+longitude
837 medications_lifetime>=active_care_plan_length*floor(QOLS)
838 medications_lifetime<=e^active_care_plans+lifetime_care_plan_length
839 medications_lifetime<=active_care_plans^healthcare_expenses
840 medications_lifetime<=medications_lifetime_cost
```

```
841 medications_lifetime<=active_care_plans+ceil(lifetime_condition_length)
842 medications_lifetime<=minimum(healthcare_expenses,floor(Sodium))
843 medications_lifetime<=minimum(healthcare_expenses,Protein__Mass_volume__in_S
erum,Plasma-1)
844 medications_lifetime<=1/2*e^sqrt(active_care_plan_length)
845 medications_lifetime<=QALY*e^num_allergies
846 medications_lifetime<=maximum(immunizations_lifetime_cost,ceil(QALY))
847 medications_lifetime>=device_lifetime_length
848 medications_lifetime>=device_lifetime_length^2-active_care_plan_length
849 medications_lifetime>=medications_active
850 medications_lifetime>=procedures_lifetime
851 medications_lifetime>=2*encounters_count+2*longitude
852 medications_lifetime>=-active_condition_length+1/2*lifetime_condition_length
853 medications_lifetime>=-active_care_plan_length+encounters_count-1
854 medications_lifetime>=floor(medications_lifetime_cost/healthcare_coverage)
855 medications_lifetime>=floor(1/2*encounters_count-1)
856 medications_lifetime>=log(DALY^active_care_plan_length)
857 medications_lifetime<=ceil(e^active_care_plan_length)
858 medications_lifetime<=medications_lifetime_cost
859 medications_lifetime<=2*lifetime_condition_length-num_allergies
860 medications_lifetime<=healthcare_expenses^medications_active*active_care_pla
n_length
861 medications_lifetime<=log(immunizations_lifetime_cost)^4
862 medications_lifetime<=ceil(DALY)*encounters_count
863 medications_lifetime<=maximum(encounters_count,e^DALY)
864 medications_lifetime<=log(log(e^encounters_lifetime_payer_coverage)/log(10))
/log(10)
865
medications_lifetime<=ceil(medications_lifetime_cost/procedures_lifetime_cost)
866 medications_lifetime>=num_allergies
867 medications_lifetime>=2*encounters_count-lifetime_care_plan_length
868 medications_lifetime>=medications_active
869 medications_lifetime>=-1/medications_lifetime_perc_covered+lifetime_care_pla
n_length
870 medications_lifetime>=e^(immunizations_lifetime^2)-1
871 medications_lifetime>=active_care_plans*procedures_lifetime
872 medications_lifetime_cost<=2*healthcare_expenses/DALY
873 medications_lifetime_cost<=active_care_plans*healthcare_expenses
874 medications_lifetime_cost<=-encounters_lifetime_total_cost*longitude
875 medications_lifetime_cost<=healthcare_expenses*lifetime_condition_length/age
876 medications_lifetime_cost<=healthcare_coverage*log(healthcare_expenses)
877 medications_lifetime_cost<=age^(log(encounters_lifetime_total_cost)/log(10))
878 medications_lifetime_cost<=10^(age^encounters_lifetime_perc_covered)
879 medications_lifetime_cost<=healthcare_expenses/active_conditions+procedures_
lifetime_cost
880 medications_lifetime_cost<=2*e^(10^medications_lifetime)
881 medications_lifetime_cost>=2*latitude^medications_active
882 medications_lifetime_cost>=encounters_lifetime_payer_coverage*log(healthcare
```

```
_expenses)
883 medications_lifetime_cost>=16*active_condition_length^2
884 medications_lifetime_cost>=2*ceil(latitude)^2
885 medications_lifetime_cost>=e^(QALY^medications_lifetime_perc_covered)
886 medications_lifetime_cost>=lifetime_conditions^(active_care_plans-1)
887 medications_lifetime_cost>=lifetime_condition_length^sqrt(num_allergies)
888 medications_lifetime_cost>=QOLS^2*medications_lifetime^2
889 medications_lifetime_cost>=lifetime_condition_length^2/encounters_lifetime_p
erc_covered
890 medications_lifetime_cost>=age*sqrt(procedures_lifetime_cost)
891 medications_lifetime_cost<=(QALY-1)*encounters_lifetime_total_cost
892 medications_lifetime_cost<=healthcare_expenses^active_conditions/medications
_lifetime
893 medications_lifetime_cost<=(log(QALY)/log(10))^mean_QALY
894 medications_lifetime_cost<=(encounters_lifetime_payer_coverage+immunizations
_lifetime_cost)^2
895 medications_lifetime_cost<=1/4*latitude^4
896 medications_lifetime_cost<=encounters_lifetime_total_cost^2/age
897
medications_lifetime_cost<=medications_lifetime_dispenses^2/procedures_lifetime
898 medications_lifetime_cost<=age^(10^QOLS)
899 medications_lifetime_cost<=e^(active_care_plan_length/medications_active)
900 medications_lifetime_cost<=(active_condition_length+1)^4
901 medications_lifetime_cost>=num_allergies
902 medications_lifetime_cost>=(latitude+1)*medications_lifetime_dispenses
903 medications_lifetime_cost>=e^active_care_plans*medications_lifetime_length
904 medications_lifetime_cost>=sqrt(active_care_plans)*healthcare_coverage
905 medications_lifetime_cost>=medications_lifetime_length*procedures_lifetime^2
906 medications_lifetime_cost>=1/2*QALY*medications_lifetime_length
907 medications_lifetime_cost>=longitude^(medications_active+1)
908 medications_lifetime_cost>=medications_lifetime_dispenses^2/lifetime_conditi
ons^2
909 medications_lifetime_cost<=healthcare_expenses^2/longitude^2
910 medications_lifetime_cost<=medications_lifetime_length^2
911 medications_lifetime_cost<=10^(lifetime_condition_length/medications_active)
912 medications_lifetime_cost<=(QOLS+1)^latitude
913 medications_lifetime_cost<=medications_lifetime_length^2/active_conditions^2
914 medications_lifetime_cost<=floor(active_condition_length)^encounters_count
915 medications_lifetime_cost<=lifetime_condition_length^2*medications_lifetime_
dispenses
916
medications_lifetime_cost<=encounters_lifetime_total_cost^2/active_conditions
917 medications_lifetime_cost<=e^(10^medications_lifetime+1)
918 medications_lifetime_cost>=num_allergies
919 medications_lifetime_cost>=10^medications_active-
encounters_lifetime_perc_covered
920 medications_lifetime_cost>=active_care_plan_length*latitude^2
921 medications_lifetime_cost>=minimum(procedures_lifetime_cost,10^active_condit
```

```
ions)
922 medications_lifetime_cost>=1/8*medications_lifetime_dispenses^2
923 medications_lifetime_cost>=active_care_plan_length*procedures_lifetime^2
924 medications_lifetime_cost>=(lifetime_care_plan_length+1)*medications_lifetim
e_dispenses
925 medications_lifetime_cost>=(procedures_lifetime_cost+1)*active_care_plans
926 medications_lifetime_cost>=medications_lifetime_length^2/encounters_count^2
927 medications_lifetime_perc_covered<=immunizations_lifetime
928 medications_lifetime_perc_covered<=floor(DALY)
929 medications_lifetime_perc_covered<=2*active_care_plan_length/lifetime_care_p
lan_length
930 medications_lifetime_perc_covered<=encounters_lifetime_perc_covered/QOLS
931 medications_lifetime_perc_covered<=active_care_plans-2
932 medications_lifetime_perc_covered<=log(sqrt(age)+1)/log(10)
933 medications_lifetime_perc_covered>=device_lifetime_length
934
medications_lifetime_perc_covered>=encounters_lifetime_perc_covered*floor(QOLS)
935
medications_lifetime_perc_covered>=encounters_count/lifetime_care_plan_length-1
936 medications_lifetime_perc_covered>=log(minimum(immunizations_lifetime,Pain_s
everity___0_10_verbal_numeric_rating__Score____Reported))
937 medications_lifetime_perc_covered>=-DALY+log(active_care_plans)
938 medications_lifetime_perc_covered>=medications_lifetime/active_condition_len
gth-1
939 medications_lifetime_perc_covered<=active_care_plans
940 medications_lifetime_perc_covered<=medications_lifetime
941 medications_lifetime_perc_covered<=QOLS
942 medications_lifetime_perc_covered<=1/2*log(ceil(age))/log(10)
943 medications_lifetime_perc_covered<=encounters_count/(medications_lifetime+1)
944 medications_lifetime_perc_covered<=log(healthcare_expenses)/(active_conditio
ns*log(10))
945 medications_lifetime_perc_covered<=encounters_count-lifetime_conditions
946 medications_lifetime_perc_covered<=DALY^procedures_lifetime_cost
947 medications_lifetime_perc_covered<=sqrt(log(10)/log(medications_lifetime))
948 medications_lifetime_perc_covered<=(2*encounters_lifetime_perc_covered)^QALY
949 medications_lifetime_perc_covered>=imaging_studies_lifetime
950 medications_lifetime_perc_covered>=log(abs(medications_active-1))/log(10)
951 medications_lifetime_perc_covered>=-1/(active_condition_length-
medications_lifetime)
952 medications_lifetime_perc_covered>=minimum(procedures_lifetime,mean_Creatini
ne)-1
953 medications_lifetime_perc_covered<=active_care_plans
954 medications_lifetime_perc_covered<=medications_lifetime
955 medications_lifetime_perc_covered<=10^(-encounters_lifetime_perc_covered+pro
cedures_lifetime)
956 medications_lifetime_perc_covered<=num_allergies^immunizations_lifetime
957 medications_lifetime_perc_covered<=floor(DALY)
958
```

```
medications_lifetime_perc_covered<=sqrt(10^(encounters_lifetime_perc_covered-1))
959 medications_lifetime_perc_covered>=num_allergies
960
medications_lifetime_perc_covered>=1/2*log(lifetime_care_plan_length)/log(10)-1
961 medications_lifetime_perc_covered>=log(minimum(procedures_lifetime,Pain_seve
rity___0_10_verbal_numeric_rating__Score____Reported))/log(10)
962 medications_lifetime_perc_covered>=(1/(DALY-latitude))
963 medications_lifetime_perc_covered>=(1/(longitude+medications_lifetime))
964 medications_lifetime_length<=e^floor(log(healthcare_coverage))
965 medications_lifetime_length<=medications_lifetime_cost
966 medications_lifetime_length<=(longitude+num_allergies)^2
967 medications_lifetime_length<=2*10^(lifetime_care_plan_length^2)
968 medications_lifetime_length<=medications_lifetime_dispenses^2+1
969 medications_lifetime_length<=(healthcare_expenses-
medications_lifetime_dispenses)/latitude
970 medications_lifetime_length<=2*log(10^medications_lifetime_dispenses)
971 medications_lifetime_length<=healthcare_expenses/(encounters_lifetime_perc_c
overed*immunizations_lifetime_cost)
972 medications_lifetime_length>=num_allergies
973 medications_lifetime_length>=1/16*medications_lifetime^2
974 medications_lifetime_length>=log(procedures_lifetime_cost^2)+1
975 medications_lifetime_length>=-2*QALY+2*lifetime_condition_length
976 medications_lifetime_length>=(active_conditions+1)*medications_lifetime
977 medications_lifetime_length>=minimum(encounters_lifetime_total_cost,10^medic
ations_active)
978 medications_lifetime_length>=longitude^2*medications_lifetime_perc_covered
979 medications_lifetime_length>=(active_care_plans-1)*medications_lifetime_disp
enses
980 medications_lifetime_length>=-latitude^2+encounters_lifetime_payer_coverage
981 medications_lifetime_length>=minimum(active_care_plan_length,medications_lif
etime)^2
982 medications_lifetime_length<=DALY*healthcare_coverage-1
983 medications_lifetime_length<=healthcare_expenses/(QOLS*immunizations_lifetim
e_cost)
984 medications_lifetime_length<=sqrt(latitude)^lifetime_care_plan_length
985 medications_lifetime_length<=1/2*healthcare_expenses/QALY
986 medications_lifetime_length<=log(medications_lifetime_cost)*medications_life
time_dispenses/log(10)
987 medications_lifetime_length<=healthcare_coverage/sqrt(procedures_lifetime)
988 medications_lifetime_length<=1/4*10^(2*medications_lifetime)
989 medications_lifetime_length<=(log(QALY)/log(10))^mean_QALY
990 medications_lifetime_length<=4*10^(2*active_care_plans)
991 medications_lifetime_length<=4*ceil(age)^2
992 medications_lifetime_length>=num_allergies
993 medications_lifetime_length>=10^log(sqrt(medications_lifetime_dispenses))
994 medications_lifetime_length>=immunizations_lifetime_cost^(1/8)
995 medications_lifetime_length>=2*encounters_lifetime_total_cost-2*healthcare_c
overage
```

```
996
medications_lifetime_length>=lifetime_condition_length*log(medications_lifetime)
997 medications_lifetime_length>=QOLS*procedures_lifetime^2
998 medications_lifetime_length>=procedures_lifetime_cost^medications_lifetime_p
erc_covered-1
999 medications_lifetime_length>=(procedures_lifetime-1)*latitude
1000 medications_lifetime_length>=log(medications_lifetime_cost^DALY)/log(10)
1001 medications_lifetime_length<=encounters_lifetime_total_cost+2*medications_l
ifetime_dispenses
1002 medications_lifetime_length<=medications_lifetime_cost
1003 medications_lifetime_length<=-(healthcare_coverage-
healthcare_expenses)/device_lifetime_length
1004 medications_lifetime_length<=active_conditions^lifetime_conditions-1
1005 medications_lifetime_length<=2*medications_lifetime_cost/QALY
1006 medications_lifetime_length<=10^(DALY/encounters_lifetime_perc_covered)
1007 medications_lifetime_length<=maximum(healthcare_coverage,latitude^2)
1008 medications_lifetime_length<=healthcare_coverage-
log(encounters_lifetime_payer_coverage)
1009 medications_lifetime_length>=num_allergies
1010 medications_lifetime_length>=4*medications_lifetime_dispenses
1011 medications_lifetime_length>=medications_active^4
1012 medications_lifetime_length>=1/4*ceil(lifetime_care_plan_length)^2
1013 medications_lifetime_length>=-sqrt(healthcare_expenses)+encounters_lifetime
_payer_coverage
1014 medications_lifetime_length>=active_care_plan_length*sqrt(encounters_lifeti
me_total_cost)
1015 medications_lifetime_length>=10^encounters_lifetime_perc_covered*medication
s_lifetime_dispenses
1016
medications_lifetime_length>=medications_lifetime_cost/sqrt(healthcare_coverage)
1017 medications_lifetime_dispenses<=healthcare_coverage
1018 medications_lifetime_dispenses<=floor(age)^2+1
1019 medications_lifetime_dispenses<=medications_lifetime_length/log(active_care
_plan_length)
1020 medications_lifetime_dispenses<=1/2*medications_lifetime_cost/age
1021 medications_lifetime_dispenses<=healthcare_expenses/encounters_count+DALY
1022 medications_lifetime_dispenses<=active_care_plan_length*healthcare_expenses
/procedures_lifetime_cost
1023 medications_lifetime_dispenses<=10^e^active_care_plans-1
1024 medications_lifetime_dispenses<=log(medications_lifetime^medications_lifeti
me_length)/log(10)
1025
medications_lifetime_dispenses<=(active_care_plan_length+medications_active)^2
1026 medications_lifetime_dispenses<=lifetime_care_plan_length^2/immunizations_l
ifetime^2
1027 medications_lifetime_dispenses>=num_allergies
1028 medications_lifetime_dispenses>=DALY*sqrt(medications_lifetime_length)
1029 medications_lifetime_dispenses>=medications_lifetime_length/sqrt(active_car
```

```
e_plan_length)
1030 medications_lifetime_dispenses>=-encounters_lifetime_total_cost+1/2*medicat
ions_lifetime_length
1031 medications_lifetime_dispenses>=encounters_lifetime_payer_coverage*log(num_
allergies)/log(10)
1032 medications_lifetime_dispenses>=10^ceil(log(medications_lifetime)/log(10))
1033
medications_lifetime_dispenses>=sqrt(medications_lifetime_cost*num_allergies)
1034 medications_lifetime_dispenses<=ceil(active_care_plan_length)^2
1035 medications_lifetime_dispenses<=medications_lifetime_length/log(QALY)
1036 medications_lifetime_dispenses<=medications_lifetime_cost
1037 medications_lifetime_dispenses<=sqrt(healthcare_expenses)/num_allergies
1038 medications_lifetime_dispenses<=sqrt(healthcare_expenses)+procedures_lifeti
me_cost
1039 medications_lifetime_dispenses<=medications_lifetime_cost/(immunizations_li
fetime_cost+1)
1040 medications_lifetime_dispenses<=1/2*(age+1)^2
1041 medications_lifetime_dispenses<=active_care_plan_length*floor(QALY)
1042
medications_lifetime_dispenses<=-1/2*QALY+1/2*encounters_lifetime_total_cost
1043 medications_lifetime_dispenses<=10^medications_lifetime+active_conditions
1044 medications_lifetime_dispenses>=num_allergies
1045 medications_lifetime_dispenses>=log(age)*medications_lifetime/log(10)
1046 medications_lifetime_dispenses>=log(10)*medications_lifetime_length/log(med
ications_lifetime_cost)
1047 medications_lifetime_dispenses>=QALY*sqrt(immunizations_lifetime_cost)
1048 medications_lifetime_dispenses>=sqrt(procedures_lifetime_cost)-medications_
lifetime
1049 medications_lifetime_dispenses>=e^(-procedures_lifetime)*procedures_lifetim
e_cost
1050 medications_lifetime_dispenses>=sqrt(lifetime_care_plan_length*medications_
lifetime_length)
1051 medications_lifetime_dispenses>=-longitude*medications_active
1052
medications_lifetime_dispenses>=sqrt(healthcare_coverage*medications_active)
1053 medications_lifetime_dispenses<=(latitude-1)*active_care_plan_length
1054 medications_lifetime_dispenses<=1/4*medications_lifetime_length-1
1055 medications_lifetime_dispenses<=lifetime_condition_length^2-active_care_pla
n_length
1056 medications_lifetime_dispenses<=10^medications_lifetime+encounters_count
1057 medications_lifetime_dispenses<=e^(medications_lifetime/encounters_lifetime
_perc_covered)
1058 medications_lifetime_dispenses<=log(10)*medications_lifetime_length/log(hea
lthcare_coverage)
1059 medications_lifetime_dispenses<=medications_lifetime_length/log(QALY)
1060 medications_lifetime_dispenses<=2*(active_care_plan_length-1)^2
1061 medications_lifetime_dispenses>=num_allergies
1062 medications_lifetime_dispenses>=sqrt(10^log(immunizations_lifetime_cost))
```

```
1063 medications_lifetime_dispenses>=sqrt(latitude)*medications_lifetime
1064 medications_lifetime_dispenses>=log(medications_lifetime_cost)-longitude
1065 medications_lifetime_dispenses>=encounters_lifetime_payer_coverage/(num_all
ergies-1)
1066 medications_lifetime_dispenses>=active_condition_length^2*medications_lifet
ime_perc_covered
1067 medications_lifetime_dispenses>=log(10)*medications_lifetime_length/log(med
ications_lifetime_cost)
1068 medications_lifetime_dispenses>=2*immunizations_lifetime_cost+2*medications
_lifetime
1069 medications_active<=maximum(num_allergies,procedures_lifetime_cost)
1070 medications_active<=active_care_plan_length
1071 medications_active<=medications_lifetime
1072 medications_active<=log(active_care_plans)^healthcare_expenses
1073 medications_active<=2/imaging_studies_lifetime
1074 medications_active<=1/(imaging_studies_lifetime*immunizations_lifetime)
1075 medications_active<=maximum(healthcare_coverage,num_allergies)
1076 medications_active>=num_allergies
1077 medications_active>=2*active_care_plans-active_conditions
1078 medications_active>=active_care_plans-immunizations_lifetime_cost
1079 medications_active>=sqrt(procedures_lifetime)-medications_lifetime
1080 medications_active>=2*num_allergies-1
1081 medications_active>=1/2*medications_lifetime_dispenses-1/2*medications_life
time_length
1082 medications_active>=-active_care_plans+log(DALY)
1083 medications_active<=active_conditions-1
1084 medications_active<=2*e^procedures_lifetime
1085 medications_active<=medications_lifetime
1086 medications_active<=active_care_plans+1
1087 medications_active<=-active_care_plan_length+lifetime_care_plan_length
1088 medications_active<=floor(active_care_plan_length)
1089 medications_active<=floor(DALY)
1090
medications_active<=maximum(immunizations_lifetime_cost,1/2*active_care_plans)
1091 medications_active>=num_allergies
1092 medications_active>=floor(1/2*active_care_plans)
1093 medications_active>=minimum(medications_lifetime,lifetime_care_plans-1)
1094 medications_active>=floor(QOLS)
1095 medications_active>=active_care_plans-immunizations_lifetime_cost
1096 medications_active>=immunizations_lifetime-2
1097 medications_active>=ceil(log(active_care_plans))
1098 medications_active>=(-procedures_lifetime)^active_care_plans
1099 medications_active>=active_conditions-immunizations_lifetime_cost-1
1100 medications_active<=active_care_plans
1101 medications_active<=medications_lifetime
1102 medications_active<=sqrt(active_conditions)
1103 medications_active<=e^immunizations_lifetime
1104 medications_active<=immunizations_lifetime+1
```

```
1105 medications_active<=active_care_plans-procedures_lifetime+1
1106 medications_active<=minimum(healthcare_expenses,Pain_severity___0_10_verbal
_numeric_rating__Score____Reported-1)
1107 medications_active>=device_lifetime_length
1108 medications_active>=ceil(medications_lifetime_perc_covered)
1109 medications_active>=minimum(medications_lifetime,QOLS)
1110 medications_active>=minimum(immunizations_lifetime,medications_lifetime)
1111 medications_active>=sqrt(active_condition_length)-encounters_count
1112 medications_active>=2*active_care_plans-active_condition_length
1113 procedures_lifetime<=lifetime_care_plans^2
1114 procedures_lifetime<=lifetime_care_plan_length
1115 procedures_lifetime<=procedures_lifetime_cost
1116 procedures_lifetime<=2/immunizations_lifetime
1117 procedures_lifetime<=active_care_plans/QOLS
1118 procedures_lifetime>=device_lifetime_length
1119 procedures_lifetime>=ceil(medications_lifetime_perc_covered)
1120 procedures_lifetime>=1/2*num_allergies
1121 procedures_lifetime>=floor(log(lifetime_care_plans)/log(10))
1122 procedures_lifetime>=floor(medications_lifetime/lifetime_care_plan_length)
1123
procedures_lifetime>=-lifetime_care_plan_length+log(procedures_lifetime_cost)
1124 procedures_lifetime>=2*active_condition_length-2*lifetime_care_plan_length
1125 procedures_lifetime>=-lifetime_conditions+medications_active
1126 procedures_lifetime<=procedures_lifetime_cost
1127 procedures_lifetime<=active_care_plan_length
1128 procedures_lifetime<=medications_lifetime
1129 procedures_lifetime<=2/num_allergies
1130 procedures_lifetime<=e^immunizations_lifetime
1131 procedures_lifetime<=immunizations_lifetime^immunizations_lifetime_cost
1132 procedures_lifetime>=device_lifetime_length
1133 procedures_lifetime>=device_lifetime_length^DALY
1134
procedures_lifetime>=procedures_lifetime_cost^2/encounters_lifetime_total_cost^2
1135 procedures_lifetime>=minimum(procedures_lifetime_cost,e^num_allergies)
1136 procedures_lifetime>=-ceil(DALY)+medications_active
1137 procedures_lifetime<=ceil(DALY^longitude)
1138 procedures_lifetime<=ceil(log(healthcare_expenses)/log(10))
1139 procedures_lifetime<=encounters_lifetime_total_cost
1140 procedures_lifetime<=procedures_lifetime_cost
1141 procedures_lifetime<=2*encounters_count
1142 procedures_lifetime<=maximum(healthcare_coverage,lifetime_care_plans)
1143 procedures_lifetime<=maximum(medications_lifetime,1/active_care_plans)
1144 procedures_lifetime>=num_allergies
1145 procedures_lifetime>=ceil(medications_lifetime_perc_covered)
1146 procedures_lifetime>=2*num_allergies
1147 procedures_lifetime>=floor(log(procedures_lifetime_cost)/log(10)-1)
1148 procedures_lifetime>=imaging_studies_lifetime-1
1149 procedures_lifetime>=immunizations_lifetime-1
```

```
1150 procedures_lifetime>=floor(procedures_lifetime_cost/healthcare_coverage)
1151 procedures_lifetime_cost<=medications_lifetime_cost
1152 procedures_lifetime_cost<=e^(2*encounters_count+2)
1153 procedures_lifetime_cost<=healthcare_expenses*procedures_lifetime
1154 procedures_lifetime_cost<=e^DALY/immunizations_lifetime
1155
procedures_lifetime_cost<=healthcare_expenses/lifetime_care_plan_length+latitude
1156 procedures_lifetime_cost>=num_allergies
1157 procedures_lifetime_cost>=e^medications_active*procedures_lifetime
1158 procedures_lifetime_cost>=healthcare_expenses*num_allergies/encounters_life
time_payer_coverage
1159 procedures_lifetime_cost>=2*immunizations_lifetime_cost*procedures_lifetime
1160 procedures_lifetime_cost>=healthcare_expenses*procedures_lifetime/encounter
s_lifetime_total_cost
1161 procedures_lifetime_cost>=device_lifetime_length*procedures_lifetime^2
1162 procedures_lifetime_cost<=age^(active_condition_length-1)
1163 procedures_lifetime_cost<=healthcare_coverage^2
1164 procedures_lifetime_cost<=healthcare_expenses*immunizations_lifetime
1165 procedures_lifetime_cost<=procedures_lifetime^healthcare_expenses
1166 procedures_lifetime_cost<=medications_lifetime_cost^2
1167 procedures_lifetime_cost<=healthcare_expenses/(lifetime_care_plan_length*me
dications_active)
1168 procedures_lifetime_cost<=(encounters_lifetime_total_cost-1)*QALY
1169 procedures_lifetime_cost<=e^(-immunizations_lifetime+medications_lifetime_d
ispenses)
1170 procedures_lifetime_cost>=device_lifetime_length
1171 procedures_lifetime_cost>=e^active_conditions*immunizations_lifetime
1172 procedures_lifetime_cost>=immunizations_lifetime_cost^2*medications_lifetim
e_perc_covered
1173 procedures_lifetime_cost>=(encounters_lifetime_total_cost-1)*immunizations_
lifetime
1174 procedures_lifetime_cost<=medications_lifetime^2/medications_lifetime_perc_
covered
1175 procedures_lifetime_cost<=active_care_plans*healthcare_expenses
1176 procedures_lifetime_cost<=healthcare_expenses*procedures_lifetime
1177 procedures_lifetime_cost<=10^(encounters_lifetime_payer_coverage/age)
1178 procedures_lifetime_cost<=10^procedures_lifetime*active_care_plan_length
1179
procedures_lifetime_cost<=healthcare_expenses^log(lifetime_condition_length)
1180 procedures_lifetime_cost<=QOLS*healthcare_expenses/active_care_plan_length
1181 procedures_lifetime_cost>=device_lifetime_length
1182 procedures_lifetime_cost>=sqrt(imaging_studies_lifetime)*medications_lifeti
me_dispenses
1183 procedures_lifetime_cost>=sqrt(10^procedures_lifetime-1)
1184 procedures_lifetime_cost>=2*immunizations_lifetime_cost*procedures_lifetime
1185 procedures_lifetime_cost>=immunizations_lifetime_cost*procedures_lifetime^2
1186 QOLS>=mean_QOLS
1187 QOLS<=healthcare_coverage
```

```
QOLS<=active_care_plans
QOLS<=mean_QOLS
QOLS>=num_allergies
QOLS>=mean_QOLS
QOLS<=mean_QOLS
QOLS>=imaging_studies_lifetime
QOLS>=mean_QOLS
QALY<=mean_QALY
QALY>=mean_QALY
QALY<=mean_QALY
QALY>=mean_QALY
QALY<=mean_QALY
QALY>=mean_QALY
DALY<=mean_DALY
DALY>=device_lifetime_length
DALY>=mean_DALY
DALY<=mean_DALY
DALY<=active_condition_length
DALY>=device_lifetime_length
DALY>=mean_DALY
DALY<=mean_DALY
DALY>=num_allergies
DALY>=mean_DALY
mean_DALY<=DALY
mean_DALY<=active_care_plan_length
mean_DALY>=device_lifetime_length
mean_DALY>=DALY
mean_DALY<=DALY
mean_DALY<=lifetime_care_plan_length
mean_DALY>=DALY
mean_DALY<=DALY
mean_DALY<=active_care_plan_length
mean_DALY>=num_allergies
mean_DALY>=DALY
mean_QALY<=QALY
mean_QALY>=QALY
mean_QALY<=QALY
mean_QALY>=QALY
mean_QALY<=QALY
mean_QALY>=QALY
mean_QOLS<=active_conditions
mean_QOLS<=QOLS
mean_QOLS>=QOLS
mean_QOLS<=active_care_plans
mean_QOLS<=active_conditions
mean_QOLS<=QOLS
mean_QOLS>=imaging_studies_lifetime
mean_QOLS>=QOLS
```

```
1236 mean_QOLS<=QOLS
1237 mean_QOLS<=medications_lifetime
1238 mean_QOLS>=device_lifetime_length
1239 mean_QOLS>=QOLS
Dead
1 healthcare_expenses<=DALY*encounters_lifetime_total_cost^2
2 healthcare_expenses<=10^sqrt(latitude-1)
3 healthcare_expenses<=(active_condition_length-1)^4
4 healthcare_expenses<=healthcare_coverage^2/lifetime_care_plan_length
5
healthcare_expenses<=QALY*healthcare_coverage/medications_lifetime_perc_covered
6 healthcare_expenses<=(encounters_lifetime_perc_covered+1)^age
7 healthcare_expenses<=medications_lifetime_length^(log(medications_lifetime_dis
penses)/log(10))
8 healthcare_expenses<=active_conditions*healthcare_coverage/imaging_studies_lif
etime
9 healthcare_expenses<=latitude^active_conditions/medications_active
10 healthcare_expenses>=imaging_studies_lifetime*medications_lifetime^2
11 healthcare_expenses>=minimum(medications_lifetime_dispenses,Triglycerides)^2
12 healthcare_expenses>=(procedures_lifetime_cost^2)^medications_lifetime_perc_c
overed
13 healthcare_expenses>=procedures_lifetime^log(Diastolic_Blood_Pressure)
14 healthcare_expenses>=e^(latitude/active_conditions)
15 healthcare_expenses>=minimum(procedures_lifetime_cost,Respiratory_rate)^2
16 healthcare_expenses>=e^(-QALY+latitude)
17 healthcare_expenses>=sqrt(encounters_lifetime_total_cost*medications_lifetime
_cost)
18 healthcare_expenses>=encounters_lifetime_payer_coverage^sqrt(immunizations_li
fetime)
19 healthcare_expenses>=1/2*device_lifetime_length^4
20 healthcare_expenses<=1/2*10^sqrt(latitude)
21 healthcare_expenses<=1/2*latitude^4
22 healthcare_expenses<=10^sqrt(floor(QALY))
23 healthcare_expenses<=e^(age-latitude)
24 healthcare_expenses<=(1/2*medications_lifetime_length)^lifetime_care_plans
25 healthcare_expenses<=medications_lifetime_cost^2/lifetime_condition_length
26 healthcare_expenses>=e^(10^QOLS)+1
27 healthcare_expenses>=e^(latitude/encounters_count)
28 healthcare_expenses>=sqrt(2)*sqrt(10^active_conditions)
29 healthcare_expenses>=1/2*active_care_plan_length*encounters_lifetime_payer_co
verage
30 healthcare_expenses>=active_care_plan_length^sqrt(active_conditions)
31 healthcare_expenses>=DALY*lifetime_care_plan_length^2
32
healthcare_expenses>=medications_lifetime_cost^2/medications_lifetime_length^2
33 healthcare_expenses>=medications_lifetime_dispenses^e^encounters_lifetime_per
c_covered
34 healthcare_expenses>=immunizations_lifetime_cost^2/DALY^2
```

```
35 healthcare_expenses>=(DALY+1)*encounters_lifetime_payer_coverage
36 healthcare_expenses<=(Body_Height-encounters_lifetime_total_cost)^2
37 healthcare_expenses<=(-active_care_plans+healthcare_coverage)^medications_lif
etime
38 healthcare_expenses<=ceil(latitude)^Potassium
39 healthcare_expenses<=(Urea_Nitrogen+1)*medications_lifetime_cost
40 healthcare_expenses<=e^(sqrt(2)*sqrt(Chloride))
41 healthcare_expenses<=2*medications_lifetime_cost/imaging_studies_lifetime
42 healthcare_expenses<=10^(mean_Chloride/procedures_lifetime)
43 healthcare_expenses<=medications_lifetime_dispenses^2/medications_lifetime_pe
rc_covered
44 healthcare_expenses<=(log(mean_Chloride)/log(10))^Carbon_Dioxide
45 healthcare_expenses<=10^Urea_Nitrogen/immunizations_lifetime_cost
46 healthcare_expenses>=(log(encounters_lifetime_total_cost)/log(10))^device_lif
etime_length
47 healthcare_expenses>=DALY^2*lifetime_condition_length
48 healthcare_expenses>=(e^Respiratory_rate)^imaging_studies_lifetime
49 healthcare_expenses>=immunizations_lifetime_cost^e^num_allergies
50 healthcare_expenses>=10^active_care_plans*active_conditions
51 healthcare_expenses>=lifetime_conditions^active_care_plans+1
52 healthcare_expenses>=medications_lifetime_length^2/medications_lifetime^2
53 healthcare_expenses>=sqrt(active_condition_length)^medications_active
54 healthcare_expenses>=encounters_lifetime_total_cost*log(medications_lifetime_
cost)/log(10)
55 healthcare_expenses>=lifetime_care_plan_length^log(active_conditions)
56 healthcare_coverage<=Body_Height*latitude^2
57 healthcare_coverage<=QALY^2*encounters_count
58 healthcare_coverage<=10^DALY/medications_lifetime_perc_covered
59 healthcare_coverage<=(2*encounters_lifetime_total_cost)^mean_Pain_severity___
0_10_verbal_numeric_rating__Score____Reported
60 healthcare_coverage<=(2*latitude)^active_conditions
61
healthcare_coverage<=maximum(immunizations_lifetime_cost,medications_lifetime)^2
62 healthcare_coverage<=4*encounters_count^4
63
healthcare_coverage<=encounters_lifetime_payer_coverage^2/medications_lifetime
64 healthcare_coverage<=latitude^(active_care_plans+1)
65 healthcare_coverage<=10^sqrt(ceil(Body_Mass_Index))
66 healthcare_coverage>=encounters_lifetime_total_cost/DALY^2
67 healthcare_coverage>=10^minimum(procedures_lifetime,Potassium)
68 healthcare_coverage>=sqrt(2)*sqrt(encounters_lifetime_total_cost^2)
69 healthcare_coverage>=2*active_condition_length*medications_lifetime
70 healthcare_coverage>=-immunizations_lifetime_cost^2+procedures_lifetime_cost
71 healthcare_coverage>=encounters_lifetime_total_cost*log(10)/log(active_condit
ions)
72
healthcare_coverage>=Microalbumin_Creatinine_Ratio^sqrt(device_lifetime_length)
73 healthcare_coverage>=-age*longitude
```

```
74 healthcare_coverage>=2*e^(medications_active-1)
75 healthcare_coverage>=e^(sqrt(age+1))
76 healthcare_coverage<=healthcare_expenses/(active_conditions+1)
77 healthcare_coverage<=-(encounters_lifetime_total_cost-
healthcare_expenses)/lifetime_conditions
78 healthcare_coverage<=encounters_count*healthcare_expenses/latitude
79 healthcare_coverage<=e^(active_conditions/medications_lifetime_perc_covered)
80 healthcare_coverage<=healthcare_expenses/sqrt(encounters_count)
81 healthcare_coverage<=10^active_conditions/DALY
82 healthcare_coverage<=e^(10^e^immunizations_lifetime)
83 healthcare_coverage<=encounters_lifetime_payer_coverage^(1/medications_lifeti
me_perc_covered)
84 healthcare_coverage<=e^(10^e^medications_lifetime_perc_covered)
85 healthcare_coverage>=minimum(lifetime_care_plan_length,Creatinine)^2
86 healthcare_coverage>=10^(medications_lifetime/latitude)
87 healthcare_coverage>=(encounters_lifetime_payer_coverage+1)/lifetime_care_pla
n_length
88 healthcare_coverage>=(QALY-1)*lifetime_condition_length
89 healthcare_coverage>=(mean_Potassium-1)^num_allergies
90 healthcare_coverage>=e^lifetime_care_plans*procedures_lifetime
91 healthcare_coverage>=(active_care_plan_length-1)*lifetime_condition_length
92 healthcare_coverage>=-sqrt(medications_lifetime_dispenses)+encounters_lifetim
e_total_cost
93 healthcare_coverage>=log(QALY)*medications_lifetime_length/log(10)
94 healthcare_coverage>=device_lifetime_length^sqrt(active_conditions)
95 healthcare_coverage<=log(10)*medications_lifetime_cost/log(active_condition_l
ength)
96 healthcare_coverage<=healthcare_expenses/(age*immunizations_lifetime)
97 healthcare_coverage<=(healthcare_expenses-medications_lifetime_cost)/DALY
98 healthcare_coverage<=medications_lifetime_cost/10^immunizations_lifetime
99 healthcare_coverage<=minimum(medications_lifetime_cost,healthcare_expenses/Bo
dy_temperature)
100 healthcare_coverage<=(lifetime_condition_length-
medications_lifetime_dispenses)^2
101 healthcare_coverage<=lifetime_condition_length^(10^encounters_lifetime_perc_
covered)
102 healthcare_coverage<=QALY^2*active_care_plan_length
103 healthcare_coverage<=maximum(lifetime_condition_length,procedures_lifetime_c
ost)^2
104 healthcare_coverage>=encounters_lifetime_payer_coverage*log(10)/log(active_c
are_plans)
105 healthcare_coverage>=active_condition_length*sqrt(procedures_lifetime_cost)
106 healthcare_coverage>=healthcare_expenses/(lifetime_condition_length-1)
107 healthcare_coverage>=10^medications_lifetime_perc_covered*encounters_lifetim
e_payer_coverage
108 healthcare_coverage>=1/2*active_conditions*medications_lifetime_dispenses
109 healthcare_coverage>=procedures_lifetime_cost/(immunizations_lifetime+1)
110 healthcare_coverage>=1/2*active_conditions^4
```

```
111 healthcare_coverage>=healthcare_expenses/10^medications_lifetime
112
healthcare_coverage>=2*encounters_lifetime_payer_coverage*immunizations_lifetime
113 latitude<=QALY+2
114 latitude<=-DALY+lifetime_care_plan_length
115 latitude<=medications_lifetime_cost^2/encounters_lifetime_total_cost^2
116 latitude<=DALY*active_care_plan_length
117 latitude<=healthcare_coverage^(1/log(10))+1
118
latitude<=healthcare_expenses/(lifetime_condition_length*procedures_lifetime)
119 latitude<=minimum(healthcare_expenses,1/2*Glucose)
120 latitude<=healthcare_expenses^medications_lifetime_perc_covered*active_condi
tions
121 latitude<=lifetime_care_plan_length^2-encounters_lifetime_payer_coverage
122 latitude<=medications_lifetime_dispenses/DALY-1
123 latitude>=floor(1/2*age)
124 latitude>=-active_care_plan_length+active_condition_length+1
125 latitude>=sqrt(active_care_plan_length)^device_lifetime_length
126 latitude>=1/2*active_care_plan_length+medications_active
127 latitude>=DALY*e^medications_lifetime_perc_covered
128 latitude>=10^log(medications_active)+1
129 latitude>=minimum(age,1/QOLS)
130 latitude>=(longitude^2)^(1/log(10))
131 latitude>=healthcare_expenses^medications_lifetime_perc_covered/encounters_l
ifetime_payer_coverage
132 latitude>=1/2*QALY+active_care_plans
133 latitude<=age-2*lifetime_conditions
134 latitude<=lifetime_care_plan_length+log(QOLS)
135 latitude<=-active_care_plans+lifetime_condition_length
136 latitude<=sqrt(healthcare_coverage)-active_condition_length
137 latitude<=(active_care_plan_length+1)/medications_lifetime_perc_covered
138 latitude<=(healthcare_expenses/active_care_plans)^encounters_lifetime_perc_c
overed
139 latitude<=e^(-active_care_plans)*medications_lifetime_length
140 latitude<=1/2*sqrt(healthcare_coverage)+1
141 latitude<=10^e^(1/immunizations_lifetime)
142 latitude<=medications_lifetime*sqrt(medications_lifetime_dispenses)
143 latitude>=sqrt(lifetime_condition_length)+active_conditions
144
latitude>=1/2*medications_lifetime_dispenses^encounters_lifetime_perc_covered
145 latitude>=-medications_lifetime^2+active_condition_length
146
latitude>=ceil(encounters_lifetime_total_cost/medications_lifetime_dispenses)
147 latitude>=log(immunizations_lifetime^QALY)
148
latitude>=minimum(immunizations_lifetime_cost,1/2*mean_Diastolic_Blood_Pressure)
149 latitude>=-1/2*longitude+1/2*procedures_lifetime
150 latitude>=2*minimum(encounters_count,Creatinine)
```

```
151 latitude>=active_care_plans^2*medications_lifetime_perc_covered^2
152 latitude>=medications_lifetime_dispenses/(lifetime_care_plan_length+1)
153 latitude<=(DALY^2)^active_care_plans
154 latitude<=encounters_count*log(medications_lifetime_length)
155 latitude<=age*log(10)/log(active_care_plan_length)
156 latitude<=floor(-DALY+QALY)
157 latitude<=-2*active_conditions+age
158 latitude<=encounters_count^2+DALY
159 latitude<=1/2*lifetime_condition_length/immunizations_lifetime
160 latitude<=-log(active_care_plans)/log(10)+lifetime_care_plan_length
161 latitude<=1/2*log(healthcare_coverage)^2
162 latitude<=minimum(healthcare_expenses,2*mean_Estimated_Glomerular_Filtration
_Rate)
163 latitude>=ceil(1/2*age+1/2)
164 latitude>=active_care_plans*log(medications_lifetime)
165 latitude>=e^(e^num_allergies+1)
166 latitude>=1/4*mean_Systolic_Blood_Pressure
167 latitude>=e^(active_care_plan_length+longitude)
168 latitude>=Heart_rate*log(10)/log(lifetime_condition_length)
169 latitude>=(mean_Diastolic_Blood_Pressure+1)/active_care_plans
170 latitude>=age^2/Body_Height
171 latitude>=-Pain_severity___0_10_verbal_numeric_rating__Score____Reported+1/2
*mean_Heart_rate
172 latitude>=Systolic_Blood_Pressure-2*active_condition_length
173 longitude<=-1/2*immunizations_lifetime_cost
174 longitude<=-age+log(healthcare_expenses)
175 longitude<=1/active_care_plans-active_care_plan_length
176 longitude<=sqrt(healthcare_coverage)-immunizations_lifetime_cost
177 longitude<=active_conditions*log(10)/log(QOLS)
178 longitude<=sqrt(QALY)-mean_QALY
179 longitude<=-lifetime_condition_length^QOLS
180 longitude>=-minimum(healthcare_expenses,Diastolic_Blood_Pressure)
181 longitude>=-active_care_plan_length-latitude
182 longitude>=-DALY*latitude
183 longitude>=-age*medications_active
184 longitude>=-QOLS*lifetime_condition_length
185 longitude>=-age-immunizations_lifetime_cost
186 longitude>=-age-medications_lifetime
187 longitude>=2*active_care_plans-2*latitude
188 longitude<=-1/2*immunizations_lifetime_cost+1/2*lifetime_care_plan_length
189 longitude<=immunizations_lifetime_cost-1/2*lifetime_care_plan_length
190 longitude<=-ceil(active_condition_length)-1
191 longitude<=-1/2*immunizations_lifetime_cost+procedures_lifetime_cost
192 longitude<=medications_active^2-age
193 longitude<=sqrt(latitude)-QALY
194 longitude<=-medications_lifetime_dispenses/latitude
195 longitude<=(-mean_Alkaline_phosphatase__Enzymatic_activity_volume__in_Serum,
Plasma)^num_allergies
```

```
196 longitude<=10^QOLS-QALY
197 longitude<=active_care_plan_length-2*latitude
198 longitude>=-sqrt(healthcare_coverage)+medications_active
199 longitude>=active_conditions-2*latitude
200 longitude>=-2*latitude+lifetime_conditions
201 longitude>=active_care_plan_length*log(10)/log(QOLS)
202 longitude>=-DALY*lifetime_condition_length
203 longitude>=-2*latitude+2*medications_active
204 longitude>=-active_care_plan_length-medications_lifetime
205 longitude>=-immunizations_lifetime_cost-medications_lifetime
206 longitude>=2*active_care_plans-2*latitude
207 longitude>=-2*QALY+2*procedures_lifetime
208 longitude<=active_condition_length-ceil(lifetime_care_plan_length)
209 longitude<=-1/2*immunizations_lifetime_cost
210 longitude<=-QALY+log(lifetime_condition_length)
211 longitude<=-QALY+e^active_care_plans
212 longitude<=-encounters_lifetime_perc_covered*lifetime_care_plan_length
213 longitude<=-encounters_count+procedures_lifetime_cost-1
214 longitude<=-sqrt(encounters_lifetime_payer_coverage)+active_care_plans
215 longitude>=-age+log(medications_lifetime_perc_covered)
216 longitude>=-2*age+latitude
217 longitude>=-minimum(healthcare_expenses,mean_Glucose)
218 longitude>=-healthcare_coverage/immunizations_lifetime_cost
219 longitude>=2*active_care_plans-2*latitude
220 longitude>=-age/imaging_studies_lifetime
221 longitude>=-minimum(healthcare_expenses,Diastolic_Blood_Pressure)
222 age<=e^(e^(1/encounters_lifetime_perc_covered))
223 age<=1/medications_lifetime_perc_covered+medications_lifetime
224 age<=longitude^2/medications_active^2
225 age<=(healthcare_expenses/encounters_count)^DALY
226 age<=QALY+2*encounters_count
227 age<=2*latitude+medications_lifetime_perc_covered
228 age<=2*lifetime_condition_length+medications_lifetime
229 age<=lifetime_care_plan_length-1/2*longitude
230 age<=1/2*encounters_lifetime_total_cost+longitude
231 age<=ceil(log(healthcare_coverage))^2
232 age>=DALY+QALY+1
233 age>=QOLS+ceil(active_care_plan_length)
234 age>=log(QALY)+mean_QALY
235 age>=encounters_count*log(10)/log(medications_lifetime_length)
236 age>=medications_lifetime_length^(1/active_care_plans)
237 age>=1/2*QALY-1/2*longitude
238 age>=e^(active_care_plan_length/encounters_count)
239 age>=-1/2*encounters_count+1/2*lifetime_care_plan_length
240 age>=e^(log(lifetime_care_plan_length)-1)
241 age<=1/2*lifetime_care_plan_length+1/2*lifetime_condition_length
242 age<=2*latitude-medications_lifetime_perc_covered
243 age<=ceil(Creatinine*lifetime_care_plan_length)
```

```
244 age<=latitude*log(Body_Weight)/log(10)
245 age<=QALY+floor(Carbon_Dioxide)
246 age<=maximum(Alkaline_phosphatase__Enzymatic_activity_volume__in_Serum,Plasm
a,healthcare_expenses-medications_lifetime_cost)
247 age<=Body_Weight+log(QALY)
248 age<=(encounters_count+1)^procedures_lifetime
249 age<=healthcare_coverage/device_lifetime_length^2
250 age<=healthcare_expenses^Pain_severity___0_10_verbal_numeric_rating__Score__
__Reported+active_care_plan_length
251 age>=DALY+QALY+1
252 age>=minimum(procedures_lifetime,mean_Body_Weight+1)
253 age>=log(QALY)/log(10)+mean_QALY
254 age>=2*DALY-2*medications_lifetime_perc_covered
255 age>=lifetime_care_plans^e^immunizations_lifetime
256 age>=1/encounters_lifetime_perc_covered+QALY
257 age>=log(imaging_studies_lifetime)-longitude
258 age>=lifetime_care_plan_length^sqrt(encounters_lifetime_perc_covered)
259 age>=log(active_conditions^Carbon_Dioxide)
260 age<=1/2*medications_lifetime_cost/medications_lifetime_dispenses
261 age<=maximum(Triglycerides,healthcare_expenses/healthcare_coverage)
262 age<=10^active_care_plans*QOLS
263 age<=QALY+1/2*active_condition_length
264 age<=(immunizations_lifetime_cost+1)/imaging_studies_lifetime
265 age<=lifetime_condition_length/immunizations_lifetime-1
266 age<=sqrt(encounters_lifetime_total_cost+lifetime_condition_length)
267 age<=maximum(mean_Heart_rate,e^medications_active)
268 age<=sqrt(1/2)*sqrt(lifetime_condition_length^2)
269 age<=2*active_condition_length+2*lifetime_care_plans
270 age>=QALY+medications_lifetime_perc_covered+1
271 age>=-active_care_plan_length+lifetime_care_plan_length+1
272 age>=sqrt(lifetime_care_plans)+QALY
273 age>=2*log(medications_lifetime)^2
274 age>=DALY+QALY+1
275 age>=encounters_lifetime_perc_covered^2*lifetime_condition_length
276 age>=QALY+log(medications_active)
277 age>=latitude+log(medications_lifetime_cost)
278 num_allergies<=active_care_plans-1
279 num_allergies<=immunizations_lifetime_cost
280 num_allergies<=procedures_lifetime
281 num_allergies<=e^(longitude^encounters_count)
282 num_allergies<=-active_care_plans+medications_lifetime
283 num_allergies<=active_care_plans-immunizations_lifetime
284 num_allergies<=minimum(healthcare_expenses,floor(Bilirubin_total__Mass_volum
e__in_Serum,Plasma))
285 num_allergies<=abs(procedures_lifetime-1)
286 num_allergies>=device_lifetime_length
287 num_allergies>=-sqrt(medications_lifetime_dispenses)+DALY
288 num_allergies<=active_care_plans
```

```
289 num_allergies<=device_lifetime_length
290 num_allergies>=device_lifetime_length
291 num_allergies>=2*active_care_plan_length+2*longitude
292 num_allergies>=(immunizations_lifetime-1)*procedures_lifetime
293 num_allergies<=device_lifetime_length
294 num_allergies>=floor(encounters_lifetime_perc_covered)
295 num_allergies>=-device_lifetime_length
296 active_care_plans<=lifetime_care_plans
297 active_care_plans<=minimum(healthcare_expenses,ceil(Leukocytes____volume__in
_Blood_by_Automated_count))
298 active_care_plans>=num_allergies
299 active_care_plans>=lifetime_care_plans
300 active_care_plans<=lifetime_care_plans
301 active_care_plans<=active_conditions-medications_active+1
302 active_care_plans>=2*immunizations_lifetime
303 active_care_plans>=minimum(lifetime_care_plans,log(encounters_count))
304 active_care_plans>=lifetime_care_plans-procedures_lifetime
305 active_care_plans>=2*imaging_studies_lifetime/QOLS
306 active_care_plans>=minimum(lifetime_care_plans,Pain_severity___0_10_verbal_n
umeric_rating__Score____Reported)
307 active_care_plans>=minimum(medications_active,Creatinine)
308 active_care_plans>=(lifetime_care_plans-1)^imaging_studies_lifetime
309 active_care_plans<=lifetime_care_plans
310 active_care_plans<=floor(sqrt(age))
311 active_care_plans<=medications_lifetime-1
312 active_care_plans<=active_conditions-immunizations_lifetime
313 active_care_plans>=lifetime_care_plans-medications_lifetime
314 active_care_plans>=QOLS
315 active_care_plans>=1/2*lifetime_care_plans
316 active_care_plans>=ceil(sqrt(lifetime_care_plans))
317 active_care_plans>=2*imaging_studies_lifetime+1
318 active_care_plans>=floor(sqrt(active_conditions))
319 active_care_plans>=minimum(lifetime_care_plans,procedures_lifetime)
320 active_care_plans>=-immunizations_lifetime_cost+lifetime_care_plans
321 lifetime_care_plans<=active_care_plans
322 lifetime_care_plans>=active_care_plans
323 lifetime_care_plans>=num_allergies^medications_active
324 lifetime_care_plans>=floor(sqrt(active_conditions))
325 lifetime_care_plans>=Pain_severity___0_10_verbal_numeric_rating__Score____Re
ported-active_care_plans
326 lifetime_care_plans>=(active_care_plans-1)*imaging_studies_lifetime
327 lifetime_care_plans>=ceil(DALY)/medications_lifetime
328 lifetime_care_plans<=active_care_plans+1
329 lifetime_care_plans<=active_care_plan_length
330 lifetime_care_plans<=active_conditions+1
331 lifetime_care_plans<=ceil(log(age))
332 lifetime_care_plans<=active_care_plans+procedures_lifetime
333 lifetime_care_plans<=ceil(log(QALY))
```

```
334 lifetime_care_plans<=maximum(active_care_plans,active_conditions)
335 lifetime_care_plans<=maximum(Sodium,ceil(active_care_plans))
336 lifetime_care_plans>=-active_conditions+lifetime_conditions
337 lifetime_care_plans>=active_care_plans
338 lifetime_care_plans>=ceil(log(latitude)/log(10))
339 lifetime_care_plans>=active_conditions-medications_lifetime+1
340 lifetime_care_plans>=procedures_lifetime-1
341 lifetime_care_plans>=2*floor(1/encounters_lifetime_perc_covered)
342 lifetime_care_plans<=active_conditions
343 lifetime_care_plans<=active_care_plans+1
344 lifetime_care_plans<=2*medications_lifetime
345 lifetime_care_plans<=active_care_plans+immunizations_lifetime
346 lifetime_care_plans<=floor(lifetime_care_plan_length/DALY)
347 lifetime_care_plans<=maximum(active_care_plans,procedures_lifetime)
348 lifetime_care_plans<=2*10^mean_Pain_severity___0_10_verbal_numeric_rating__S
core____Reported
349 lifetime_care_plans>=active_care_plans
350 lifetime_care_plans>=ceil(log(DALY))
351 lifetime_care_plans>=-Heart_rate+1/2*Systolic_Blood_Pressure
352 lifetime_care_plans>=Pain_severity___0_10_verbal_numeric_rating__Score____Re
ported/medications_lifetime
353 lifetime_care_plans>=floor(1/encounters_lifetime_perc_covered)
354 active_care_plan_length<=maximum(active_condition_length,healthcare_expenses
/encounters_lifetime_total_cost)
355 active_care_plan_length<=latitude*log(QALY)/log(10)
356 active_care_plan_length<=maximum(active_condition_length,medications_lifetim
e_dispenses)
357 active_care_plan_length<=2*active_condition_length/immunizations_lifetime
358 active_care_plan_length<=floor(latitude)/medications_lifetime_perc_covered
359 active_care_plan_length<=2*active_condition_length+encounters_lifetime_perc_
covered
360 active_care_plan_length<=sqrt(encounters_lifetime_payer_coverage)/encounters
_lifetime_perc_covered
361 active_care_plan_length<=active_condition_length/imaging_studies_lifetime
362 active_care_plan_length<=-medications_active^2+lifetime_care_plan_length
363 active_care_plan_length>=lifetime_care_plan_length/active_care_plans
364
active_care_plan_length>=minimum(active_condition_length,2*active_conditions)
365 active_care_plan_length>=active_condition_length/(procedures_lifetime-1)
366 active_care_plan_length>=QALY-e^DALY
367
active_care_plan_length>=minimum(active_condition_length,1/2*encounters_count)
368 active_care_plan_length>=minimum(latitude,Pain_severity___0_10_verbal_numeri
c_rating__Score____Reported)-1
369 active_care_plan_length>=2*active_condition_length+longitude
370 active_care_plan_length>=DALY*e^immunizations_lifetime
371 active_care_plan_length<=active_condition_length
372 active_care_plan_length<=lifetime_care_plan_length
```

```
373 active_care_plan_length<=encounters_count+floor(QALY)
374 active_care_plan_length<=healthcare_expenses^encounters_lifetime_perc_covere
d+DALY
375 active_care_plan_length<=active_condition_length^(2*QOLS)
376 active_care_plan_length>=lifetime_care_plan_length/lifetime_care_plans
377 active_care_plan_length>=minimum(lifetime_care_plan_length,active_condition_
length)
378 active_care_plan_length>=Body_Weight^num_allergies
379 active_care_plan_length>=e^(minimum(active_care_plans,Creatinine))
380 active_care_plan_length<=age-2*medications_active
381 active_care_plan_length<=lifetime_care_plan_length
382 active_care_plan_length<=active_condition_length
383 active_care_plan_length<=10^e^sqrt(encounters_lifetime_perc_covered)
384
active_care_plan_length<=-sqrt(device_lifetime_length)+active_condition_length
385 active_care_plan_length<=maximum(immunizations_lifetime_cost,sqrt(encounters
_lifetime_payer_coverage))
386 active_care_plan_length>=minimum(active_condition_length,Creatinine)
387 active_care_plan_length>=minimum(healthcare_coverage,lifetime_care_plans^2)
388 active_care_plan_length>=e^(latitude/QALY)
389 active_care_plan_length>=lifetime_care_plan_length/lifetime_care_plans
390 active_care_plan_length>=1/2*medications_lifetime/lifetime_care_plans
391 active_care_plan_length>=minimum(active_condition_length,e^device_lifetime_l
ength)
392 active_care_plan_length>=medications_lifetime_length^(medications_lifetime_p
erc_covered^2)
393 active_care_plan_length>=minimum(active_condition_length,log(Triglycerides)/
log(10))
394 active_care_plan_length>=active_care_plans+1/2*procedures_lifetime
395 lifetime_care_plan_length<=2*QOLS*lifetime_condition_length
396
lifetime_care_plan_length<=medications_lifetime_cost/sqrt(healthcare_coverage)
397 lifetime_care_plan_length<=maximum(mean_Heart_rate,healthcare_expenses^encou
nters_lifetime_perc_covered)
398 lifetime_care_plan_length<=active_care_plan_length^2
399 lifetime_care_plan_length<=active_care_plan_length^active_care_plans
400 lifetime_care_plan_length<=ceil(active_condition_length)/imaging_studies_lif
etime
401 lifetime_care_plan_length<=e^active_care_plans-longitude
402 lifetime_care_plan_length<=active_care_plans*sqrt(procedures_lifetime_cost)
403 lifetime_care_plan_length<=2*Systolic_Blood_Pressure-2*procedures_lifetime
404 lifetime_care_plan_length<=e^(mean_Body_Weight/Respiratory_rate)
405 lifetime_care_plan_length>=active_care_plan_length
406 lifetime_care_plan_length>=active_condition_length^2/latitude
407 lifetime_care_plan_length>=(1/2*mean_Systolic_Blood_Pressure)^immunizations_
lifetime
408 lifetime_care_plan_length>=sqrt(active_care_plan_length*encounters_count)
409 lifetime_care_plan_length>=age*medications_lifetime_perc_covered+1
```

```
410 lifetime_care_plan_length>=1/2*latitude*medications_active
411 lifetime_care_plan_length>=10^(medications_active-procedures_lifetime_cost)
412 lifetime_care_plan_length>=1/2*active_care_plans+1/2*encounters_count
413 lifetime_care_plan_length>=age-2*encounters_count
414 lifetime_care_plan_length>=2*immunizations_lifetime_cost^medications_lifetim
e_perc_covered
415 lifetime_care_plan_length<=1/2*age+lifetime_condition_length
416 lifetime_care_plan_length<=Calcium^active_care_plans
417 lifetime_care_plan_length<=Body_Mass_Index*sqrt(medications_lifetime)
418 lifetime_care_plan_length<=Carbon_Dioxide^e^Creatinine
419 lifetime_care_plan_length<=Calcium^(active_conditions-1)
420 lifetime_care_plan_length<=10^medications_active+Body_Weight
421 lifetime_care_plan_length<=maximum(procedures_lifetime_cost,2*QALY)
422 lifetime_care_plan_length<=QALY*healthcare_expenses/healthcare_coverage
423 lifetime_care_plan_length<=e^Calcium/QALY
424 lifetime_care_plan_length<=1/2*mean_Sodium/medications_lifetime_perc_covered
425 lifetime_care_plan_length>=active_care_plan_length
426 lifetime_care_plan_length>=(-DALY)^Pain_severity___0_10_verbal_numeric_ratin
g__Score____Reported
427 lifetime_care_plan_length>=active_care_plans^log(Body_Mass_Index)
428
lifetime_care_plan_length>=-2*mean_Systolic_Blood_Pressure+medications_lifetime
429 lifetime_care_plan_length>=Body_Mass_Index*log(Respiratory_rate)/log(10)
430
lifetime_care_plan_length>=Body_Weight*sqrt(medications_lifetime_perc_covered)
431 lifetime_care_plan_length>=2*floor(device_lifetime_length)
432 lifetime_care_plan_length>=age*log(10)/log(medications_lifetime)
433 lifetime_care_plan_length>=e^(Pain_severity___0_10_verbal_numeric_rating__Sc
ore____Reported+encounters_lifetime_perc_covered)
434 lifetime_care_plan_length>=healthcare_expenses/(encounters_lifetime_payer_co
verage*latitude)
435 lifetime_care_plan_length<=active_care_plan_length^active_care_plans
436 lifetime_care_plan_length<=DALY^2+age
437 lifetime_care_plan_length<=maximum(QALY,medications_lifetime^2)
438
lifetime_care_plan_length<=active_condition_length*log(active_care_plan_length)
439 lifetime_care_plan_length<=2*QALY+2*age
440 lifetime_care_plan_length<=2*age/medications_lifetime_perc_covered
441 lifetime_care_plan_length<=lifetime_conditions^log(latitude)
442 lifetime_care_plan_length<=healthcare_expenses^QOLS-longitude
443 lifetime_care_plan_length<=log(medications_lifetime_length^2)^2
444 lifetime_care_plan_length<=-(healthcare_coverage-
healthcare_expenses)/medications_lifetime
445 lifetime_care_plan_length>=-log(encounters_count)/log(10)+latitude
446 lifetime_care_plan_length>=2*active_condition_length-latitude
447 lifetime_care_plan_length>=encounters_lifetime_payer_coverage/floor(mean_Sys
tolic_Blood_Pressure)
448 lifetime_care_plan_length>=-Systolic_Blood_Pressure^2+medications_lifetime_l
```

```
ength
449
lifetime_care_plan_length>=10^immunizations_lifetime+imaging_studies_lifetime
450 lifetime_care_plan_length>=(DALY-1)*active_care_plans
451 lifetime_care_plan_length>=2*active_care_plan_length-
procedures_lifetime_cost
452 lifetime_care_plan_length>=sqrt(latitude)*medications_active
453 lifetime_care_plan_length>=2*medications_lifetime_cost/healthcare_coverage
454 lifetime_care_plan_length>=1/2*QALY*procedures_lifetime
455 active_conditions<=lifetime_conditions
456 active_conditions<=maximum(Triglycerides,2*lifetime_care_plans)
457 active_conditions<=10^floor(sqrt(active_care_plans))
458 active_conditions>=minimum(lifetime_conditions,2*active_care_plans)
459 active_conditions>=medications_active
460 active_conditions>=lifetime_conditions-2
461 active_conditions>=minimum(lifetime_conditions,Pain_severity___0_10_verbal_n
umeric_rating__Score____Reported)
462 active_conditions>=(immunizations_lifetime+1)^2
463 active_conditions>=ceil(log(healthcare_coverage)/log(10))
464 active_conditions>=floor(10^medications_lifetime_perc_covered)
465 active_conditions>=-immunizations_lifetime+lifetime_conditions-1
466 active_conditions>=floor(encounters_count^(1/log(10)))
467 active_conditions<=lifetime_conditions
468 active_conditions<=encounters_count
469 active_conditions<=floor(active_care_plan_length/procedures_lifetime)
470 active_conditions<=ceil(e^active_care_plans)
471 active_conditions>=active_care_plans+1
472 active_conditions>=-active_care_plans+lifetime_conditions
473 active_conditions>=ceil(sqrt(DALY))
474 active_conditions>=-active_care_plans+num_allergies
475 active_conditions>=active_care_plans+immunizations_lifetime
476
active_conditions>=minimum(lifetime_conditions,sqrt(active_care_plan_length))
477 active_conditions>=-immunizations_lifetime_cost+lifetime_conditions-1
478 active_conditions>=minimum(lifetime_conditions,DALY-1)
479 active_conditions<=lifetime_conditions
480 active_conditions<=minimum(healthcare_expenses,Respiratory_rate)
481 active_conditions<=maximum(encounters_lifetime_payer_coverage,lifetime_condi
tions-1)
482 active_conditions>=2*QOLS
483 active_conditions>=lifetime_conditions^imaging_studies_lifetime
484 active_conditions>=medications_active+1
485 active_conditions>=medications_active*procedures_lifetime
486 active_conditions>=minimum(lifetime_conditions,Urea_Nitrogen)
487 active_conditions>=2*procedures_lifetime+2
488 lifetime_conditions<=ceil(age/active_care_plans)
489 lifetime_conditions<=active_conditions+2
490 lifetime_conditions<=encounters_count
```

```
491 lifetime_conditions<=2*active_conditions
492 lifetime_conditions<=medications_lifetime+1
493 lifetime_conditions<=sqrt(10^medications_active)
494 lifetime_conditions<=maximum(healthcare_coverage,active_care_plans)
495 lifetime_conditions<=2*ceil(DALY)
496 lifetime_conditions<=active_conditions+procedures_lifetime+1
497 lifetime_conditions<=maximum(Estimated_Glomerular_Filtration_Rate,active_con
ditions+1)
498 lifetime_conditions>=num_allergies
499 lifetime_conditions>=active_care_plans
500 lifetime_conditions>=active_conditions
501 lifetime_conditions>=procedures_lifetime-1
502 lifetime_conditions>=1/2*immunizations_lifetime_cost^medications_lifetime_pe
rc_covered
503 lifetime_conditions>=floor(immunizations_lifetime_cost/medications_lifetime_
dispenses)
504 lifetime_conditions>=2*DALY-procedures_lifetime_cost
505 lifetime_conditions<=active_conditions+1
506 lifetime_conditions<=active_conditions+num_allergies
507 lifetime_conditions<=maximum(active_conditions,medications_lifetime)
508 lifetime_conditions>=active_conditions
509 lifetime_conditions>=active_care_plans+procedures_lifetime
510 lifetime_conditions>=ceil(sqrt(device_lifetime_length))
511 lifetime_conditions>=10^lifetime_care_plans/encounters_lifetime_total_cost
512 lifetime_conditions>=DALY*log(procedures_lifetime)/log(10)
513 lifetime_conditions<=active_care_plans+active_conditions
514 lifetime_conditions<=active_conditions+procedures_lifetime
515 lifetime_conditions<=encounters_count-1
516 lifetime_conditions<=maximum(active_conditions,immunizations_lifetime_cost)
517 lifetime_conditions<=active_conditions/floor(QOLS)
518 lifetime_conditions<=minimum(healthcare_expenses,floor(Urea_Nitrogen))
519 lifetime_conditions<=1/2*active_care_plans+active_conditions
520 lifetime_conditions>=active_conditions
521 lifetime_conditions>=ceil(log(healthcare_expenses)/log(10))
522 lifetime_conditions>=medications_active+1
523 lifetime_conditions>=active_care_plans+procedures_lifetime-1
524 lifetime_conditions>=immunizations_lifetime+lifetime_care_plans
525 lifetime_conditions>=floor(log(encounters_lifetime_payer_coverage))
526 active_condition_length<=age
527 active_condition_length<=-1/DALY+Heart_rate
528 active_condition_length<=maximum(active_care_plan_length,healthcare_expenses
/healthcare_coverage)
529 active_condition_length<=maximum(active_care_plan_length,sqrt(healthcare_cov
erage))
530 active_condition_length<=maximum(active_care_plan_length,procedures_lifetime
_cost)
531
active_condition_length<=maximum(active_care_plan_length,10^medications_active)
```

```
532 active_condition_length<=QALY*active_care_plan_length
533 active_condition_length<=maximum(Sodium,abs(active_care_plan_length))
534
active_condition_length<=maximum(active_care_plan_length,e^active_conditions)
535 active_condition_length<=maximum(active_care_plan_length,10^Pain_severity___
0_10_verbal_numeric_rating__Score____Reported)
536 active_condition_length>=active_care_plan_length/active_conditions
537 active_condition_length>=active_care_plan_length^imaging_studies_lifetime
538 active_condition_length>=10^log(sqrt(DALY))
539 active_condition_length>=minimum(latitude,1/2*encounters_count)
540
active_condition_length>=minimum(immunizations_lifetime_cost,floor(latitude))
541 active_condition_length>=medications_lifetime_dispenses/age+1
542 active_condition_length>=log(mean_Calcium^device_lifetime_length)
543 active_condition_length>=e^(10^encounters_lifetime_perc_covered)
544 active_condition_length>=2*medications_active/QOLS
545 active_condition_length<=-sqrt(immunizations_lifetime_cost)+age
546 active_condition_length<=active_care_plan_length/encounters_lifetime_perc_co
vered-1
547 active_condition_length<=maximum(active_care_plan_length,procedures_lifetime
_cost)
548
active_condition_length<=maximum(active_care_plan_length,10^procedures_lifetime)
549 active_condition_length<=maximum(Systolic_Blood_Pressure,abs(active_care_pla
n_length))
550 active_condition_length<=medications_active^(10^QOLS)
551 active_condition_length<=maximum(Body_Mass_Index,10^DALY)
552 active_condition_length<=sqrt(medications_lifetime_cost)/procedures_lifetime
553 active_condition_length<=maximum(active_care_plan_length,healthcare_expenses
/encounters_lifetime_total_cost)
554 active_condition_length>=active_care_plan_length
555 active_condition_length>=QALY/(QOLS+1)
556 active_condition_length>=-DALY+ceil(latitude)
557 active_condition_length>=-sqrt(encounters_lifetime_total_cost)+age
558 active_condition_length>=2*maximum(Body_temperature,mean_DALY)
559
active_condition_length>=active_care_plans^2/encounters_lifetime_perc_covered^2
560 active_condition_length>=QALY^encounters_lifetime_perc_covered+1
561 active_condition_length>=encounters_count/(DALY-1)
562 active_condition_length>=1/2*lifetime_care_plan_length/DALY
563 active_condition_length<=sqrt(lifetime_condition_length)+latitude
564 active_condition_length<=encounters_lifetime_payer_coverage/ceil(DALY)
565 active_condition_length<=floor(lifetime_condition_length)-lifetime_care_plan
_length
566 active_condition_length<=(healthcare_expenses/medications_lifetime_cost)^act
ive_conditions
567 active_condition_length<=maximum(Triglycerides,floor(latitude))
568 active_condition_length<=encounters_count^(log(medications_lifetime_dispense
```

```
s)/log(10))
569 active_condition_length<=sqrt(encounters_lifetime_total_cost/medications_lif
etime_perc_covered)
570 active_condition_length<=maximum(procedures_lifetime_cost,sqrt(medications_l
ifetime_length))
571 active_condition_length<=sqrt(healthcare_coverage-
medications_lifetime_length)
572 active_condition_length<=10^(sqrt(QOLS)+1)
573 active_condition_length>=1/2*QALY+1/2*encounters_lifetime_perc_covered
574 active_condition_length>=-2*QALY+lifetime_care_plan_length
575 active_condition_length>=log(10)*procedures_lifetime/log(DALY)
576 active_condition_length>=active_care_plan_length^imaging_studies_lifetime
577 active_condition_length>=active_care_plan_length-immunizations_lifetime_cost
578 active_condition_length>=age/sqrt(DALY)
579 active_condition_length>=-10^lifetime_care_plans+lifetime_condition_length
580 active_condition_length>=minimum(active_care_plan_length,procedures_lifetime
_cost)
581 active_condition_length>=active_care_plan_length/medications_active
582 active_condition_length>=minimum(QALY,e^active_care_plans)
583 lifetime_condition_length<=10^lifetime_care_plans+DALY
584 lifetime_condition_length<=active_care_plan_length*active_conditions+1
585 lifetime_condition_length<=healthcare_expenses/medications_lifetime_dispense
s+active_condition_length
586 lifetime_condition_length<=log(e^active_condition_length)^2/log(10)^2
587 lifetime_condition_length<=-active_care_plan_length+1/2*encounters_lifetime_
payer_coverage
588 lifetime_condition_length<=medications_lifetime_cost/sqrt(procedures_lifetim
e_cost)
589 lifetime_condition_length<=age*healthcare_expenses/healthcare_coverage
590 lifetime_condition_length<=medications_lifetime_length/active_care_plans
591 lifetime_condition_length<=active_care_plan_length^(log(QALY)/log(10))
592 lifetime_condition_length<=healthcare_expenses*lifetime_conditions/encounter
s_lifetime_total_cost
593 lifetime_condition_length>=2*minimum(latitude,lifetime_care_plan_length)
594
lifetime_condition_length>=immunizations_lifetime^sqrt(active_care_plan_length)
595 lifetime_condition_length>=-2*QALY+2*lifetime_care_plan_length
596 lifetime_condition_length>=2*active_care_plan_length-1
597 lifetime_condition_length>=QALY+active_care_plan_length-1
598 lifetime_condition_length>=1/2*active_condition_length*lifetime_conditions
599 lifetime_condition_length>=1/2*active_conditions+1/2*medications_lifetime
600 lifetime_condition_length>=sqrt(encounters_count*medications_lifetime)
601 lifetime_condition_length>=QALY/(DALY-1)
602 lifetime_condition_length>=active_condition_length*e^QOLS
603
lifetime_condition_length<=healthcare_expenses^QOLS*lifetime_care_plan_length
604 lifetime_condition_length<=maximum(lifetime_care_plan_length,10^active_condi
tions)
```

```
605 lifetime_condition_length<=longitude+1/2*medications_lifetime_length
606 lifetime_condition_length<=encounters_count^2+DALY
607 lifetime_condition_length<=healthcare_expenses/(device_lifetime_length*medic
ations_lifetime_dispenses)
608 lifetime_condition_length<=sqrt(active_care_plan_length)*age
609 lifetime_condition_length<=e^(medications_lifetime_perc_covered^longitude)
610 lifetime_condition_length<=e^active_care_plans*lifetime_care_plan_length
611 lifetime_condition_length<=10^active_care_plans/medications_lifetime_perc_co
vered
612 lifetime_condition_length<=QALY*ceil(DALY)
613 lifetime_condition_length>=(log(healthcare_coverage)+1)^2
614 lifetime_condition_length>=1/2*active_care_plans*age
615 lifetime_condition_length>=1/2*active_conditions*procedures_lifetime
616 lifetime_condition_length>=sqrt(active_conditions)+medications_lifetime
617 lifetime_condition_length>=ceil(10^log(lifetime_conditions))
618 lifetime_condition_length>=2*lifetime_conditions^2+2
619 lifetime_condition_length>=active_condition_length+latitude+1
620
lifetime_condition_length>=10^immunizations_lifetime+lifetime_care_plan_length
621 lifetime_condition_length>=device_lifetime_length*log(encounters_lifetime_to
tal_cost)
622 lifetime_condition_length<=healthcare_expenses/medications_lifetime_dispense
s+lifetime_care_plan_length
623 lifetime_condition_length<=(active_conditions-1)*latitude
624 lifetime_condition_length<=2*active_care_plans*active_condition_length
625 lifetime_condition_length<=Pain_severity___0_10_verbal_numeric_rating__Score
____Reported*encounters_count^2
626 lifetime_condition_length<=active_care_plan_length*e^Pain_severity___0_10_ve
rbal_numeric_rating__Score____Reported
627 lifetime_condition_length<=2*latitude*medications_lifetime
628 lifetime_condition_length<=e^medications_active*latitude
629 lifetime_condition_length<=Systolic_Blood_Pressure/medications_lifetime_perc
_covered^2
630 lifetime_condition_length<=QALY^(log(Heart_rate)/log(10))
631 lifetime_condition_length<=sqrt(1/2)*e^(1/2*mean_Respiratory_rate)
632 lifetime_condition_length>=1/encounters_lifetime_perc_covered+QALY
633 lifetime_condition_length>=1/2*encounters_count+1/2*medications_lifetime
634 lifetime_condition_length>=active_conditions*procedures_lifetime-1
635 lifetime_condition_length>=minimum(DALY,Respiratory_rate)^2
636 lifetime_condition_length>=immunizations_lifetime_cost*log(DALY)/log(10)
637 lifetime_condition_length>=log(mean_Chloride^device_lifetime_length)
638
lifetime_condition_length>=immunizations_lifetime^sqrt(active_care_plan_length)
639 lifetime_condition_length>=active_care_plan_length/(DALY-1)
640 lifetime_condition_length>=DALY^2/lifetime_conditions
641 lifetime_condition_length>=maximum(Glucose,mean_DALY)+1
642 device_lifetime_length<=num_allergies
643 device_lifetime_length>=num_allergies
```

```
644 device_lifetime_length>=maximum(Prostate_specific_Ag__Mass_volume__in_Serum,
Plasma,-healthcare_expenses)
645 device_lifetime_length>=log(1/2*sqrt(active_care_plans))/log(10)
646 device_lifetime_length<=num_allergies
647 device_lifetime_length<=imaging_studies_lifetime
648 device_lifetime_length>=num_allergies
649 device_lifetime_length<=(QALY-1)^(1/log(10))
650 device_lifetime_length<=active_care_plan_length
651 device_lifetime_length<=immunizations_lifetime_cost
652
device_lifetime_length<=healthcare_expenses*medications_lifetime_perc_covered
653 device_lifetime_length<=DALY
654 device_lifetime_length<=-log(imaging_studies_lifetime)/log(10)
655 device_lifetime_length<=mean_Pain_severity___0_10_verbal_numeric_rating__Sco
re____Reported^immunizations_lifetime_cost
656 device_lifetime_length<=2*medications_active
657 device_lifetime_length>=-num_allergies
658 device_lifetime_length>=log(num_allergies)/log(10)
659 device_lifetime_length>=2*imaging_studies_lifetime*immunizations_lifetime
660 encounters_count<=floor(1/2*lifetime_condition_length)
661 encounters_count<=QALY/ceil(device_lifetime_length)
662 encounters_count<=2*log(procedures_lifetime_cost)^2
663 encounters_count<=maximum(medications_lifetime,2*QALY)
664 encounters_count<=maximum(lifetime_care_plan_length,medications_lifetime)
665 encounters_count<=10^active_care_plans+1
666 encounters_count<=DALY^2+medications_lifetime
667 encounters_count<=4*active_conditions^2
668
encounters_count<=maximum(immunizations_lifetime_cost,medications_lifetime^2)
669 encounters_count<=latitude^(10^medications_lifetime_perc_covered)
670 encounters_count>=minimum(medications_lifetime,Respiratory_rate)
671 encounters_count>=longitude+1/2*medications_lifetime
672 encounters_count>=lifetime_conditions
673 encounters_count>=device_lifetime_length*procedures_lifetime+1
674
encounters_count>=encounters_lifetime_total_cost/(immunizations_lifetime_cost-1)
675 encounters_count>=ceil(device_lifetime_length)+1
676 encounters_count>=minimum(medications_lifetime,1/2*Heart_rate)
677 encounters_count>=minimum(immunizations_lifetime_cost,10^Creatinine)
678 encounters_count>=active_conditions+procedures_lifetime
679
encounters_count>=1/2*maximum(Protein__Mass_volume__in_Serum,Plasma,mean_DALY)
680 encounters_count<=2*ceil(Glucose)+1
681 encounters_count<=minimum(healthcare_expenses,ceil(Hemoglobin__Mass_volume__
in_Blood))
682 encounters_count<=maximum(latitude,medications_lifetime)
683 encounters_count<=healthcare_expenses/(encounters_lifetime_perc_covered*medi
cations_lifetime_dispenses)
```

```
684 encounters_count<=active_conditions+medications_lifetime+1
685 encounters_count<=sqrt(encounters_lifetime_total_cost+healthcare_coverage)
686 encounters_count<=2*lifetime_care_plan_length^Creatinine
687 encounters_count<=floor(Urea_Nitrogen)+medications_lifetime
688 encounters_count<=floor(log(device_lifetime_length)^2)
689 encounters_count>=1/2*encounters_lifetime_total_cost/Body_Weight
690 encounters_count>=medications_lifetime^QOLS
691 encounters_count>=1/2*Respiratory_rate
692
encounters_count>=1/2*maximum(Estimated_Glomerular_Filtration_Rate,mean_DALY)
693 encounters_count>=ceil(Body_Mass_Index)*immunizations_lifetime
694 encounters_count>=-2*lifetime_care_plan_length+mean_Systolic_Blood_Pressure
695 encounters_count>=minimum(medications_lifetime,1/procedures_lifetime)
696 encounters_count>=active_conditions+procedures_lifetime
697 encounters_count>=-lifetime_care_plan_length+1/2*medications_lifetime
698 encounters_count>=minimum(medications_lifetime,1/immunizations_lifetime)
699 encounters_count<=2*medications_lifetime/imaging_studies_lifetime
700 encounters_count<=healthcare_expenses/(active_care_plans*lifetime_condition_
length)
701 encounters_count<=maximum(active_condition_length,medications_lifetime+1)
702 encounters_count<=maximum(age,medications_lifetime-1)
703 encounters_count<=abs(encounters_lifetime_total_cost-
medications_lifetime_length)
704 encounters_count<=maximum(Triglycerides,10^active_care_plans)
705 encounters_count<=10^(log(latitude)^2/log(10)^2)
706 encounters_count<=4*medications_lifetime
707 encounters_count<=age^(medications_lifetime_perc_covered+1)
708 encounters_count<=1/medications_lifetime_perc_covered+medications_lifetime
709 encounters_count>=active_conditions
710 encounters_count>=Heart_rate+floor(longitude)
711 encounters_count>=encounters_lifetime_total_cost/(mean_Sodium-1)
712 encounters_count>=-2*active_condition_length+lifetime_care_plan_length
713 encounters_count>=10^QOLS+1
714 encounters_count>=floor(device_lifetime_length)-medications_active
715 encounters_count>=(medications_lifetime+1)/medications_active
716 encounters_count>=maximum(mean_Microalbumin_Creatinine_Ratio,mean_Pain_sever
ity___0_10_verbal_numeric_rating__Score____Reported)+1
717 encounters_count>=minimum(QALY,1/Pain_severity___0_10_verbal_numeric_rating_
_Score____Reported)
718 encounters_count>=sqrt(active_conditions)*procedures_lifetime
719 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
720 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
721 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
722 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
723 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
724 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
725 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
726 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
```

```
727 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
728 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
729 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
730 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
731 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
ounters_lifetime_perc_covered
732 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_perc_covered*en
counters_lifetime_total_cost)
733 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
734 encounters_lifetime_payer_coverage>=floor(encounters_lifetime_perc_covered*e
ncounters_lifetime_total_cost)
735
encounters_lifetime_payer_coverage>=encounters_lifetime_total_cost^(2/log(10))
736 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
ounters_lifetime_perc_covered
737 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_perc_covered*en
counters_lifetime_total_cost)
738 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
739 encounters_lifetime_payer_coverage>=immunizations_lifetime_cost-log(age)
740 encounters_lifetime_payer_coverage>=floor(encounters_lifetime_perc_covered*e
ncounters_lifetime_total_cost)
741 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
ounters_lifetime_perc_covered
742 encounters_lifetime_payer_coverage<=encounters_lifetime_perc_covered*healthc
are_expenses
743 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
744 encounters_lifetime_payer_coverage>=floor(encounters_lifetime_perc_covered*e
ncounters_lifetime_total_cost)
745 encounters_lifetime_payer_coverage>=1/4*floor(QALY)^2
746 encounters_lifetime_perc_covered<=ceil(encounters_lifetime_payer_coverage)/e
ncounters_lifetime_total_cost
747 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/floor(e
ncounters_lifetime_total_cost)
748 encounters_lifetime_perc_covered>=(1/active_conditions)
749 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/ceil(en
counters_lifetime_total_cost)
750 encounters_lifetime_perc_covered<=active_care_plans
751 encounters_lifetime_perc_covered<=ceil(encounters_lifetime_payer_coverage)/e
ncounters_lifetime_total_cost
752 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/floor(e
ncounters_lifetime_total_cost)
753 encounters_lifetime_perc_covered<=log(sqrt(lifetime_condition_length))^2/log
(10)^2
754 encounters_lifetime_perc_covered>=floor(encounters_lifetime_payer_coverage)/
encounters_lifetime_total_cost
```

755 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/ceil(en
counters_lifetime_total_cost)
756 encounters_lifetime_perc_covered<=ceil(encounters_lifetime_payer_coverage)/e
ncounters_lifetime_total_cost
757 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/floor(e
ncounters_lifetime_total_cost)
758 encounters_lifetime_perc_covered>=(1/active_conditions)
759 encounters_lifetime_perc_covered>=floor(encounters_lifetime_payer_coverage)/
encounters_lifetime_total_cost
760 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/ceil(en
counters_lifetime_total_cost)
761 imaging_studies_lifetime<=num_allergies
762 imaging_studies_lifetime>=num_allergies
763 imaging_studies_lifetime>=(immunizations_lifetime-1)^lifetime_conditions
764 imaging_studies_lifetime<=num_allergies^procedures_lifetime
765 imaging_studies_lifetime<=e^num_allergies
766 imaging_studies_lifetime<=num_allergies^immunizations_lifetime
767 imaging_studies_lifetime<=ceil(medications_lifetime_perc_covered)
768 imaging_studies_lifetime<=-active_care_plans+lifetime_care_plans
769 imaging_studies_lifetime<=num_allergies^device_lifetime_length
770 imaging_studies_lifetime>=device_lifetime_length
771 imaging_studies_lifetime<=e^num_allergies
772 imaging_studies_lifetime<=immunizations_lifetime
773 imaging_studies_lifetime<=ceil(medications_lifetime_perc_covered)
774 imaging_studies_lifetime<=procedures_lifetime
775 imaging_studies_lifetime<=Pain_severity___0_10_verbal_numeric_rating__Score_
___Reported
776 imaging_studies_lifetime<=num_allergies^device_lifetime_length
777 imaging_studies_lifetime<=-active_conditions+lifetime_conditions
778 imaging_studies_lifetime>=-device_lifetime_length
779 imaging_studies_lifetime>=-num_allergies
780 immunizations_lifetime<=active_conditions
781 immunizations_lifetime<=immunizations_lifetime_cost
782 immunizations_lifetime<=e^num_allergies
783 immunizations_lifetime<=medications_lifetime^num_allergies
784 immunizations_lifetime>=device_lifetime_length
785 immunizations_lifetime>=imaging_studies_lifetime
786 immunizations_lifetime>=num_allergies-1
787 immunizations_lifetime>=1/QOLS-2
788 immunizations_lifetime>=floor(immunizations_lifetime_cost/lifetime_condition
_length)
789 immunizations_lifetime>=minimum(immunizations_lifetime_cost,QOLS)
790 immunizations_lifetime>=floor(log(procedures_lifetime)/log(10))
791 immunizations_lifetime>=-active_care_plans+medications_active
792 immunizations_lifetime>=(num_allergies-1)^encounters_count
793 immunizations_lifetime<=active_care_plans
794 immunizations_lifetime<=immunizations_lifetime_cost
795 immunizations_lifetime<=floor(1/medications_lifetime_perc_covered)

```
796 immunizations_lifetime<=sqrt(medications_lifetime)
797 immunizations_lifetime<=minimum(healthcare_expenses,Specific_gravity_of_Urin
e_by_Test_strip)
798 immunizations_lifetime<=floor(sqrt(medications_active))
799 immunizations_lifetime>=num_allergies
800 immunizations_lifetime>=num_allergies^active_care_plans
801 immunizations_lifetime>=minimum(immunizations_lifetime_cost,e^num_allergies)
802 immunizations_lifetime>=floor(log(1/2*immunizations_lifetime_cost)/log(10))
803 immunizations_lifetime>=-active_care_plans+procedures_lifetime
804 immunizations_lifetime<=lifetime_care_plans
805 immunizations_lifetime<=immunizations_lifetime_cost
806 immunizations_lifetime<=Pain_severity___0_10_verbal_numeric_rating__Score___
_Reported
807 immunizations_lifetime<=e^imaging_studies_lifetime
808 immunizations_lifetime<=e^device_lifetime_length
809 immunizations_lifetime>=num_allergies
810 immunizations_lifetime>=num_allergies^medications_lifetime
811 immunizations_lifetime>=-active_conditions+lifetime_conditions
812 immunizations_lifetime>=floor(log(device_lifetime_length)/log(10))
813 immunizations_lifetime>=floor(log(1/2*immunizations_lifetime_cost)/log(10))
814 immunizations_lifetime>=floor(log(active_care_plans))
815 immunizations_lifetime_cost<=10^sqrt(encounters_count-1)
816 immunizations_lifetime_cost<=(2*age)^immunizations_lifetime
817 immunizations_lifetime_cost<=-2*longitude+procedures_lifetime_cost
818 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
819 immunizations_lifetime_cost<=floor(log(medications_lifetime_cost))^2
820 immunizations_lifetime_cost<=maximum(mean_Sodium,1/imaging_studies_lifetime)
821 immunizations_lifetime_cost<=maximum(mean_Sodium,healthcare_expenses/encount
ers_lifetime_total_cost)
822 immunizations_lifetime_cost>=num_allergies
823
immunizations_lifetime_cost>=sqrt(device_lifetime_length)^lifetime_care_plans
824 immunizations_lifetime_cost>=medications_lifetime_cost^(1/DALY)
825
immunizations_lifetime_cost>=sqrt(healthcare_coverage)-procedures_lifetime_cost
826 immunizations_lifetime_cost>=-QALY+2*encounters_count
827 immunizations_lifetime_cost>=-QALY+1/2*lifetime_condition_length
828 immunizations_lifetime_cost>=(immunizations_lifetime^2)^active_conditions
829
immunizations_lifetime_cost>=medications_lifetime^2/lifetime_condition_length
830 immunizations_lifetime_cost>=log(Body_Mass_Index^device_lifetime_length)
831 immunizations_lifetime_cost>=2*encounters_count-procedures_lifetime_cost
832
immunizations_lifetime_cost<=-1/2*QALY+1/2*encounters_lifetime_payer_coverage
833 immunizations_lifetime_cost<=e^(age^QOLS)
834 immunizations_lifetime_cost<=sqrt(encounters_lifetime_total_cost*lifetime_ca
re_plan_length)
835 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
```

```
836 immunizations_lifetime_cost<=2*age/medications_lifetime_perc_covered
837 immunizations_lifetime_cost<=minimum(healthcare_expenses,Platelet_distributi
on_width__Entitic_volume__in_Blood_by_Automated_count+1)
838 immunizations_lifetime_cost<=encounters_lifetime_total_cost/10^imaging_studi
es_lifetime
839 immunizations_lifetime_cost<=maximum(procedures_lifetime_cost,2*medications_
lifetime)
840 immunizations_lifetime_cost<=e^(1/2*10^immunizations_lifetime)
841 immunizations_lifetime_cost>=num_allergies
842
immunizations_lifetime_cost>=2*active_care_plan_length*immunizations_lifetime
843 immunizations_lifetime_cost>=imaging_studies_lifetime*sqrt(lifetime_conditio
n_length)
844 immunizations_lifetime_cost>=age*immunizations_lifetime^2
845 immunizations_lifetime_cost>=1/2*encounters_lifetime_total_cost-
medications_lifetime_cost
846 immunizations_lifetime_cost>=log(age^device_lifetime_length)/log(10)
847 immunizations_lifetime_cost>=sqrt(encounters_lifetime_payer_coverage)*immuni
zations_lifetime
848 immunizations_lifetime_cost>=immunizations_lifetime*sqrt(medications_lifetim
e_length)
849 immunizations_lifetime_cost>=encounters_count/(device_lifetime_length-1)
850 immunizations_lifetime_cost<=healthcare_coverage
851 immunizations_lifetime_cost<=-2*longitude-1
852 immunizations_lifetime_cost<=medications_lifetime_cost
853 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
854 immunizations_lifetime_cost<=10^log(sqrt(age))
855
immunizations_lifetime_cost<=1/2*medications_lifetime_length/active_conditions
856 immunizations_lifetime_cost<=1/2*10^sqrt(encounters_count)
857 immunizations_lifetime_cost<=log(e^QALY)^2/log(10)^2
858 immunizations_lifetime_cost>=device_lifetime_length
859 immunizations_lifetime_cost>=1/2*encounters_lifetime_payer_coverage-
medications_lifetime_cost
860 immunizations_lifetime_cost>=ceil(active_care_plans*device_lifetime_length)
861 immunizations_lifetime_cost>=imaging_studies_lifetime*sqrt(procedures_lifeti
me_cost)
862 immunizations_lifetime_cost>=2*encounters_count-2*lifetime_care_plan_length
863 immunizations_lifetime_cost>=16*immunizations_lifetime^4
864
immunizations_lifetime_cost>=2*active_care_plan_length*immunizations_lifetime
865 medications_lifetime<=(active_conditions-1)*QALY
866 medications_lifetime<=(DALY+1)*encounters_count
867 medications_lifetime<=maximum(age,e^DALY)
868 medications_lifetime<=healthcare_coverage/immunizations_lifetime_cost-1
869 medications_lifetime<=floor(QALY+lifetime_condition_length)
870 medications_lifetime<=maximum(encounters_count,e^active_conditions)
871 medications_lifetime<=2*encounters_count/num_allergies
```

```
872 medications_lifetime<=latitude^(1/medications_lifetime_perc_covered)
873 medications_lifetime<=floor(1/4*encounters_count^2)
874 medications_lifetime<=e^encounters_count/latitude
875 medications_lifetime>=e^medications_active*procedures_lifetime
876 medications_lifetime>=active_care_plan_length*log(procedures_lifetime)
877 medications_lifetime>=device_lifetime_length*sqrt(latitude)
878 medications_lifetime>=medications_active
879 medications_lifetime>=medications_active^2-2
880 medications_lifetime>=minimum(encounters_lifetime_payer_coverage,Respiratory
_rate-1)
881 medications_lifetime>=e^(lifetime_care_plan_length/QALY)
882 medications_lifetime>=sqrt(QALY)*procedures_lifetime
883 medications_lifetime>=1/8*device_lifetime_length^2
884 medications_lifetime>=(Carbon_Dioxide^2)^imaging_studies_lifetime
885 medications_lifetime<=encounters_lifetime_total_cost
886 medications_lifetime<=ceil(lifetime_condition_length)
887 medications_lifetime<=10^(1/QOLS+1)
888 medications_lifetime<=healthcare_expenses/(active_care_plans*lifetime_care_p
lan_length)
889 medications_lifetime<=(DALY+1)*latitude
890 medications_lifetime<=e^(encounters_count^(1/log(10)))
891 medications_lifetime<=medications_lifetime_length/(active_conditions+1)
892 medications_lifetime<=(healthcare_expenses-
medications_lifetime_length)/lifetime_condition_length
893 medications_lifetime<=sqrt(QALY)*active_care_plan_length
894 medications_lifetime<=2*age+2*immunizations_lifetime_cost
895 medications_lifetime>=-active_care_plans+encounters_count
896 medications_lifetime>=active_conditions^2
897 medications_lifetime>=sqrt(healthcare_coverage)-immunizations_lifetime_cost
898 medications_lifetime>=active_conditions+floor(active_condition_length)
899 medications_lifetime>=encounters_count-procedures_lifetime
900 medications_lifetime>=encounters_count/active_care_plans
901 medications_lifetime>=lifetime_condition_length*log(10)/log(procedures_lifet
ime_cost)
902 medications_lifetime>=encounters_lifetime_perc_covered*e^lifetime_care_plans
903 medications_lifetime>=device_lifetime_length*log(age)
904 medications_lifetime>=-age+2*encounters_count
905 medications_lifetime<=(latitude-1)/medications_lifetime_perc_covered
906 medications_lifetime<=minimum(healthcare_expenses,Total_score__MMSE_-1)
907 medications_lifetime<=10^active_care_plans+encounters_count
908 medications_lifetime<=e^active_care_plan_length
909 medications_lifetime<=(encounters_count-1)^active_care_plans
910 medications_lifetime<=minimum(healthcare_expenses,Systolic_Blood_Pressure-1)
911 medications_lifetime<=sqrt(medications_lifetime_cost)/lifetime_care_plans
912 medications_lifetime<=1/immunizations_lifetime+encounters_count
913 medications_lifetime<=minimum(healthcare_expenses,2*Alkaline_phosphatase__En
zymatic_activity_volume__in_Serum,Plasma)
914 medications_lifetime<=medications_lifetime_dispenses^sqrt(QOLS)
```

```
915 medications_lifetime>=lifetime_care_plans+1
916 medications_lifetime>=(1/2*medications_lifetime_dispenses)^medications_lifet
ime_perc_covered
917 medications_lifetime>=active_condition_length*log(device_lifetime_length)
918 medications_lifetime>=medications_active
919 medications_lifetime>=encounters_count^num_allergies
920 medications_lifetime>=(2*lifetime_care_plan_length)^imaging_studies_lifetime
921 medications_lifetime>=device_lifetime_length*log(medications_lifetime_cost)/
log(10)
922 medications_lifetime>=encounters_count-lifetime_conditions-1
923 medications_lifetime>=ceil(maximum(Glomerular_filtration_rate_1_73_sq_M_pred
icted,mean_QOLS))
924
medications_lifetime>=maximum(mean_Microalbumin_Creatinine_Ratio,mean_QOLS)+1
925 medications_lifetime_cost<=-(encounters_lifetime_payer_coverage-
healthcare_expenses)*encounters_lifetime_perc_covered
926 medications_lifetime_cost<=1/2*medications_lifetime_dispenses^2-1
927 medications_lifetime_cost<=encounters_count^2*lifetime_condition_length
928 medications_lifetime_cost<=1/2*healthcare_expenses-procedures_lifetime_cost
929 medications_lifetime_cost<=e^(10^(QOLS+1))
930 medications_lifetime_cost<=2*10^(active_conditions+1)
931 medications_lifetime_cost<=encounters_lifetime_total_cost^2/lifetime_care_pl
an_length
932 medications_lifetime_cost<=2*latitude*medications_lifetime_length
933 medications_lifetime_cost<=e^(2*sqrt(lifetime_care_plan_length))
934 medications_lifetime_cost<=2*lifetime_condition_length*medications_lifetime_
dispenses
935 medications_lifetime_cost>=10^(lifetime_conditions^encounters_lifetime_perc_
covered)
936 medications_lifetime_cost>=mean_Systolic_Blood_Pressure^(log(medications_lif
etime)/log(10))
937 medications_lifetime_cost>=medications_active^2*medications_lifetime_length
938 medications_lifetime_cost>=Heart_rate^2/QOLS
939 medications_lifetime_cost>=(immunizations_lifetime_cost+1)*QALY
940 medications_lifetime_cost>=(2*lifetime_care_plans)^active_care_plans
941 medications_lifetime_cost>=(active_care_plans^2)^medications_active
942 medications_lifetime_cost>=(device_lifetime_length+1)*encounters_lifetime_pa
yer_coverage
943 medications_lifetime_cost>=(2*immunizations_lifetime_cost)^immunizations_lif
etime
944 medications_lifetime_cost>=active_conditions^2*device_lifetime_length^2
945 medications_lifetime_cost<=10^log(2*lifetime_condition_length)
946 medications_lifetime_cost<=10^e^sqrt(active_care_plans)
947 medications_lifetime_cost<=healthcare_expenses*log(active_conditions)
948 medications_lifetime_cost<=e^(log(lifetime_care_plan_length)^2)
949 medications_lifetime_cost<=(healthcare_coverage-medications_lifetime)*age
950 medications_lifetime_cost<=QOLS^(-lifetime_condition_length)
951
```

```
medications_lifetime_cost<=encounters_lifetime_total_cost^2/medications_lifetime
952 medications_lifetime_cost<=(healthcare_expenses/latitude)^DALY
953 medications_lifetime_cost<=medications_lifetime_dispenses^2/encounters_lifet
ime_perc_covered^2
954 medications_lifetime_cost<=QALY*healthcare_expenses/active_conditions
955 medications_lifetime_cost>=e^active_conditions+lifetime_condition_length
956 medications_lifetime_cost>=active_care_plans^e^imaging_studies_lifetime
957 medications_lifetime_cost>=procedures_lifetime_cost/sqrt(QOLS)
958 medications_lifetime_cost>=(longitude+2)^2
959 medications_lifetime_cost>=e^lifetime_care_plans*lifetime_conditions
960 medications_lifetime_cost>=2*active_condition_length*medications_lifetime_di
spenses
961 medications_lifetime_cost>=10^medications_active/latitude
962 medications_lifetime_cost>=encounters_lifetime_total_cost/encounters_lifetim
e_perc_covered^2
963 medications_lifetime_cost>=lifetime_conditions^(active_care_plans-1)
964 medications_lifetime_cost>=medications_lifetime_length^2/lifetime_condition_
length
965 medications_lifetime_cost<=(Body_Mass_Index^2-1)^2
966 medications_lifetime_cost<=(Heart_rate-1)*medications_lifetime_length
967 medications_lifetime_cost<=log(age)^Calcium
968 medications_lifetime_cost<=(Chloride-1)*encounters_lifetime_payer_coverage
969 medications_lifetime_cost<=latitude^(log(encounters_lifetime_payer_coverage)
/log(10))
970 medications_lifetime_cost<=e^mean_Urea_Nitrogen*mean_Calcium
971 medications_lifetime_cost<=10^(mean_Glucose/Respiratory_rate)
972 medications_lifetime_cost<=Body_Weight*Chloride^2
973 medications_lifetime_cost<=10^(sqrt(1/2)*sqrt(lifetime_condition_length))
974 medications_lifetime_cost>=1/2*QALY*medications_lifetime_length
975
medications_lifetime_cost>=healthcare_coverage/log(lifetime_care_plan_length)
976 medications_lifetime_cost>=1/2*encounters_lifetime_total_cost*latitude
977 medications_lifetime_cost>=(DALY+1)*encounters_lifetime_total_cost
978 medications_lifetime_cost>=QALY^2*medications_active^2
979 medications_lifetime_cost>=QALY^e^imaging_studies_lifetime
980 medications_lifetime_cost>=e^(device_lifetime_length+longitude)
981 medications_lifetime_cost>=(log(encounters_lifetime_total_cost)/log(10))^lif
etime_care_plans
982 medications_lifetime_cost>=medications_lifetime_length^2/lifetime_condition_
length
983 medications_lifetime_perc_covered<=active_care_plans
984
medications_lifetime_perc_covered<=log(log(lifetime_condition_length)/log(10))
985 medications_lifetime_perc_covered<=encounters_lifetime_payer_coverage/active
_care_plan_length^2
986 medications_lifetime_perc_covered<=maximum(encounters_lifetime_perc_covered,
immunizations_lifetime)
987 medications_lifetime_perc_covered<=-active_care_plan_length+lifetime_care_pl
```

an_length
988 medications_lifetime_perc_covered<=10^medications_active/lifetime_condition_
length
989 medications_lifetime_perc_covered<=(active_care_plans+1)/active_conditions
990 medications_lifetime_perc_covered<=minimum(healthcare_expenses,log(Glucose__
Mass_volume__in_Urine_by_Test_strip)/log(10))
991
medications_lifetime_perc_covered<=sqrt(encounters_count/medications_lifetime)
992
medications_lifetime_perc_covered<=1/(lifetime_condition_length*num_allergies)
993 medications_lifetime_perc_covered>=-num_allergies
994
medications_lifetime_perc_covered>=log(10)*num_allergies/log(encounters_count)
995 medications_lifetime_perc_covered>=device_lifetime_length/lifetime_care_plan
_length
996 medications_lifetime_perc_covered>=imaging_studies_lifetime/log(encounters_c
ount)
997 medications_lifetime_perc_covered>=encounters_lifetime_total_cost/healthcare
_coverage-1
998 medications_lifetime_perc_covered>=imaging_studies_lifetime/log(mean_Systoli
c_Blood_Pressure)
999 medications_lifetime_perc_covered>=-active_care_plan_length+floor(latitude)
1000
medications_lifetime_perc_covered>=device_lifetime_length-e^medications_active
1001 medications_lifetime_perc_covered<=medications_lifetime^2/immunizations_lif
etime_cost^2
1002 medications_lifetime_perc_covered<=log(medications_lifetime)/log(10)
1003 medications_lifetime_perc_covered<=active_condition_length/ceil(QALY)
1004 medications_lifetime_perc_covered<=latitude/medications_active^2
1005 medications_lifetime_perc_covered<=healthcare_expenses^2/medications_lifeti
me_cost^2
1006 medications_lifetime_perc_covered<=(1/2*mean_Pain_severity___0_10_verbal_nu
meric_rating__Score____Reported)^procedures_lifetime
1007 medications_lifetime_perc_covered<=QALY^2/procedures_lifetime^2
1008 medications_lifetime_perc_covered<=ceil(DALY)-immunizations_lifetime
1009 medications_lifetime_perc_covered<=log(log(sqrt(medications_lifetime_cost))
)/log(10)
1010 medications_lifetime_perc_covered<=1/4*procedures_lifetime+1/2
1011 medications_lifetime_perc_covered>=num_allergies
1012 medications_lifetime_perc_covered>=log(1/QOLS-1)
1013 medications_lifetime_perc_covered>=minimum(imaging_studies_lifetime,log(mea
n_Pain_severity___0_10_verbal_numeric_rating__Score____Reported)/log(10))
1014 medications_lifetime_perc_covered>=sqrt(medications_active)-DALY
1015 medications_lifetime_perc_covered>=log(1/2*sqrt(active_care_plans))/log(10)
1016 medications_lifetime_perc_covered<=sqrt(log(1/2*active_conditions)/log(10))
1017 medications_lifetime_perc_covered<=immunizations_lifetime
1018 medications_lifetime_perc_covered<=longitude^2/medications_lifetime_length
1019 medications_lifetime_perc_covered<=4*encounters_lifetime_perc_covered^2

```
1020 medications_lifetime_perc_covered<=floor(DALY)
1021 medications_lifetime_perc_covered<=1/2*10^(1/medications_active)
1022 medications_lifetime_perc_covered<=log(sqrt(DALY))^2
1023 medications_lifetime_perc_covered<=(encounters_lifetime_payer_coverage-1)/m
edications_lifetime_length
1024 medications_lifetime_perc_covered<=1/2*log(floor(QALY))/log(10)
1025 medications_lifetime_perc_covered>=device_lifetime_length
1026 medications_lifetime_perc_covered>=medications_lifetime_cost/healthcare_exp
enses-1
1027 medications_lifetime_perc_covered>=-active_care_plan_length+latitude-1
1028 medications_lifetime_perc_covered>=num_allergies/10^immunizations_lifetime
1029 medications_lifetime_perc_covered>=-Pain_severity___0_10_verbal_numeric_rat
ing__Score____Reported+log(mean_Pain_severity___0_10_verbal_numeric_rating__Scor
e____Reported)
1030 medications_lifetime_perc_covered>=sqrt(lifetime_care_plans)-2
1031
medications_lifetime_perc_covered>=-sqrt(encounters_lifetime_perc_covered)+QOLS
1032 medications_lifetime_perc_covered>=1/2*Diastolic_Blood_Pressure-
active_care_plan_length
1033 medications_lifetime_perc_covered>=log(age/Heart_rate)
1034 medications_lifetime_perc_covered>=1/4*active_care_plans-1
1035 medications_lifetime_length<=-encounters_count+1/2*healthcare_coverage
1036 medications_lifetime_length<=log(10^(encounters_lifetime_payer_coverage-1))
1037 medications_lifetime_length<=longitude^2/medications_lifetime_perc_covered
1038
medications_lifetime_length<=e^(-immunizations_lifetime)*healthcare_coverage
1039 medications_lifetime_length<=lifetime_condition_length^2+immunizations_life
time_cost
1040 medications_lifetime_length<=sqrt(active_condition_length)*medications_life
time_dispenses
1041 medications_lifetime_length<=healthcare_expenses/(immunizations_lifetime*im
munizations_lifetime_cost)
1042 medications_lifetime_length<=active_care_plans*longitude^2
1043
medications_lifetime_length<=healthcare_expenses/immunizations_lifetime_cost-
lifetime_condition_length
1044 medications_lifetime_length<=healthcare_expenses^QOLS*encounters_count
1045 medications_lifetime_length>=num_allergies
1046 medications_lifetime_length>=procedures_lifetime_cost/sqrt(encounters_lifet
ime_payer_coverage)
1047 medications_lifetime_length>=medications_lifetime^(encounters_lifetime_perc
_covered+1)
1048 medications_lifetime_length>=encounters_lifetime_payer_coverage*floor(QOLS)
1049 medications_lifetime_length>=ceil(immunizations_lifetime_cost)/encounters_l
ifetime_perc_covered
1050 medications_lifetime_length>=encounters_lifetime_total_cost^medications_lif
etime_perc_covered-1
1051 medications_lifetime_length>=log(active_condition_length)*medications_lifet
```

```
ime_dispenses
1052 medications_lifetime_length>=encounters_lifetime_payer_coverage+log(device_
lifetime_length)
1053 medications_lifetime_length>=encounters_lifetime_payer_coverage*log(10)/log
(procedures_lifetime_cost)
1054 medications_lifetime_length<=(QALY+medications_lifetime)^2
1055 medications_lifetime_length<=medications_lifetime_cost
1056 medications_lifetime_length<=maximum(immunizations_lifetime_cost,medication
s_lifetime)^2
1057 medications_lifetime_length<=(encounters_lifetime_total_cost-1)/encounters_
lifetime_perc_covered
1058 medications_lifetime_length<=age^2/medications_lifetime_perc_covered^2
1059 medications_lifetime_length<=1/2*(lifetime_condition_length+1)^2
1060
medications_lifetime_length<=active_care_plan_length*lifetime_care_plan_length^2
1061 medications_lifetime_length<=age^2/encounters_lifetime_perc_covered
1062
medications_lifetime_length<=1/2*lifetime_care_plan_length^medications_active
1063 medications_lifetime_length<=2*encounters_lifetime_total_cost/procedures_li
fetime
1064
medications_lifetime_length>=encounters_count^e^encounters_lifetime_perc_covered
1065 medications_lifetime_length>=log(active_care_plan_length)*medications_lifet
ime_dispenses
1066 medications_lifetime_length>=4*medications_lifetime_dispenses+4
1067
medications_lifetime_length>=healthcare_coverage/(active_condition_length-1)
1068 medications_lifetime_length>=e^(sqrt(active_care_plan_length+1))
1069 medications_lifetime_length>=e^DALY/encounters_lifetime_total_cost
1070 medications_lifetime_length>=encounters_count^2-procedures_lifetime_cost
1071 medications_lifetime_length>=healthcare_coverage^(log(medications_active)/l
og(10))
1072
medications_lifetime_length<=sqrt(encounters_lifetime_perc_covered^longitude)
1073 medications_lifetime_length<=medications_lifetime_cost
1074 medications_lifetime_length<=ceil(QALY^active_conditions)
1075 medications_lifetime_length<=10^ceil(log(latitude))
1076 medications_lifetime_length<=(2*lifetime_condition_length+1)^2
1077 medications_lifetime_length<=latitude^2*medications_lifetime
1078 medications_lifetime_length<=ceil(QALY)^active_care_plans
1079 medications_lifetime_length<=healthcare_expenses/(lifetime_condition_length
*num_allergies)
1080 medications_lifetime_length<=2*(longitude+1)^2
1081 medications_lifetime_length<=healthcare_expenses/QALY+encounters_lifetime_t
otal_cost
1082 medications_lifetime_length>=(1/2*QALY)^QOLS
1083 medications_lifetime_length>=medications_lifetime_cost/(age-1)
1084 medications_lifetime_length>=log(QALY)*medications_lifetime_dispenses
```

```
1085 medications_lifetime_length>=mean_Calcium^(active_care_plans-1)
1086 medications_lifetime_length>=minimum(encounters_lifetime_payer_coverage,Pai
n_severity___0_10_verbal_numeric_rating__Score____Reported)+1
1087 medications_lifetime_length>=e^(lifetime_care_plans-2)
1088 medications_lifetime_length>=sqrt(active_conditions)*medications_lifetime_d
ispenses
1089 medications_lifetime_length>=Low_Density_Lipoprotein_Cholesterol^log(medica
tions_active)
1090 medications_lifetime_length>=log(encounters_lifetime_payer_coverage)*medica
tions_lifetime_dispenses/log(10)
1091 medications_lifetime_dispenses<=maximum(procedures_lifetime_cost,sqrt(healt
hcare_expenses))
1092 medications_lifetime_dispenses<=active_conditions*sqrt(medications_lifetime
_cost)
1093 medications_lifetime_dispenses<=-(encounters_lifetime_total_cost-
healthcare_expenses)/encounters_count
1094 medications_lifetime_dispenses<=encounters_lifetime_total_cost^(2/log(10))
1095 medications_lifetime_dispenses<=ceil(e^medications_lifetime)
1096 medications_lifetime_dispenses<=1/2*ceil(1/2*medications_lifetime_length)
1097 medications_lifetime_dispenses<=1/2*age*latitude
1098 medications_lifetime_dispenses<=10^e^active_care_plans-1
1099 medications_lifetime_dispenses<=encounters_lifetime_payer_coverage/log(acti
ve_conditions)
1100 medications_lifetime_dispenses>=medications_lifetime_cost/(procedures_lifet
ime_cost-1)
1101 medications_lifetime_dispenses>=medications_lifetime
1102 medications_lifetime_dispenses>=-2*age+2*lifetime_condition_length
1103 medications_lifetime_dispenses>=medications_lifetime_length/log(lifetime_co
ndition_length)
1104 medications_lifetime_dispenses>=DALY*lifetime_care_plans^2
1105
medications_lifetime_dispenses>=e^(encounters_count/active_care_plan_length)
1106 medications_lifetime_dispenses>=-lifetime_care_plan_length^2+medications_li
fetime_length
1107 medications_lifetime_dispenses>=-2*healthcare_coverage+medications_lifetime
_length
1108 medications_lifetime_dispenses>=medications_lifetime_length/log(immunizatio
ns_lifetime_cost)
1109 medications_lifetime_dispenses<=medications_lifetime_length/log(active_care
_plan_length)
1110 medications_lifetime_dispenses<=10^(healthcare_coverage/encounters_lifetime
_payer_coverage)
1111 medications_lifetime_dispenses<=active_conditions^2*medications_lifetime^2
1112 medications_lifetime_dispenses<=minimum(healthcare_coverage,healthcare_expe
nses/mean_Sodium)
1113 medications_lifetime_dispenses<=1/2*latitude*lifetime_care_plan_length
1114 medications_lifetime_dispenses<=(QALY+1)*encounters_count
1115 medications_lifetime_dispenses<=10^(active_conditions^QOLS)
```

```
1116 medications_lifetime_dispenses<=DALY*sqrt(medications_lifetime_cost)
1117 medications_lifetime_dispenses<=healthcare_expenses/active_conditions^2
1118
medications_lifetime_dispenses>=Body_Height*e^encounters_lifetime_perc_covered
1119 medications_lifetime_dispenses>=2*log(10^lifetime_care_plan_length)
1120 medications_lifetime_dispenses>=medications_lifetime_length/log(mean_Systol
ic_Blood_Pressure)
1121 medications_lifetime_dispenses>=Systolic_Blood_Pressure+encounters_count+1
1122 medications_lifetime_dispenses>=(1/2*medications_lifetime_length)^medicatio
ns_lifetime_perc_covered
1123 medications_lifetime_dispenses>=Heart_rate*log(QALY)
1124 medications_lifetime_dispenses>=active_care_plans^sqrt(Respiratory_rate)
1125 medications_lifetime_dispenses>=device_lifetime_length^(log(Body_Weight)/lo
g(10))
1126 medications_lifetime_dispenses>=medications_active^log(Heart_rate)
1127 medications_lifetime_dispenses>=-2*Diastolic_Blood_Pressure+2*medications_l
ifetime
1128 medications_lifetime_dispenses<=healthcare_coverage
1129 medications_lifetime_dispenses<=healthcare_coverage/(DALY+1)
1130 medications_lifetime_dispenses<=medications_lifetime_length/log(QALY)
1131 medications_lifetime_dispenses<=-(encounters_lifetime_payer_coverage-
healthcare_expenses)/latitude
1132 medications_lifetime_dispenses<=(active_care_plans+encounters_count)^2
1133 medications_lifetime_dispenses<=e^sqrt(floor(lifetime_care_plan_length))
1134 medications_lifetime_dispenses<=1/2*QALY^2-1
1135 medications_lifetime_dispenses<=active_care_plan_length*e^active_conditions
1136
medications_lifetime_dispenses<=healthcare_expenses/immunizations_lifetime_cost-
medications_lifetime
1137 medications_lifetime_dispenses>=num_allergies
1138
medications_lifetime_dispenses>=ceil(sqrt(2)*sqrt(procedures_lifetime_cost))
1139 medications_lifetime_dispenses>=1/2*minimum(procedures_lifetime_cost,Platel
et_mean_volume__Entitic_volume__in_Blood_by_Automated_count)
1140 medications_lifetime_dispenses>=floor(medications_lifetime_length/active_co
ndition_length)
1141 medications_lifetime_dispenses>=10^active_care_plans-QALY
1142 medications_lifetime_dispenses>=medications_lifetime_length/log(immunizatio
ns_lifetime_cost)
1143 medications_lifetime_dispenses>=DALY^2-immunizations_lifetime_cost
1144 medications_lifetime_dispenses>=healthcare_expenses^medications_lifetime_pe
rc_covered-active_condition_length
1145 medications_active<=active_conditions-1
1146
medications_active<=maximum(immunizations_lifetime_cost,procedures_lifetime)
1147 medications_active<=2*lifetime_care_plans
1148 medications_active<=QOLS*healthcare_expenses
1149 medications_active<=minimum(healthcare_expenses,ceil(Ketones__Mass_volume__
```

```
in_Urine_by_Test_strip))
1150 medications_active<=maximum(active_care_plans,DALY)
1151 medications_active<=Respiratory_rate-imaging_studies_lifetime
1152 medications_active<=2*Respiratory_rate/active_care_plans
1153 medications_active<=maximum(Glomerular_filtration_rate_1_73_sq_M_predicted,
2*immunizations_lifetime)
1154 medications_active<=lifetime_care_plans^2-Pain_severity___0_10_verbal_numer
ic_rating__Score____Reported
1155 medications_active>=immunizations_lifetime
1156 medications_active>=active_conditions^num_allergies
1157 medications_active>=ceil(e^medications_lifetime_perc_covered)
1158 medications_active>=active_care_plans-procedures_lifetime
1159 medications_active>=minimum(active_care_plans,device_lifetime_length)
1160 medications_active>=active_conditions-medications_lifetime-1
1161 medications_active>=floor(sqrt(active_care_plans))
1162 medications_active>=-2*lifetime_care_plans+lifetime_conditions
1163 medications_active>=-sqrt(medications_lifetime_dispenses)+DALY
1164 medications_active<=maximum(Respiratory_rate,e^device_lifetime_length)
1165 medications_active<=2*lifetime_care_plans
1166 medications_active<=maximum(Platelet_distribution_width__Entitic_volume__in
_Blood_by_Automated_count,ceil(active_care_plans))
1167 medications_active<=medications_lifetime
1168 medications_active<=ceil(DALY)
1169 medications_active<=maximum(active_care_plans,procedures_lifetime_cost)
1170 medications_active<=2/imaging_studies_lifetime
1171 medications_active<=active_conditions+procedures_lifetime
1172 medications_active>=num_allergies
1173 medications_active>=ceil(DALY)*medications_lifetime_perc_covered
1174 medications_active>=ceil(medications_lifetime_perc_covered)
1175 medications_active>=floor(log(DALY))
1176 medications_active>=1/2*DALY*imaging_studies_lifetime
1177 medications_active>=imaging_studies_lifetime*lifetime_care_plans
1178 medications_active>=-active_care_plans+procedures_lifetime
1179 medications_active>=active_care_plans-procedures_lifetime-1
1180 medications_active>=10^medications_lifetime_perc_covered-
procedures_lifetime
1181 medications_active<=active_care_plans+1
1182 medications_active<=medications_lifetime
1183 medications_active<=ceil(10^QOLS)
1184 medications_active<=minimum(healthcare_expenses,Hemoglobin_A1c_Hemoglobin_t
otal_in_Blood)
1185 medications_active<=ceil(age-latitude)
1186 medications_active<=QOLS^longitude
1187 medications_active<=2/num_allergies
1188 medications_active>=num_allergies
1189 medications_active>=ceil(device_lifetime_length)
1190 medications_active>=ceil(4*medications_lifetime_perc_covered)
1191 medications_active>=procedures_lifetime
```

```
1192 medications_active>=minimum(active_care_plans,e^num_allergies)
1193 medications_active>=ceil(medications_lifetime_perc_covered)
1194 medications_active>=floor(medications_lifetime_length/encounters_lifetime_t
otal_cost)
1195 medications_active>=-active_care_plans+lifetime_care_plans
1196 procedures_lifetime<=maximum(Triglycerides,active_care_plans-1)
1197 procedures_lifetime<=maximum(immunizations_lifetime,medications_lifetime)
1198 procedures_lifetime<=procedures_lifetime_cost
1199 procedures_lifetime<=minimum(healthcare_expenses,Prostate_specific_Ag__Mass
_volume__in_Serum,Plasma)
1200 procedures_lifetime<=active_conditions+medications_active
1201 procedures_lifetime<=(1/imaging_studies_lifetime)
1202 procedures_lifetime<=encounters_count-immunizations_lifetime
1203 procedures_lifetime<=minimum(healthcare_expenses,Hemoglobin_A1c_Hemoglobin_
total_in_Blood-1)
1204 procedures_lifetime>=num_allergies
1205 procedures_lifetime>=imaging_studies_lifetime
1206 procedures_lifetime>=floor(1/2*device_lifetime_length)
1207 procedures_lifetime>=immunizations_lifetime^2-1
1208 procedures_lifetime>=floor(QOLS)
1209 procedures_lifetime>=num_allergies^immunizations_lifetime
1210 procedures_lifetime>=num_allergies^medications_lifetime_perc_covered
1211 procedures_lifetime>=Pain_severity___0_10_verbal_numeric_rating__Score____R
eported*imaging_studies_lifetime
1212 procedures_lifetime>=-active_care_plan_length+e^Pain_severity___0_10_verbal
_numeric_rating__Score____Reported
1213 procedures_lifetime<=active_conditions-1
1214 procedures_lifetime<=medications_lifetime
1215 procedures_lifetime<=procedures_lifetime_cost
1216 procedures_lifetime<=maximum(active_care_plans,1/device_lifetime_length)
1217 procedures_lifetime<=2*10^immunizations_lifetime
1218 procedures_lifetime<=10^medications_lifetime_perc_covered*active_care_plans
1219 procedures_lifetime<=mean_Pain_severity___0_10_verbal_numeric_rating__Score
____Reported^medications_lifetime
1220 procedures_lifetime<=(active_care_plans-1)*lifetime_care_plans
1221 procedures_lifetime>=e^num_allergies
1222 procedures_lifetime>=1/2*Heart_rate-immunizations_lifetime_cost
1223 procedures_lifetime>=QOLS
1224 procedures_lifetime>=imaging_studies_lifetime
1225 procedures_lifetime>=Body_Mass_Index-encounters_count
1226 procedures_lifetime>=1/2*10^num_allergies
1227 procedures_lifetime>=medications_lifetime_cost^2/healthcare_expenses^2
1228 procedures_lifetime>=(-medications_active)^Pain_severity___0_10_verbal_nume
ric_rating__Score____Reported
1229
procedures_lifetime<=(e^healthcare_expenses)^medications_lifetime_perc_covered
1230 procedures_lifetime<=Diastolic_Blood_Pressure+lifetime_care_plans
1231 procedures_lifetime<=procedures_lifetime_cost
```

```
1232 procedures_lifetime<=ceil(lifetime_care_plan_length/device_lifetime_length)
1233 procedures_lifetime<=active_care_plans^(10^QOLS)
1234 procedures_lifetime<=e^immunizations_lifetime_cost
1235 procedures_lifetime<=e^DALY
1236 procedures_lifetime<=10^Pain_severity___0_10_verbal_numeric_rating__Score__
__Reported
1237 procedures_lifetime<=maximum(Alkaline_phosphatase__Enzymatic_activity_volum
e__in_Serum,Plasma,active_care_plans+1)
1238 procedures_lifetime>=num_allergies
1239 procedures_lifetime>=num_allergies^healthcare_coverage
1240 procedures_lifetime>=active_conditions-medications_lifetime_cost
1241 procedures_lifetime>=floor(log(DALY)/log(10))
1242
procedures_lifetime>=minimum(procedures_lifetime_cost,2*immunizations_lifetime)
1243 procedures_lifetime>=floor(encounters_count/lifetime_care_plan_length)
1244 procedures_lifetime>=log(procedures_lifetime_cost^imaging_studies_lifetime)
/log(10)
1245 procedures_lifetime>=floor(procedures_lifetime_cost/encounters_lifetime_tot
al_cost)
1246 procedures_lifetime_cost<=immunizations_lifetime_cost^2
1247 procedures_lifetime_cost<=healthcare_coverage^(DALY^2)
1248 procedures_lifetime_cost<=e^(e^(1/2*active_conditions))
1249 procedures_lifetime_cost<=1/2*medications_lifetime*medications_lifetime_dis
penses
1250 procedures_lifetime_cost<=10^procedures_lifetime*lifetime_care_plan_length
1251 procedures_lifetime_cost<=healthcare_expenses*procedures_lifetime
1252 procedures_lifetime_cost<=e^(sqrt(lifetime_condition_length)+1)
1253 procedures_lifetime_cost<=2*medications_lifetime_dispenses+medications_life
time_length
1254 procedures_lifetime_cost<=healthcare_expenses/latitude-
encounters_lifetime_payer_coverage
1255 procedures_lifetime_cost>=num_allergies
1256 procedures_lifetime_cost>=lifetime_condition_length*procedures_lifetime^2
1257 procedures_lifetime_cost>=(immunizations_lifetime-1)*healthcare_coverage
1258 procedures_lifetime_cost>=e^lifetime_care_plans+longitude
1259 procedures_lifetime_cost>=healthcare_coverage*procedures_lifetime/QALY
1260 procedures_lifetime_cost>=healthcare_coverage/encounters_count-
encounters_lifetime_total_cost
1261 procedures_lifetime_cost>=(-DALY)^medications_active
1262
procedures_lifetime_cost>=sqrt(medications_lifetime_cost)*procedures_lifetime
1263 procedures_lifetime_cost>=(encounters_count-medications_lifetime)^2
1264 procedures_lifetime_cost>=2*longitude^immunizations_lifetime
1265 procedures_lifetime_cost<=medications_lifetime_cost/(medications_active-1)
1266 procedures_lifetime_cost<=log(10^(1/2*medications_lifetime_dispenses))
1267 procedures_lifetime_cost<=maximum(medications_lifetime_dispenses,e^medicati
ons_lifetime)
1268 procedures_lifetime_cost<=healthcare_expenses*immunizations_lifetime
```

```
1269 procedures_lifetime_cost<=healthcare_expenses/(active_conditions+1)
1270 procedures_lifetime_cost<=e^(active_condition_length/active_care_plans)
1271 procedures_lifetime_cost<=(2*healthcare_coverage)^procedures_lifetime
1272 procedures_lifetime_cost<=1/2*healthcare_coverage/num_allergies
1273 procedures_lifetime_cost<=10^(active_care_plan_length^QOLS)
1274 procedures_lifetime_cost<=healthcare_expenses^encounters_lifetime_perc_cove
red*medications_lifetime
1275 procedures_lifetime_cost>=imaging_studies_lifetime
1276 procedures_lifetime_cost>=healthcare_expenses/QALY-
medications_lifetime_cost
1277 procedures_lifetime_cost>=healthcare_coverage-1/2*medications_lifetime_cost
1278 procedures_lifetime_cost>=healthcare_expenses*log(immunizations_lifetime)
1279
procedures_lifetime_cost>=sqrt(medications_lifetime_cost)*procedures_lifetime
1280 procedures_lifetime_cost<=1/2*healthcare_expenses/DALY
1281 procedures_lifetime_cost<=healthcare_expenses*procedures_lifetime
1282 procedures_lifetime_cost<=10^(active_conditions-1)-1
1283
procedures_lifetime_cost<=healthcare_expenses^active_care_plans/encounters_count
1284
procedures_lifetime_cost<=2*healthcare_coverage+2*medications_lifetime_length
1285 procedures_lifetime_cost<=encounters_lifetime_payer_coverage*healthcare_cov
erage/medications_lifetime_dispenses
1286 procedures_lifetime_cost<=Body_Weight*e^active_conditions
1287 procedures_lifetime_cost<=2*10^(10^QOLS)
1288 procedures_lifetime_cost<=lifetime_condition_length^log(encounters_count)
1289 procedures_lifetime_cost>=num_allergies
1290 procedures_lifetime_cost>=log(10^procedures_lifetime)^2
1291 procedures_lifetime_cost>=healthcare_expenses*procedures_lifetime/medicatio
ns_lifetime_length
1292 procedures_lifetime_cost>=healthcare_expenses/encounters_count-
healthcare_coverage
1293 procedures_lifetime_cost>=healthcare_coverage*log(device_lifetime_length)
1294 procedures_lifetime_cost>=healthcare_expenses^medications_lifetime_perc_cov
ered*imaging_studies_lifetime
1295 procedures_lifetime_cost>=healthcare_coverage/active_condition_length-
medications_lifetime_dispenses
1296 procedures_lifetime_cost>=log(procedures_lifetime)*medications_lifetime_dis
penses
1297 QOLS<=mean_QOLS
1298 QOLS>=mean_QOLS
1299 QOLS<=mean_QOLS
1300 QOLS<=medications_active
1301 QOLS>=device_lifetime_length
1302 QOLS>=mean_QOLS
1303 QOLS<=mean_QOLS
1304 QOLS>=num_allergies
1305 QOLS>=mean_QOLS
```

```
1306 QALY<=mean_QALY
1307 QALY>=mean_QALY
1308 QALY<=mean_QALY
1309 QALY>=mean_QALY
1310 QALY<=mean_QALY
1311 QALY>=mean_QALY
1312 DALY<=mean_DALY
1313 DALY<=active_care_plan_length
1314 DALY>=device_lifetime_length
1315 DALY>=mean_DALY
1316 DALY<=mean_DALY
1317 DALY>=mean_DALY
1318 DALY>=num_allergies
1319 DALY>=mean_DALY
1320 Heart_rate<=mean_Heart_rate^immunizations_lifetime
1321 Heart_rate<=floor(age)+medications_lifetime
1322 Heart_rate<=1/imaging_studies_lifetime+Diastolic_Blood_Pressure
1323 Heart_rate<=maximum(lifetime_condition_length,Diastolic_Blood_Pressure)
1324 Heart_rate<=mean_Heart_rate/imaging_studies_lifetime
1325 Heart_rate<=medications_lifetime^Pain_severity___0_10_verbal_numeric_rating
__Score____Reported
1326 Heart_rate<=-Respiratory_rate+Systolic_Blood_Pressure
1327 Diastolic_Blood_Pressure<=ceil(mean_Diastolic_Blood_Pressure)
1328 Diastolic_Blood_Pressure<=-Body_Mass_Index+mean_Systolic_Blood_Pressure-1
1329 Diastolic_Blood_Pressure<=maximum(age,10^Pain_severity___0_10_verbal_numeri
c_rating__Score____Reported)
1330 Diastolic_Blood_Pressure>=mean_Diastolic_Blood_Pressure
1331 Diastolic_Blood_Pressure>=DALY+QALY
1332 Diastolic_Blood_Pressure>=-active_conditions+procedures_lifetime
1333
Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=e^num_allergies
1334 Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=floor(sqrt(l
ifetime_care_plans))
1335 Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=1/4*mean_Pai
n_severity___0_10_verbal_numeric_rating__Score____Reported^2
1336 Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=QOLS
1337 Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=active_care_
plans-medications_active
1338 Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=mean_Pain_se
verity___0_10_verbal_numeric_rating__Score____Reported-procedures_lifetime
1339 Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=-immunizatio
ns_lifetime_cost+medications_active
1340 Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=ceil(mean_Pa
in_severity___0_10_verbal_numeric_rating__Score____Reported)/active_care_plans
1341 mean_Body_Mass_Index<=Body_Mass_Index
1342 mean_Body_Mass_Index<=Body_Mass_Index
1343 mean_Body_Weight<=Body_Weight
1344 mean_DALY<=DALY
```

```
1345 mean_DALY>=DALY
1346 mean_DALY<=DALY
1347 mean_DALY>=DALY
1348 mean_DALY<=DALY
1349 mean_DALY>=medications_active
1350 mean_DALY>=DALY
1351 mean_Diastolic_Blood_Pressure<=Diastolic_Blood_Pressure+2*active_care_plans
1352 mean_Diastolic_Blood_Pressure<=age/imaging_studies_lifetime
1353
mean_Diastolic_Blood_Pressure<=maximum(Diastolic_Blood_Pressure,1/num_allergies)
1354 mean_Diastolic_Blood_Pressure<=maximum(medications_lifetime,Diastolic_Blood
_Pressure)
1355 mean_Diastolic_Blood_Pressure<=-2*lifetime_conditions+mean_Systolic_Blood_P
ressure
1356
mean_Diastolic_Blood_Pressure<=sqrt(healthcare_coverage/procedures_lifetime)
1357 mean_Diastolic_Blood_Pressure<=-1/2*latitude+lifetime_condition_length
1358
mean_Diastolic_Blood_Pressure<=Diastolic_Blood_Pressure/imaging_studies_lifetime
1359 mean_Diastolic_Blood_Pressure<=maximum(Diastolic_Blood_Pressure,mean_Body_W
eight+1)
1360 mean_Diastolic_Blood_Pressure>=Diastolic_Blood_Pressure-active_conditions
1361
mean_Diastolic_Blood_Pressure>=-e^active_care_plans+lifetime_care_plan_length
1362 mean_Diastolic_Blood_Pressure>=minimum(Diastolic_Blood_Pressure,High_Densit
y_Lipoprotein_Cholesterol)
1363 mean_Diastolic_Blood_Pressure>=2*DALY-2*medications_lifetime_perc_covered
1364 mean_Diastolic_Blood_Pressure>=Body_Weight-Respiratory_rate-1
1365 mean_Diastolic_Blood_Pressure>=Diastolic_Blood_Pressure-
medications_lifetime
1366 mean_Diastolic_Blood_Pressure>=Heart_rate^2/Systolic_Blood_Pressure
1367 mean_Diastolic_Blood_Pressure>=Diastolic_Blood_Pressure-
active_care_plan_length
1368 mean_Diastolic_Blood_Pressure>=1/2*age-1/2*longitude
1369 mean_Heart_rate<=minimum(healthcare_expenses,mean_Alkaline_phosphatase__Enz
ymatic_activity_volume__in_Serum,Plasma-1)
1370 mean_Heart_rate<=maximum(encounters_count,Heart_rate)
1371
mean_Heart_rate<=maximum(immunizations_lifetime_cost,1/2*medications_lifetime)
1372 mean_Heart_rate<=maximum(healthcare_coverage,Heart_rate)
1373 mean_Heart_rate<=Heart_rate/num_allergies
1374 mean_Heart_rate<=sqrt(mean_Systolic_Blood_Pressure)+Body_Weight
1375 mean_Heart_rate<=e^(lifetime_care_plan_length^(1/log(10)))
1376 mean_Heart_rate<=maximum(lifetime_condition_length,Heart_rate)
1377 mean_Heart_rate<=-sqrt(medications_lifetime)+mean_Systolic_Blood_Pressure
1378 mean_Heart_rate<=maximum(Heart_rate,1/2*encounters_count)
1379 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=Respira
tory_rate-mean_Respiratory_rate
```

```
1380 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=floor(Q
ALY)-mean_Heart_rate
1381 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=1/2*Pai
n_severity___0_10_verbal_numeric_rating__Score____Reported
1382 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=-QOLS+i
mmunizations_lifetime
1383 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=active_
care_plans-medications_active
1384 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=procedu
res_lifetime/sqrt(medications_lifetime)
1385 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=Pain_se
verity___0_10_verbal_numeric_rating__Score____Reported-procedures_lifetime
1386 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=Pain_se
verity___0_10_verbal_numeric_rating__Score____Reported/active_care_plans
1387 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported>=minimum
(Pain_severity___0_10_verbal_numeric_rating__Score____Reported,log(Hemoglobin_A1
c_Hemoglobin_total_in_Blood)/log(10))
1388 mean_QALY<=QALY
1389 mean_QALY>=QALY
1390 mean_QALY<=QALY
1391 mean_QALY>=QALY
1392 mean_QALY<=QALY
1393 mean_QALY>=QALY
1394 mean_QOLS<=QOLS
1395 mean_QOLS<=medications_lifetime
1396 mean_QOLS>=QOLS
1397 mean_QOLS<=QOLS
1398 mean_QOLS>=QOLS
1399 mean_QOLS>=QOLS
1400 mean_Respiratory_rate>=Respiratory_rate^num_allergies
1401 mean_Respiratory_rate>=Respiratory_rate-active_care_plans
1402
mean_Respiratory_rate>=Respiratory_rate-1/2*encounters_lifetime_perc_covered
1403 mean_Respiratory_rate>=Respiratory_rate-medications_lifetime_perc_covered
1404 mean_Respiratory_rate>=Respiratory_rate-procedures_lifetime
1405 mean_Respiratory_rate>=Respiratory_rate^QOLS
1406 mean_Respiratory_rate>=Heart_rate-mean_Diastolic_Blood_Pressure
1407 mean_Respiratory_rate>=minimum(Respiratory_rate,Hemoglobin_A1c_Hemoglobin_t
otal_in_Blood)
1408 mean_Respiratory_rate>=1/2*active_conditions*imaging_studies_lifetime
Number of dead, alive properties
1408 1239

/Users/jpbrooks/opt/anaconda3/envs/sage/lib/python3.7/site-
packages/sage/repl/ipython_kernel/__main__.py:85: RuntimeWarning: overflow
encountered in double_scalars
/Users/jpbrooks/opt/anaconda3/envs/sage/lib/python3.7/site-
packages/sage/misc/functional.py:1558: ComplexWarning: Casting complex values to
```

```
real discards the imaginary part
  x = float(x)
/Users/jpbrooks/opt/anaconda3/envs/sage/lib/python3.7/site-
packages/sage/repl/ipython_kernel/__main__.py:187: RuntimeWarning: overflow
encountered in double_scalars

Property Conjectures
6
(covid_death_status)->(healthcare_coverage>=healthcare_expenses*medications_life
time_perc_covered/active_condition_length)
healthcare_coverage_geq_healthcare_expenses_times_medications_lifetime_perc_cove
red_divided_by_active_condition_length
0.9719121683440073
(covid_death_status)->(healthcare_expenses>=medications_lifetime_length^2/medica
tions_lifetime^2)
healthcare_expenses_geq_medications_lifetime_length_squared_divided_by_medicatio
ns_lifetime_squared
0.9774005866230706
(covid_death_status)->(healthcare_expenses<=1/2*encounters_lifetime_total_cost*h
ealthcare_coverage)
healthcare_expenses_leq_inverse_of_2_times_encounters_lifetime_total_cost_times_
healthcare_coverage
0.986516000379831
(covid_death_status)->(healthcare_coverage<=10^active_conditions/active_care_pla
ns)
healthcare_coverage_leq_10_to_the_power_active_conditions_divided_by_active_care
_plans
0.9712770216172938
(covid_death_status)->(active_condition_length>=1/2*encounters_lifetime_perc_cov
ered*lifetime_care_plan_length)
active_condition_length_geq_inverse_of_2_times_encounters_lifetime_perc_covered_
times_lifetime_care_plan_length
0.948779260005034
(covid_death_status)->(latitude>=10^encounters_lifetime_perc_covered*active_cond
itions)
latitude_geq_10_to_the_power_encounters_lifetime_perc_covered_times_active_condi
tions
0.8520698051948052
6
(pneumococcal_polysacchari)->(covid_death_status)
pneumococcal_polysacchari
0.08464328899637243
(Alcoholism)->(covid_death_status)
Alcoholism
0.09344314222363002
(Hyperlipidemia)->(covid_death_status)
Hyperlipidemia
0.1208931873133267
```

```
(Osteoporosis__disorder_)->(covid_death_status)
Osteoporosis__disorder_
0.16374889478337754
(healthcare_coverage<=minimum(medications_lifetime_cost,healthcare_expenses/Body
_temperature))->(covid_death_status)
healthcare_coverage_leq_minimumopen_bracket_medications_lifetime_cost_or_healthc
are_expenses_divided_by_Body_temperature_close_bracket
0.06788637457871931
(~(healthcare_expenses<=1/16*longitude^4))->(covid_death_status)
~healthcare_expenses_leq_inverse_of_16_times_longitude_to_the_power_4
0.16090897149612504
```

7.3 ICU Status among Those with Covid

[111]:
```
p_examples_list = list(p_examples)

# only pick people with covid
covid_not_icu = [patient for patient in p_examples_list if (patient.
 ↪icu_status() and patient.covid_status())]
covid_icu= [patient for patient in p_examples_list if (not patient.icu_status()␣
 ↪and patient.covid_status())]

print(len(covid_not_icu), len(covid_icu))
```

```
4981 68716
```

[112]:
```
covid_invariants = invariants


set_random_seed(12345)
covid_icu_properties = []
covid_not_icu_properties = []
use_operators =  { '-1', '+1', '*2', '/2', '^2', '-()', '1/', 'sqrt', 'ln',␣
 ↪'log10', 'exp', '10^', 'ceil', 'floor', 'abs', '+', '*', 'max', 'min', '-',␣
 ↪'/', '^'}


# not dead patients
print("ICU")
for inv in covid_invariants:
    #print(inv.__name__)
    inv_of_interest = covid_invariants.index(inv)
    for i in range(3):
        # upper bounds
        conjs = conjecture(sample(covid_icu, 10),
                           covid_invariants,
```

```
                        inv_of_interest,
                        operators=use_operators,
                        upperBound=True,
                        debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_icu_properties += conjs
        # lower bounds
        conjs = conjecture(sample(covid_icu, 10),
                        covid_invariants,
                        inv_of_interest,
                        operators=use_operators,
                        upperBound=False,
                        debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_icu_properties += conjs
count = 0
for conj in covid_icu_properties:
    count +=1
    print(count, convert_name_back(conj.__name__))

#  dead patients
print("Not ICU")
for inv in covid_invariants:
    #print(inv.__name__)
    inv_of_interest = covid_invariants.index(inv)
    for i in range(3):
        # upper bounds
        conjs = conjecture(sample(covid_not_icu, 10),
                        covid_invariants,
                        inv_of_interest,
                        operators=use_operators,
                        upperBound=True,
                        debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_not_icu_properties += conjs
        # lower bounds
        conjs = conjecture(sample(covid_not_icu, 10),
                        covid_invariants,
                        inv_of_interest,
                        operators=use_operators,
                        upperBound=False,
```

```
                            debug=False)
        convert_conjecture_names(conjs)
        #for c in conjs:
        #    print(c)
        covid_not_icu_properties += conjs
count = 0
for conj in covid_not_icu_properties:
    count +=1
    print(count, convert_name_back(conj.__name__))
print("Number of not ICU, ICU properties")
print(len(covid_not_icu_properties), len(covid_icu_properties))

load("conjecturing.py")

set_random_seed(12345)
all_covid_properties = properties + covid_icu_properties +␣
 ↪covid_not_icu_properties
all_covid_properties.append(Patient.icu_status)

target_prop = len(all_covid_properties)-1
for i in range(100):
    not_icu_conjs =␣
 ↪propertyBasedConjecture(objects=sample(covid_icu,10)+sample(covid_not_icu,10),
                                    properties = all_covid_properties,
                                    mainProperty=target_prop,
                                    sufficient=False)

    icu_conjs =␣
 ↪propertyBasedConjecture(objects=sample(covid_icu,10)+sample(covid_not_icu,10),
                                    properties = all_covid_properties,
                                    mainProperty=target_prop,
                                    sufficient=True)
count = 0
for p in icu_conjs:
    #print(count, ".", convert_name_back(p.__name__))
    count += 1
for p in not_icu_conjs:
    #print(count, ".", convert_name_back(p.__name__))
    count += 1


load("prop_conjecturing.py")
print("Property Conjectures")
print(len(not_icu_conjs))
for p in not_icu_conjs:
    my_conclusion = get_conclusion(p)
    num_false = 0
```

```
    num_not_icu = 0
    for patient in p_examples_list:
        try:
            if my_conclusion(patient) == False:
                num_false += 1
                if patient.icu_status() == False:
                    num_not_icu += 1
        except:
            continue
    print(convert_name_back(p.__name__))
    print(num_not_icu/float(num_false))
print(len(icu_conjs))
for p in icu_conjs:
    my_premise = get_premise(p)
    num_true = 0
    num_icu = 0
    for patient in p_examples_list:
        try: # deal with missing values
            if my_premise(patient) == True:
                num_true += 1
                if patient.icu_status() == True:
                    num_icu += 1
        except:
            continue
    print(convert_name_back(p.__name__))
    print(num_icu/float(num_true))
```

```
ICU
1 healthcare_expenses<=1/2*(healthcare_coverage-1)^2
2 healthcare_expenses<=1/16*longitude^4
3 healthcare_expenses<=active_condition_length*healthcare_coverage/num_allergies
4 healthcare_expenses<=healthcare_coverage*lifetime_care_plan_length/medications
_lifetime_perc_covered
5 healthcare_expenses<=2*(encounters_lifetime_total_cost-1)^2
6 healthcare_expenses<=10^active_care_plan_length/DALY
7 healthcare_expenses<=4*e^lifetime_condition_length
8 healthcare_expenses<=10^(latitude/medications_active)
9 healthcare_expenses<=10^abs(log(procedures_lifetime_cost))
10 healthcare_expenses>=10^(latitude/lifetime_condition_length)
11 healthcare_expenses>=2*10^(1/encounters_lifetime_perc_covered)
12 healthcare_expenses>=log(encounters_count)*medications_lifetime_cost/log(10)
13 healthcare_expenses>=(2*encounters_lifetime_perc_covered)^latitude
14 healthcare_expenses>=(medications_lifetime_cost+1)/encounters_lifetime_perc_c
overed
15 healthcare_expenses>=(age+1)*procedures_lifetime_cost
16 healthcare_expenses>=10^(active_conditions/medications_active)
17 healthcare_expenses>=10^active_care_plans-medications_lifetime_cost
```

```
18 healthcare_expenses>=2*age*encounters_lifetime_total_cost
19 healthcare_expenses>=10^(-active_care_plans+active_conditions)
20
healthcare_expenses<=(encounters_lifetime_payer_coverage-1)*healthcare_coverage
21 healthcare_expenses<=10^sqrt(latitude-1)
22 healthcare_expenses<=10^(2*lifetime_conditions+2)
23 healthcare_expenses<=(QALY+1)^4
24
healthcare_expenses<=10^(medications_lifetime_dispenses/immunizations_lifetime)
25
healthcare_expenses<=(encounters_lifetime_payer_coverage^2)^lifetime_care_plans
26
healthcare_expenses<=e^(medications_lifetime/medications_lifetime_perc_covered)
27 healthcare_expenses<=e^(-DALY+QALY)
28 healthcare_expenses>=10^(2*e^QOLS)
29 healthcare_expenses>=2*QALY*healthcare_coverage
30 healthcare_expenses>=(active_care_plan_length-
medications_lifetime_dispenses)^2
31 healthcare_expenses>=2*active_condition_length^lifetime_care_plans
32 healthcare_expenses>=(1/2*longitude)^lifetime_conditions
33 healthcare_expenses>=active_conditions^2*encounters_count^2
34 healthcare_expenses>=1/2*healthcare_coverage*immunizations_lifetime_cost
35 healthcare_expenses>=2*QALY*encounters_lifetime_total_cost
36 healthcare_expenses>=(QALY-medications_lifetime_dispenses)^2
37 healthcare_expenses>=e^(healthcare_coverage/encounters_lifetime_total_cost)
38 healthcare_expenses<=10^e^(e^QOLS)
39 healthcare_expenses<=healthcare_coverage*latitude/medications_lifetime_perc_c
overed
40 healthcare_expenses<=10^lifetime_condition_length/latitude
41 healthcare_expenses<=e^QALY/healthcare_coverage
42 healthcare_expenses<=healthcare_coverage^2/medications_lifetime
43 healthcare_expenses<=encounters_lifetime_total_cost^(1/medications_lifetime_p
erc_covered)
44 healthcare_expenses<=10^medications_lifetime/encounters_lifetime_perc_covered
45 healthcare_expenses>=e^(-age+latitude)
46
healthcare_expenses>=healthcare_coverage^(medications_lifetime_perc_covered+1)
47
healthcare_expenses>=encounters_lifetime_payer_coverage^(log(latitude)/log(10))
48 healthcare_expenses>=10^log(immunizations_lifetime_cost)
49 healthcare_expenses>=QALY^2*immunizations_lifetime_cost
50 healthcare_expenses>=active_condition_length^2+procedures_lifetime_cost
51 healthcare_expenses>=10^(medications_lifetime_length/encounters_lifetime_paye
r_coverage)
52 healthcare_expenses>=encounters_lifetime_perc_covered^2*medications_lifetime_
dispenses^2
53 healthcare_expenses>=procedures_lifetime^e^immunizations_lifetime
54 healthcare_expenses>=10^(active_conditions-procedures_lifetime)
```

```
55 healthcare_coverage<=healthcare_expenses/medications_lifetime_dispenses+medic
ations_lifetime_cost
56 healthcare_coverage<=(encounters_lifetime_total_cost-1)*age
57 healthcare_coverage<=encounters_lifetime_total_cost^(encounters_lifetime_perc
_covered+1)
58 healthcare_coverage<=10^(encounters_lifetime_total_cost/age)
59 healthcare_coverage<=healthcare_expenses/active_conditions+encounters_lifetim
e_total_cost
60 healthcare_coverage<=e^active_conditions/medications_lifetime_perc_covered
61 healthcare_coverage<=healthcare_expenses^encounters_lifetime_perc_covered*enc
ounters_lifetime_payer_coverage
62 healthcare_coverage<=10^encounters_count/medications_lifetime
63 healthcare_coverage<=(log(medications_lifetime_length)/log(10))^QALY
64 healthcare_coverage<=healthcare_expenses/(active_conditions*device_lifetime_l
ength)
65 healthcare_coverage>=active_conditions
66
healthcare_coverage>=encounters_lifetime_total_cost*sqrt(immunizations_lifetime)
67 healthcare_coverage>=lifetime_condition_length^(QOLS+1)
68 healthcare_coverage>=sqrt(healthcare_expenses)-encounters_lifetime_total_cost
69 healthcare_coverage>=minimum(immunizations_lifetime_cost,Diastolic_Blood_Pres
sure)^2
70 healthcare_coverage>=sqrt(healthcare_expenses)-medications_lifetime_cost
71 healthcare_coverage>=encounters_lifetime_total_cost-
medications_lifetime_dispenses+1
72 healthcare_coverage>=log(10)*longitude/log(lifetime_care_plan_length)
73 healthcare_coverage>=2*medications_lifetime_perc_covered*procedures_lifetime_
cost
74 healthcare_coverage>=10^lifetime_care_plans*lifetime_conditions
75 healthcare_coverage<=10^log(-longitude)
76 healthcare_coverage<=2*medications_lifetime_cost-procedures_lifetime_cost
77 healthcare_coverage<=sqrt(healthcare_expenses)*latitude
78 healthcare_coverage<=(active_care_plan_length-1)^encounters_count
79 healthcare_coverage<=encounters_lifetime_payer_coverage^e^encounters_lifetime
_perc_covered
80 healthcare_coverage<=(immunizations_lifetime_cost-
medications_lifetime_dispenses)^2
81 healthcare_coverage<=e^(QALY/lifetime_care_plans)
82
healthcare_coverage<=encounters_lifetime_perc_covered*healthcare_expenses/DALY
83 healthcare_coverage<=(lifetime_condition_length-procedures_lifetime_cost)^2
84 healthcare_coverage>=2*minimum(medications_lifetime_length,Creatinine)
85
healthcare_coverage>=-sqrt(healthcare_expenses)+medications_lifetime_dispenses
86 healthcare_coverage>=e^(sqrt(QALY)+1)
87 healthcare_coverage>=-QALY^2+procedures_lifetime_cost
88 healthcare_coverage>=1/2*e^(1/DALY)
89 healthcare_coverage>=e^active_conditions/QALY
```

```
90 healthcare_coverage>=lifetime_condition_length^2/encounters_count
91 healthcare_coverage>=longitude^2-medications_lifetime_cost
92 healthcare_coverage>=2*encounters_lifetime_payer_coverage+2*immunizations_lif
etime_cost
93 healthcare_coverage>=10^(2*encounters_lifetime_perc_covered+2)
94 healthcare_coverage<=active_conditions*longitude^2
95 healthcare_coverage<=e^(encounters_lifetime_perc_covered+medications_lifetime
_dispenses)
96 healthcare_coverage<=(latitude-longitude)^2
97 healthcare_coverage<=healthcare_expenses/active_care_plan_length+lifetime_con
dition_length
98 healthcare_coverage<=minimum(healthcare_expenses,Low_Density_Lipoprotein_Chol
esterol^2)
99 healthcare_coverage<=e^(QALY/active_care_plans)
100 healthcare_coverage<=(longitude^2)^active_conditions
101 healthcare_coverage<=1/4*e^(2*encounters_count)
102 healthcare_coverage<=10^e^(1/encounters_lifetime_perc_covered)
103 healthcare_coverage<=medications_lifetime_cost^sqrt(QOLS)
104 healthcare_coverage>=1/2*10^log(latitude)
105 healthcare_coverage>=e^(2*10^medications_lifetime_perc_covered)
106 healthcare_coverage>=(immunizations_lifetime_cost^2)^encounters_lifetime_per
c_covered
107 healthcare_coverage>=lifetime_condition_length^e^encounters_lifetime_perc_co
vered
108 healthcare_coverage>=e^(sqrt(encounters_count+1))
109
healthcare_coverage>=encounters_lifetime_total_cost*sqrt(procedures_lifetime)
110 healthcare_coverage>=(latitude+1)*lifetime_condition_length
111 healthcare_coverage>=encounters_lifetime_total_cost-1/2*medications_lifetime
_dispenses
112 healthcare_coverage>=medications_lifetime_cost/(active_care_plan_length-1)
113 healthcare_coverage>=age^log(active_conditions)
114 latitude<=encounters_count^e^active_care_plan_length
115 latitude<=log(floor(procedures_lifetime_cost))^2
116 latitude<=minimum(healthcare_expenses,Erythrocyte_distribution_width__Entiti
c_volume__by_Automated_count)
117 latitude<=maximum(QALY,1/device_lifetime_length)
118 latitude<=age/QOLS
119 latitude<=QALY+e^encounters_lifetime_payer_coverage
120 latitude<=QALY+medications_lifetime_cost-1
121 latitude<=age/sqrt(QOLS)
122 latitude<=minimum(healthcare_expenses,2*Carbon_Dioxide)
123 latitude<=healthcare_expenses^QOLS+encounters_lifetime_perc_covered
124 latitude>=e^(e^QOLS+1)
125 latitude>=-age+2*medications_lifetime
126 latitude>=minimum(QALY,active_conditions^2)
127 latitude>=e^(e^immunizations_lifetime+1)
128 latitude>=medications_lifetime_length/10^active_conditions
```

```
129 latitude>=-active_condition_length+ceil(age)
130 latitude>=immunizations_lifetime_cost/log(QALY)
131 latitude>=age*e^(-encounters_lifetime_perc_covered)
132 latitude>=medications_lifetime_dispenses^encounters_lifetime_perc_covered+1
133 latitude<=age+log(healthcare_expenses)
134 latitude<=10^(sqrt(QOLS)+1)
135 latitude<=encounters_lifetime_total_cost/medications_lifetime-1
136 latitude<=log(age)*medications_lifetime_length/log(10)
137 latitude<=log(medications_lifetime_cost)/medications_lifetime_perc_covered
138 latitude<=e^active_care_plans/medications_lifetime_perc_covered
139 latitude<=active_condition_length^2/lifetime_conditions
140 latitude<=(active_care_plan_length-medications_active)^2
141 latitude<=1/medications_lifetime_perc_covered+age
142 latitude<=10^e^(1/2*active_care_plans)
143 latitude>=1/2*active_care_plans+1/2*age
144 latitude>=sqrt(medications_lifetime_length/lifetime_conditions)
145 latitude>=(longitude^2)^(1/log(10))
146 latitude>=2*sqrt(encounters_count)-2
147 latitude>=2*e^immunizations_lifetime+1
148 latitude>=lifetime_condition_length/(medications_lifetime+1)
149 latitude>=immunizations_lifetime_cost^encounters_lifetime_perc_covered+1
150 latitude>=lifetime_care_plan_length^sqrt(encounters_lifetime_perc_covered)
151 latitude>=encounters_lifetime_perc_covered*e^medications_active
152
latitude>=minimum(procedures_lifetime_cost,1/2*mean_Diastolic_Blood_Pressure)
153 latitude<=encounters_count^(log(encounters_lifetime_total_cost)/log(10))
154 latitude<=sqrt(QALY)/medications_lifetime_perc_covered
155 latitude<=sqrt(healthcare_expenses/encounters_count)
156 latitude<=(healthcare_expenses/active_care_plans)^QOLS
157 latitude<=(QALY-1)/encounters_lifetime_perc_covered
158 latitude<=1/2*QALY-1/2*longitude
159 latitude<=2*QALY+active_condition_length
160 latitude<=healthcare_expenses/(encounters_lifetime_perc_covered*procedures_l
ifetime_cost)
161 latitude<=10^e^(1/medications_active)
162 latitude>=1/2*age+1/2*medications_lifetime_perc_covered
163 latitude>=sqrt(QALY*device_lifetime_length)
164 latitude>=e^(e^immunizations_lifetime+1)
165 latitude>=immunizations_lifetime_cost/log(age)
166 latitude>=(longitude^2)^(1/log(10))
167 latitude>=sqrt(DALY*age)
168 latitude>=-10^medications_active+active_care_plan_length
169 latitude>=active_conditions^(QOLS+1)
170 latitude>=1/2*QOLS+1/2*age
171 longitude<=-10^(encounters_lifetime_perc_covered+1)
172 longitude<=QALY-2*active_care_plan_length
173 longitude<=-ceil(age)+procedures_lifetime
174 longitude<=-2*encounters_count+immunizations_lifetime_cost
```

```
175 longitude<=latitude*log(encounters_lifetime_perc_covered)
176 longitude<=10^encounters_lifetime_perc_covered-age
177 longitude<=floor(-1/2*immunizations_lifetime_cost)
178 longitude<=-2*QALY+2*active_condition_length
179 longitude<=1/encounters_lifetime_perc_covered-encounters_count
180 longitude<=e^DALY-lifetime_condition_length
181 longitude>=active_conditions-2*latitude
182 longitude>=-sqrt(healthcare_expenses)+active_conditions
183
longitude>=encounters_lifetime_total_cost*log(encounters_lifetime_perc_covered)
184 longitude>=2*active_care_plans-2*latitude
185 longitude>=-2*latitude+2*lifetime_care_plans
186 longitude>=-minimum(healthcare_expenses,Low_Density_Lipoprotein_Cholesterol)
187 longitude>=-log(medications_lifetime_cost)^2
188 longitude>=-minimum(healthcare_expenses,mean_Diastolic_Blood_Pressure)
189 longitude<=-2*active_care_plan_length+encounters_lifetime_payer_coverage
190 longitude<=log(lifetime_condition_length)/log(10)-QALY
191 longitude<=floor(lifetime_condition_length)-immunizations_lifetime_cost
192 longitude<=-1/2*ceil(immunizations_lifetime_cost)
193 longitude<=-sqrt(healthcare_coverage)+QALY
194 longitude<=2*active_condition_length-2*age
195 longitude<=lifetime_condition_length/(DALY-1)
196 longitude<=(active_care_plans-1)*encounters_lifetime_payer_coverage
197 longitude<=-2*latitude+2*lifetime_condition_length
198 longitude<=medications_lifetime/log(medications_lifetime_perc_covered)
199 longitude>=2*active_care_plans-2*latitude
200 longitude>=-active_care_plan_length^2+DALY
201 longitude>=-lifetime_condition_length^2+active_care_plans
202 longitude>=-1/2*e^encounters_count
203 longitude>=-10^active_conditions+lifetime_condition_length
204 longitude<=age-2*latitude
205 longitude<=QOLS-active_care_plan_length-1
206 longitude<=-age+log(encounters_lifetime_payer_coverage)
207 longitude<=-sqrt(encounters_lifetime_total_cost)+active_condition_length
208 longitude<=-device_lifetime_length*lifetime_conditions
209 longitude<=-2*active_care_plan_length+procedures_lifetime_cost
210 longitude<=-QALY-active_care_plans
211 longitude<=2*lifetime_care_plans-2*procedures_lifetime
212 longitude<=active_care_plan_length/(DALY-1)
213 longitude<=-active_conditions^2+DALY
214 longitude>=active_care_plans-2*latitude
215 longitude>=-sqrt(1/2)*sqrt(healthcare_expenses)
216 longitude>=-sqrt(healthcare_expenses)+lifetime_condition_length
217 longitude>=2*age-encounters_lifetime_total_cost
218 longitude>=-minimum(healthcare_expenses,mean_Heart_rate)
219 longitude>=-e^active_care_plan_length+medications_lifetime_dispenses
220 longitude>=-2*latitude+procedures_lifetime
221 longitude>=-minimum(healthcare_expenses,Glucose)
```

```
222 longitude>=-minimum(healthcare_expenses,mean_Glucose)
223 age<=encounters_count-longitude+1
224 age<=1/2*latitude+lifetime_condition_length
225 age<=QALY-1/2*longitude
226 age<=ceil(active_care_plan_length)/num_allergies
227 age<=healthcare_expenses/procedures_lifetime_cost+lifetime_conditions
228 age<=healthcare_expenses/medications_lifetime_cost-longitude
229 age<=healthcare_expenses/(device_lifetime_length*encounters_lifetime_payer_c
overage)
230 age<=1/2*healthcare_expenses^(1/log(10))
231 age<=1/2*10^(2*active_care_plans)
232 age<=log(10^(encounters_count^2))
233 age>=sqrt(active_conditions)+QALY
234 age>=log(DALY)/log(10)+active_care_plan_length
235 age>=DALY+QALY+1
236 age>=10^medications_lifetime_perc_covered+QALY
237 age>=-lifetime_care_plan_length+1/2*medications_lifetime
238 age>=1/2*10^immunizations_lifetime+1/2
239 age>=log(medications_lifetime_dispenses)/log(10)+QALY
240 age>=DALY+latitude-1
241 age>=mean_Calcium^sqrt(device_lifetime_length)
242 age>=2*active_care_plan_length^QOLS
243 age<=(log(encounters_lifetime_total_cost)+1)^2
244 age<=2*latitude-2
245 age<=active_condition_length+latitude-1
246 age<=lifetime_condition_length-log(medications_lifetime_length)
247 age<=1/2*healthcare_coverage/lifetime_care_plan_length
248 age<=maximum(High_Density_Lipoprotein_Cholesterol,healthcare_expenses^QOLS)
249 age<=ceil(healthcare_expenses/procedures_lifetime_cost)
250 age<=lifetime_care_plan_length-1/2*longitude
251 age<=10^(1/immunizations_lifetime+1)
252 age>=QALY+e^encounters_lifetime_perc_covered
253 age>=lifetime_care_plans*log(medications_lifetime_cost)
254 age>=e^active_conditions-medications_lifetime_cost
255 age>=sqrt(DALY*lifetime_condition_length)
256 age>=sqrt(medications_lifetime_perc_covered)+active_care_plan_length
257 age>=log(lifetime_condition_length)/log(10)+QALY
258 age>=DALY+QALY+1
259 age>=sqrt(medications_active)+QALY
260 age>=DALY^2-medications_lifetime_dispenses
261 age>=lifetime_condition_length/(DALY+1)
262 age<=floor(active_care_plan_length)+latitude
263 age<=ceil(QALY)/medications_lifetime_perc_covered
264 age<=floor(active_condition_length)^2
265 age<=e^encounters_count*lifetime_care_plan_length
266 age<=encounters_lifetime_total_cost/ceil(DALY)
267 age<=healthcare_coverage/(lifetime_care_plan_length+1)
268 age<=lifetime_care_plan_length/medications_lifetime_perc_covered-1
```

```
269 age<=ceil(encounters_lifetime_total_cost/medications_lifetime)
270 age<=10^DALY+latitude
271 age<=sqrt(encounters_lifetime_total_cost)+active_condition_length
272 age>=QALY+1
273 age>=ceil(active_care_plan_length)
274 age>=2*DALY-2
275 age>=latitude-procedures_lifetime_cost
276 age>=log(active_care_plans)/log(10)+active_care_plan_length
277 age>=QALY+2*num_allergies
278 age>=log(healthcare_coverage^medications_active)
279 age>=10^(2*medications_lifetime_perc_covered)
280 age>=log(lifetime_condition_length)/log(10)+QALY
281 age>=active_care_plan_length-log(QOLS)
282 num_allergies<=log(active_care_plans)^healthcare_expenses
283 num_allergies<=active_care_plan_length
284 num_allergies<=-medications_active+medications_lifetime
285 num_allergies<=active_conditions+1
286 num_allergies<=log(medications_active)^healthcare_expenses
287 num_allergies<=floor(1/immunizations_lifetime)
288 num_allergies<=(1/imaging_studies_lifetime)
289 num_allergies<=-DALY+QALY
290 num_allergies<=minimum(healthcare_expenses,Pain_severity___0_10_verbal_numer
ic_rating__Score____Reported)
291 num_allergies>=imaging_studies_lifetime
292 num_allergies<=active_care_plans
293 num_allergies<=device_lifetime_length
294 num_allergies>=device_lifetime_length
295 num_allergies>=active_care_plans-active_conditions
296 num_allergies<=active_care_plans
297 num_allergies<=device_lifetime_length
298 num_allergies<=imaging_studies_lifetime
299 num_allergies>=device_lifetime_length
300 active_care_plans<=lifetime_care_plans
301 active_care_plans<=e^num_allergies+medications_lifetime
302 active_care_plans>=num_allergies
303 active_care_plans>=lifetime_care_plans-procedures_lifetime
304 active_care_plans>=medications_active
305 active_care_plans>=lifetime_care_plans-medications_lifetime_length
306 active_care_plans>=(1/lifetime_care_plans)
307 active_care_plans>=floor(sqrt(lifetime_care_plans))
308 active_care_plans>=1/2*active_conditions-1
309 active_care_plans>=lifetime_care_plans^imaging_studies_lifetime
310 active_care_plans<=lifetime_care_plans
311 active_care_plans<=ceil(active_care_plan_length)
312 active_care_plans<=2*e^immunizations_lifetime
313 active_care_plans>=immunizations_lifetime
314 active_care_plans>=e^num_allergies
315 active_care_plans>=QOLS
```

```
316 active_care_plans>=ceil(log(device_lifetime_length)/log(10))
317 active_care_plans>=minimum(healthcare_coverage,lifetime_care_plans-1)
318 active_care_plans>=immunizations_lifetime^2
319 active_care_plans>=floor(log(encounters_count))
320 active_care_plans>=-immunizations_lifetime_cost+lifetime_care_plans
321 active_care_plans<=lifetime_care_plans
322 active_care_plans<=active_care_plan_length
323 active_care_plans>=num_allergies
324 active_care_plans>=sqrt(lifetime_care_plans)
325 active_care_plans>=lifetime_care_plans-1
326 active_care_plans>=medications_active-1
327 active_care_plans>=lifetime_care_plans*num_allergies
328 active_care_plans>=lifetime_care_plans^immunizations_lifetime
329 lifetime_care_plans<=active_care_plans+1
330 lifetime_care_plans<=active_care_plans^2
331 lifetime_care_plans<=floor(sqrt(age))
332 lifetime_care_plans<=active_care_plans/QOLS
333 lifetime_care_plans<=active_care_plans+procedures_lifetime
334 lifetime_care_plans<=maximum(Glomerular_filtration_rate_1_73_sq_M_predicted,
ceil(active_care_plans))
335 lifetime_care_plans<=maximum(Sodium,ceil(active_care_plans))
336 lifetime_care_plans>=num_allergies
337 lifetime_care_plans>=active_care_plans
338 lifetime_care_plans>=ceil(log(active_conditions))
339 lifetime_care_plans>=minimum(device_lifetime_length,procedures_lifetime)
340 lifetime_care_plans>=imaging_studies_lifetime*procedures_lifetime
341 lifetime_care_plans<=2*10^medications_active
342 lifetime_care_plans<=2*lifetime_care_plan_length
343 lifetime_care_plans<=minimum(healthcare_expenses,pH_of_Urine_by_Test_strip)
344 lifetime_care_plans<=medications_lifetime_cost
345 lifetime_care_plans<=medications_lifetime_length-procedures_lifetime
346
lifetime_care_plans<=maximum(procedures_lifetime,floor(active_care_plan_length))
347 lifetime_care_plans<=(active_care_plans+1)/immunizations_lifetime
348 lifetime_care_plans<=maximum(active_care_plans,1/medications_lifetime_perc_c
overed)
349 lifetime_care_plans<=minimum(healthcare_expenses,floor(Prostate_specific_Ag_
_Mass_volume__in_Serum,Plasma))
350 lifetime_care_plans>=num_allergies
351 lifetime_care_plans>=active_care_plans
352 lifetime_care_plans>=ceil(log(procedures_lifetime))
353 lifetime_care_plans>=floor(log(lifetime_conditions))^2
354 lifetime_care_plans<=active_care_plans+1
355 lifetime_care_plans<=active_care_plan_length
356 lifetime_care_plans<=e^healthcare_coverage
357 lifetime_care_plans<=2*active_conditions
358 lifetime_care_plans<=medications_lifetime-1
359 lifetime_care_plans<=active_care_plans^2
```

```
360 lifetime_care_plans<=10^(lifetime_care_plan_length/encounters_count)
361 lifetime_care_plans>=num_allergies
362 lifetime_care_plans>=active_care_plans
363 lifetime_care_plans>=minimum(procedures_lifetime_cost,floor(DALY))
364 active_care_plan_length<=active_condition_length+e^immunizations_lifetime
365 active_care_plan_length<=lifetime_care_plan_length
366 active_care_plan_length<=active_condition_length+num_allergies
367 active_care_plan_length<=sqrt(-active_condition_length+encounters_lifetime_t
otal_cost)
368 active_care_plan_length<=active_care_plans*healthcare_expenses
369 active_care_plan_length>=num_allergies
370 active_care_plan_length>=device_lifetime_length^2/QALY
371 active_care_plan_length>=lifetime_care_plan_length/active_conditions
372 active_care_plan_length>=minimum(active_care_plans,1/2*lifetime_care_plan_le
ngth)
373 active_care_plan_length>=lifetime_care_plan_length/log(lifetime_condition_le
ngth)
374 active_care_plan_length>=(lifetime_care_plan_length-1)/active_care_plans
375 active_care_plan_length>=sqrt(encounters_lifetime_payer_coverage)-age
376 active_care_plan_length>=log(lifetime_care_plan_length)/encounters_lifetime_
perc_covered
377 active_care_plan_length>=QOLS^2*device_lifetime_length^2
378 active_care_plan_length<=log(encounters_lifetime_total_cost)^2
379 active_care_plan_length<=lifetime_care_plan_length
380 active_care_plan_length<=latitude-log(immunizations_lifetime_cost)
381 active_care_plan_length<=active_condition_length*e^medications_active
382
active_care_plan_length<=(active_conditions+1)/medications_lifetime_perc_covered
383 active_care_plan_length<=lifetime_condition_length+log(QALY)
384 active_care_plan_length<=e^floor(sqrt(active_condition_length))
385 active_care_plan_length>=num_allergies
386 active_care_plan_length>=e^(log(lifetime_care_plan_length)-1)
387 active_care_plan_length>=(active_care_plans-1)*active_conditions
388 active_care_plan_length>=1/2*lifetime_condition_length+longitude
389 active_care_plan_length>=maximum(Alanine_aminotransferase__Enzymatic_activit
y_volume__in_Serum,Plasma,mean_QOLS)-1
390
active_care_plan_length>=minimum(lifetime_care_plan_length,2*active_conditions)
391 active_care_plan_length>=1/2*age-encounters_lifetime_payer_coverage
392 active_care_plan_length<=age-log(QALY)
393 active_care_plan_length<=lifetime_care_plan_length
394 active_care_plan_length<=active_condition_length/num_allergies
395 active_care_plan_length<=maximum(active_condition_length,immunizations_lifet
ime_cost)
396
active_care_plan_length<=maximum(active_condition_length,1/healthcare_coverage)
397 active_care_plan_length<=active_condition_length/imaging_studies_lifetime
398 active_care_plan_length>=lifetime_care_plan_length/active_care_plans
```

```
399 active_care_plan_length>=minimum(latitude,active_condition_length)
400 active_care_plan_length>=DALY*log(lifetime_condition_length)/log(10)
401 active_care_plan_length>=10^immunizations_lifetime*procedures_lifetime
402 active_care_plan_length>=2*active_conditions*num_allergies
403 active_care_plan_length>=QOLS*active_condition_length
404 active_care_plan_length>=2*QALY+longitude
405 lifetime_care_plan_length<=encounters_lifetime_total_cost^2/age^2
406 lifetime_care_plan_length<=active_care_plan_length*active_care_plans
407 lifetime_care_plan_length<=active_care_plan_length^active_care_plans
408 lifetime_care_plan_length<=active_care_plan_length^2
409 lifetime_care_plan_length<=healthcare_expenses/(active_conditions*age)
410 lifetime_care_plan_length<=healthcare_coverage/ceil(active_condition_length)
411 lifetime_care_plan_length<=minimum(healthcare_expenses,floor(Triglycerides))
412 lifetime_care_plan_length<=lifetime_condition_length/sqrt(QOLS)
413
lifetime_care_plan_length>=log(1/2*encounters_lifetime_perc_covered+1)/log(10)
414 lifetime_care_plan_length>=active_care_plan_length
415 lifetime_care_plan_length>=active_conditions^2-procedures_lifetime_cost
416 lifetime_care_plan_length>=(active_care_plans-1)^lifetime_care_plans
417 lifetime_care_plan_length>=e^active_care_plans*immunizations_lifetime
418
lifetime_care_plan_length>=encounters_count*encounters_lifetime_perc_covered-1
419 lifetime_care_plan_length>=log(DALY)/log(10)+active_care_plan_length
420 lifetime_care_plan_length>=(medications_active-1)*age
421 lifetime_care_plan_length>=e^active_care_plans*num_allergies
422 lifetime_care_plan_length>=2*active_care_plan_length-active_condition_length
423 lifetime_care_plan_length<=age/medications_lifetime_perc_covered^2
424 lifetime_care_plan_length<=active_care_plan_length^active_care_plans
425 lifetime_care_plan_length<=e^(sqrt(1/2)*sqrt(age))
426 lifetime_care_plan_length<=1/2*e^sqrt(active_care_plan_length)
427 lifetime_care_plan_length<=10^log(active_condition_length+1)
428 lifetime_care_plan_length<=(latitude-medications_lifetime)^2
429 lifetime_care_plan_length<=healthcare_coverage/(age+1)
430 lifetime_care_plan_length<=encounters_lifetime_payer_coverage/sqrt(latitude)
431 lifetime_care_plan_length<=minimum(healthcare_expenses,1/2*MCV__Entitic_volu
me__by_Automated_count)
432 lifetime_care_plan_length>=num_allergies
433 lifetime_care_plan_length>=active_care_plan_length
434 lifetime_care_plan_length>=sqrt(medications_lifetime_length)-procedures_life
time_cost
435 lifetime_care_plan_length>=ceil(immunizations_lifetime_cost*medications_life
time_perc_covered)
436
lifetime_care_plan_length>=1/2*immunizations_lifetime*lifetime_condition_length
437 lifetime_care_plan_length>=sqrt(DALY*immunizations_lifetime_cost)
438 lifetime_care_plan_length<=encounters_lifetime_total_cost/sqrt(age)
439 lifetime_care_plan_length<=sqrt(healthcare_expenses/active_condition_length)
440 lifetime_care_plan_length<=active_care_plan_length^(1/medications_lifetime_p
```

```
erc_covered)
441 lifetime_care_plan_length<=sqrt(procedures_lifetime_cost)-longitude
442 lifetime_care_plan_length<=active_care_plan_length*active_care_plans
443 lifetime_care_plan_length<=active_care_plan_length^active_care_plans
444 lifetime_care_plan_length<=-log(medications_lifetime)+medications_lifetime_d
ispenses
445 lifetime_care_plan_length<=log(10^ceil(age))
446 lifetime_care_plan_length<=10^(2/immunizations_lifetime)
447 lifetime_care_plan_length>=num_allergies
448 lifetime_care_plan_length>=active_care_plan_length^2/latitude
449 lifetime_care_plan_length>=sqrt(age*lifetime_care_plans)
450 lifetime_care_plan_length>=log(10^(2*device_lifetime_length))
451 lifetime_care_plan_length>=ceil(age*medications_lifetime_perc_covered)
452 lifetime_care_plan_length>=(active_care_plans-num_allergies)^2
453
lifetime_care_plan_length>=sqrt(lifetime_condition_length*medications_active)
454 lifetime_care_plan_length>=10^active_care_plans-
encounters_lifetime_total_cost
455 lifetime_care_plan_length>=(active_care_plans-1)*active_care_plan_length
456 lifetime_care_plan_length>=active_care_plan_length^2/encounters_count^2
457 active_conditions<=lifetime_conditions
458 active_conditions<=ceil(1/2*encounters_count)
459 active_conditions<=ceil(log(healthcare_expenses))
460 active_conditions<=floor(lifetime_condition_length)-procedures_lifetime
461 active_conditions<=floor(DALY)/immunizations_lifetime
462 active_conditions>=2*num_allergies
463 active_conditions>=QOLS
464 active_conditions>=minimum(lifetime_conditions,immunizations_lifetime_cost)
465 active_conditions>=lifetime_conditions-procedures_lifetime
466 active_conditions>=-active_care_plans+lifetime_conditions
467 active_conditions>=lifetime_conditions-medications_lifetime
468 active_conditions>=minimum(lifetime_conditions,DALY)
469 active_conditions<=lifetime_conditions
470 active_conditions<=ceil(log(healthcare_expenses))
471 active_conditions<=maximum(medications_lifetime,DALY)
472
active_conditions<=active_care_plan_length/10^medications_lifetime_perc_covered
473 active_conditions<=active_care_plans^2/immunizations_lifetime
474 active_conditions>=num_allergies
475 active_conditions>=lifetime_conditions-medications_active
476 active_conditions>=lifetime_conditions-1
477 active_conditions>=lifetime_conditions-medications_lifetime
478 active_conditions>=minimum(lifetime_conditions,procedures_lifetime)
479 active_conditions>=lifetime_care_plans^2-encounters_count
480 active_conditions>=minimum(lifetime_conditions,1/medications_lifetime_perc_c
overed)
481 active_conditions<=lifetime_conditions
482 active_conditions<=-imaging_studies_lifetime+lifetime_conditions
```

```
483 active_conditions<=ceil(medications_lifetime/procedures_lifetime)
484 active_conditions>=device_lifetime_length
485 active_conditions>=lifetime_conditions-num_allergies
486 active_conditions>=lifetime_conditions-1
487 active_conditions>=procedures_lifetime-1
488 active_conditions>=immunizations_lifetime-1
489 lifetime_conditions<=active_conditions+1
490 lifetime_conditions<=floor(log(medications_lifetime_cost))
491 lifetime_conditions<=encounters_count
492 lifetime_conditions<=active_conditions/num_allergies
493 lifetime_conditions<=ceil(sqrt(encounters_lifetime_payer_coverage))
494 lifetime_conditions<=1/2*active_conditions*lifetime_care_plans
495 lifetime_conditions<=minimum(healthcare_expenses,sqrt(Erythrocyte_distributi
on_width__Entitic_volume__by_Automated_count))
496 lifetime_conditions>=num_allergies
497 lifetime_conditions>=active_conditions
498 lifetime_conditions>=floor(log(procedures_lifetime))
499 lifetime_conditions>=(active_care_plans-1)*procedures_lifetime
500 lifetime_conditions>=(procedures_lifetime-1)*active_care_plans
501 lifetime_conditions<=maximum(active_conditions,log(latitude))
502 lifetime_conditions<=encounters_count
503 lifetime_conditions<=floor(QALY)
504 lifetime_conditions<=e^active_conditions
505 lifetime_conditions<=10^(1/immunizations_lifetime)
506 lifetime_conditions<=encounters_count-medications_active
507
lifetime_conditions<=maximum(active_conditions,log(healthcare_coverage)/log(10))
508 lifetime_conditions<=maximum(Body_temperature,encounters_count-1)
509 lifetime_conditions>=num_allergies
510 lifetime_conditions>=active_conditions
511 lifetime_conditions<=active_conditions+1
512 lifetime_conditions<=active_care_plan_length
513 lifetime_conditions<=ceil(log(healthcare_coverage))
514 lifetime_conditions<=active_conditions+medications_lifetime
515 lifetime_conditions<=2*10^DALY
516 lifetime_conditions<=active_conditions^2
517 lifetime_conditions>=num_allergies
518 lifetime_conditions>=2*immunizations_lifetime
519 lifetime_conditions>=active_conditions
520 lifetime_conditions>=-active_care_plans+lifetime_care_plans
521 active_condition_length<=latitude+log(encounters_lifetime_payer_coverage)
522 active_condition_length<=lifetime_care_plan_length
523 active_condition_length<=lifetime_condition_length
524 active_condition_length<=maximum(device_lifetime_length,2*encounters_count)
525 active_condition_length<=10^DALY+encounters_count
526 active_condition_length<=active_care_plan_length^active_care_plans
527 active_condition_length<=active_care_plan_length+log(medications_lifetime_le
ngth)
```

```
528 active_condition_length<=(log(medications_lifetime_dispenses)/log(10))^medic
ations_lifetime
529 active_condition_length<=-10^QOLS+age
530 active_condition_length>=active_care_plan_length-
encounters_lifetime_payer_coverage
531 active_condition_length>=ceil(lifetime_condition_length)/encounters_count
532
active_condition_length>=minimum(active_care_plans,lifetime_condition_length)
533 active_condition_length>=active_care_plan_length*immunizations_lifetime
534 active_condition_length>=minimum(active_care_plan_length,device_lifetime_len
gth^2)
535 active_condition_length>=(immunizations_lifetime_cost+1)/encounters_count
536
active_condition_length>=minimum(active_care_plan_length,1/medications_active)
537 active_condition_length>=log(active_care_plans)^medications_active
538 active_condition_length<=-1/QOLS+age
539 active_condition_length<=maximum(procedures_lifetime_cost,QALY)
540 active_condition_length<=1/2*active_conditions^lifetime_conditions
541
active_condition_length<=medications_lifetime_cost*medications_lifetime_length
542 active_condition_length<=active_care_plan_length*e^device_lifetime_length
543 active_condition_length<=maximum(lifetime_care_plan_length,device_lifetime_l
ength)
544 active_condition_length<=maximum(active_care_plan_length,immunizations_lifet
ime_cost)
545 active_condition_length>=active_care_plan_length/active_conditions
546 active_condition_length>=log(lifetime_condition_length)^4/log(10)^4
547 active_condition_length>=active_care_plan_length/active_care_plans
548 active_condition_length>=active_care_plan_length*log(lifetime_care_plans)/lo
g(10)
549 active_condition_length>=QOLS^2*active_conditions^2
550 active_condition_length>=e^(1/2*e^immunizations_lifetime)
551 active_condition_length>=active_care_plan_length/(encounters_lifetime_perc_c
overed+1)
552 active_condition_length>=log(lifetime_care_plan_length)*num_allergies
553 active_condition_length>=minimum(active_care_plan_length,immunizations_lifet
ime_cost)
554 active_condition_length>=e^(sqrt(DALY)-1)
555 active_condition_length<=age
556 active_condition_length<=lifetime_condition_length
557
active_condition_length<=maximum(lifetime_care_plan_length,1/medications_active)
558 active_condition_length<=1/2*encounters_lifetime_total_cost/encounters_count
559 active_condition_length<=-QOLS+ceil(age)
560
active_condition_length<=maximum(healthcare_coverage,active_care_plan_length)
561 active_condition_length<=maximum(lifetime_care_plan_length,ceil(latitude))
562 active_condition_length<=lifetime_condition_length-log(active_conditions)
```

```
563 active_condition_length>=num_allergies
564 active_condition_length>=active_care_plan_length-immunizations_lifetime
565 active_condition_length>=DALY*log(10)/log(encounters_count)
566 active_condition_length>=active_care_plan_length-1
567 active_condition_length>=medications_lifetime_dispenses^medications_lifetime
_perc_covered-1
568 active_condition_length>=ceil(DALY)*immunizations_lifetime
569 active_condition_length>=active_care_plan_length-procedures_lifetime
570 lifetime_condition_length<=active_condition_length*log(healthcare_coverage)/
log(10)
571 lifetime_condition_length<=encounters_lifetime_total_cost
572 lifetime_condition_length<=encounters_count^(10^encounters_lifetime_perc_cov
ered)
573 lifetime_condition_length<=(DALY+1)*age
574 lifetime_condition_length<=e^active_condition_length/medications_lifetime_di
spenses
575 lifetime_condition_length<=1/2*healthcare_coverage-1/2*medications_lifetime_
length
576 lifetime_condition_length<=(2*encounters_lifetime_payer_coverage)^QOLS
577 lifetime_condition_length<=encounters_lifetime_payer_coverage*log(10)/log(en
counters_lifetime_total_cost)
578 lifetime_condition_length<=healthcare_expenses^encounters_lifetime_perc_cove
red/medications_active
579 lifetime_condition_length>=(1/latitude)^lifetime_care_plan_length
580 lifetime_condition_length>=active_condition_length
581 lifetime_condition_length>=log(DALY^encounters_count)
582 lifetime_condition_length>=2*log(procedures_lifetime_cost)/log(10)+2
583 lifetime_condition_length>=DALY*log(encounters_lifetime_total_cost)
584 lifetime_condition_length>=log(medications_active)^lifetime_conditions
585 lifetime_condition_length>=2*active_care_plan_length-latitude
586 lifetime_condition_length>=1/2*maximum(Low_Density_Lipoprotein_Cholesterol,m
ean_DALY)
587 lifetime_condition_length>=active_conditions*sqrt(medications_lifetime)
588 lifetime_condition_length<=1/2*active_condition_length^2
589 lifetime_condition_length<=medications_lifetime_length/(DALY+1)
590 lifetime_condition_length<=healthcare_expenses^lifetime_care_plans/medicatio
ns_lifetime_cost
591
lifetime_condition_length<=maximum(Total_Cholesterol,1/immunizations_lifetime)
592 lifetime_condition_length<=active_condition_length^lifetime_conditions
593 lifetime_condition_length<=10^encounters_lifetime_perc_covered*lifetime_care
_plan_length
594 lifetime_condition_length<=ceil(active_care_plan_length)^active_conditions
595 lifetime_condition_length<=age*log(healthcare_expenses)/log(10)
596 lifetime_condition_length<=1/4*medications_lifetime_dispenses+1
597 lifetime_condition_length<=age+e^active_conditions
598 lifetime_condition_length>=2*active_care_plan_length/active_care_plans
599 lifetime_condition_length>=sqrt(encounters_lifetime_total_cost)+active_care_
```

```
plans
600 lifetime_condition_length>=QOLS*medications_lifetime+1
601
lifetime_condition_length>=-active_condition_length+lifetime_care_plan_length+1
602 lifetime_condition_length>=longitude/log(medications_lifetime_perc_covered)
603 lifetime_condition_length>=-active_care_plan_length+e^active_care_plans
604 lifetime_condition_length>=mean_Glucose^sqrt(immunizations_lifetime)
605 lifetime_condition_length>=1/2*encounters_lifetime_total_cost/active_care_pl
an_length
606 lifetime_condition_length>=latitude/log(DALY)
607 lifetime_condition_length>=medications_lifetime^2/QALY^2
608
lifetime_condition_length<=encounters_lifetime_total_cost/medications_active^2
609 lifetime_condition_length<=(latitude-1)*lifetime_conditions
610 lifetime_condition_length<=active_condition_length^active_conditions
611 lifetime_condition_length<=e^active_care_plan_length/QALY
612 lifetime_condition_length<=age^2/lifetime_conditions
613 lifetime_condition_length<=log(encounters_lifetime_total_cost^age)/log(10)
614 lifetime_condition_length<=floor(encounters_lifetime_payer_coverage/active_c
are_plans)
615 lifetime_condition_length<=2*10^sqrt(active_conditions)
616 lifetime_condition_length<=maximum(Sodium,encounters_count^2)
617 lifetime_condition_length<=10^(active_condition_length^(1/4))
618 lifetime_condition_length>=num_allergies
619 lifetime_condition_length>=active_condition_length
620 lifetime_condition_length>=1/2*lifetime_conditions^2
621 lifetime_condition_length>=medications_lifetime_perc_covered*sqrt(procedures
_lifetime_cost)
622 lifetime_condition_length>=-sqrt(encounters_lifetime_payer_coverage)+medicat
ions_lifetime
623 lifetime_condition_length>=1/2*active_care_plan_length-3/2
624 lifetime_condition_length>=maximum(Chloride,mean_DALY)
625 lifetime_condition_length>=DALY*log(encounters_lifetime_payer_coverage)
626 lifetime_condition_length>=DALY*lifetime_conditions
627 lifetime_condition_length>=ceil(maximum(Chloride,mean_DALY))
628 device_lifetime_length<=healthcare_coverage
629 device_lifetime_length<=num_allergies
630 device_lifetime_length<=imaging_studies_lifetime
631 device_lifetime_length>=imaging_studies_lifetime
632 device_lifetime_length<=1/2*log(QOLS+1)/log(10)
633 device_lifetime_length<=immunizations_lifetime
634 device_lifetime_length<=floor(1/active_care_plans)
635 device_lifetime_length<=procedures_lifetime
636 device_lifetime_length>=imaging_studies_lifetime
637 device_lifetime_length<=healthcare_coverage
638 device_lifetime_length<=num_allergies
639 device_lifetime_length>=num_allergies
640 encounters_count<=floor(2*active_condition_length)
```

```
641 encounters_count<=10^active_conditions
642 encounters_count<=1/2*encounters_lifetime_total_cost/active_care_plan_length
643 encounters_count<=maximum(Triglycerides,floor(latitude))
644 encounters_count<=maximum(Pain_severity___0_10_verbal_numeric_rating__Score_
___Reported,1/num_allergies)
645 encounters_count<=floor(sqrt(encounters_lifetime_payer_coverage))
646 encounters_count<=10^QOLS+lifetime_care_plan_length
647 encounters_count<=sqrt(age)+lifetime_care_plan_length
648 encounters_count<=maximum(active_conditions,medications_lifetime_cost)
649 encounters_count<=10^immunizations_lifetime+medications_lifetime
650 encounters_count>=active_conditions
651 encounters_count>=medications_lifetime
652 encounters_count>=procedures_lifetime+1
653 encounters_count>=active_care_plans^2-procedures_lifetime
654 encounters_count>=immunizations_lifetime^2-active_conditions
655 encounters_count>=floor(active_care_plan_length)^num_allergies
656
encounters_count>=ceil(medications_lifetime_perc_covered)+medications_lifetime
657 encounters_count>=10^(medications_lifetime/active_condition_length)
658 encounters_count>=(1/(log(medications_lifetime_perc_covered)/log(10)+1))
659 encounters_count<=DALY+QALY-1
660 encounters_count<=lifetime_care_plan_length
661 encounters_count<=QALY/sqrt(QOLS)
662 encounters_count<=10^medications_lifetime-1
663 encounters_count<=floor(DALY+active_care_plan_length)
664 encounters_count<=ceil(encounters_lifetime_payer_coverage/QALY)
665 encounters_count<=ceil(lifetime_condition_length)+medications_active
666 encounters_count<=ceil(healthcare_expenses/medications_lifetime_length)
667 encounters_count<=-2*active_care_plan_length+2*lifetime_care_plan_length
668 encounters_count<=age^(1/immunizations_lifetime)
669 encounters_count>=medications_lifetime/(encounters_lifetime_perc_covered+1)
670 encounters_count>=-1/2*latitude+medications_lifetime
671 encounters_count>=lifetime_conditions+1
672 encounters_count>=floor(log(e^procedures_lifetime)/log(10))
673 encounters_count>=medications_lifetime^2/lifetime_condition_length
674 encounters_count>=immunizations_lifetime^lifetime_care_plans
675 encounters_count>=-e^active_care_plans+medications_lifetime
676 encounters_count>=10^(1/log(active_conditions))
677 encounters_count>=lifetime_care_plans^e^encounters_lifetime_perc_covered
678
encounters_count>=floor(encounters_lifetime_perc_covered*procedures_lifetime)
679 encounters_count<=abs(-QALY+lifetime_condition_length)
680 encounters_count<=maximum(lifetime_condition_length,medications_lifetime)
681 encounters_count<=maximum(active_conditions,medications_lifetime_cost)
682 encounters_count<=1/2*age/procedures_lifetime
683 encounters_count<=10^medications_active+QALY
684 encounters_count<=10^e^encounters_lifetime_payer_coverage
685 encounters_count<=active_conditions^2/procedures_lifetime
```

```
686 encounters_count<=ceil(QALY/encounters_lifetime_perc_covered)
687 encounters_count<=1/2*QALY/num_allergies
688 encounters_count<=10^medications_active/procedures_lifetime_cost
689 encounters_count>=active_conditions-1
690 encounters_count>=2*active_care_plans+2
691 encounters_count>=minimum(age,medications_lifetime+1)
692 encounters_count>=minimum(lifetime_care_plan_length,medications_lifetime)
693 encounters_count>=floor(latitude^medications_lifetime_perc_covered)
694 encounters_count>=1/2*medications_lifetime*medications_lifetime_perc_covered
695 encounters_count>=ceil(active_condition_length-lifetime_care_plan_length)
696 encounters_count>=ceil(Carbon_Dioxide)^num_allergies
697 encounters_count>=procedures_lifetime^4+1
698 encounters_count>=minimum(medications_lifetime,sqrt(medications_lifetime_len
gth))
699 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
700 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
701 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
702 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
703 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
704 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
705 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
706 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
707 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
708 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
709 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
710 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
711 encounters_lifetime_payer_coverage<=healthcare_coverage
712 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
ounters_lifetime_perc_covered
713 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_perc_covered*en
counters_lifetime_total_cost)
714 encounters_lifetime_payer_coverage>=num_allergies
715 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
716 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered^2*encou
nters_lifetime_total_cost
717 encounters_lifetime_payer_coverage<=encounters_lifetime_total_cost
718 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
ounters_lifetime_perc_covered
719 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_perc_covered*en
counters_lifetime_total_cost)
720 encounters_lifetime_payer_coverage>=device_lifetime_length
721 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
722 encounters_lifetime_payer_coverage>=floor(encounters_lifetime_perc_covered*e
ncounters_lifetime_total_cost)
723 encounters_lifetime_payer_coverage<=healthcare_coverage
724 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
```

ounters_lifetime_perc_covered
725 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_perc_covered*en
counters_lifetime_total_cost)
726 encounters_lifetime_payer_coverage<=encounters_lifetime_perc_covered*healthc
are_expenses
727 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
728 encounters_lifetime_payer_coverage>=lifetime_condition_length*log(QALY)
729 encounters_lifetime_payer_coverage>=floor(encounters_lifetime_perc_covered*e
ncounters_lifetime_total_cost)
730 encounters_lifetime_perc_covered<=healthcare_coverage
731 encounters_lifetime_perc_covered<=ceil(encounters_lifetime_payer_coverage)/e
ncounters_lifetime_total_cost
732 encounters_lifetime_perc_covered<=encounters_count
733 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/floor(e
ncounters_lifetime_total_cost)
734 encounters_lifetime_perc_covered>=floor(encounters_lifetime_payer_coverage)/
encounters_lifetime_total_cost
735 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/ceil(en
counters_lifetime_total_cost)
736 encounters_lifetime_perc_covered<=ceil(encounters_lifetime_payer_coverage)/e
ncounters_lifetime_total_cost
737 encounters_lifetime_perc_covered<=sqrt(DALY)+mean_DALY
738 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/floor(e
ncounters_lifetime_total_cost)
739 encounters_lifetime_perc_covered>=num_allergies
740 encounters_lifetime_perc_covered>=floor(encounters_lifetime_payer_coverage)/
encounters_lifetime_total_cost
741 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/ceil(en
counters_lifetime_total_cost)
742 encounters_lifetime_perc_covered<=ceil(encounters_lifetime_payer_coverage)/e
ncounters_lifetime_total_cost
743 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/floor(e
ncounters_lifetime_total_cost)
744 encounters_lifetime_perc_covered>=floor(encounters_lifetime_payer_coverage)/
encounters_lifetime_total_cost
745 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/ceil(en
counters_lifetime_total_cost)
746 imaging_studies_lifetime<=num_allergies
747 imaging_studies_lifetime>=device_lifetime_length
748 imaging_studies_lifetime<=healthcare_coverage
749 imaging_studies_lifetime<=active_care_plans
750 imaging_studies_lifetime<=procedures_lifetime
751 imaging_studies_lifetime<=num_allergies^medications_lifetime_perc_covered
752 imaging_studies_lifetime<=num_allergies^immunizations_lifetime
753 imaging_studies_lifetime>=device_lifetime_length
754 imaging_studies_lifetime>=ceil(medications_lifetime_perc_covered)*medication
s_active

```
755 imaging_studies_lifetime>=-active_conditions+1/2*lifetime_care_plans
756 imaging_studies_lifetime<=active_care_plans
757 imaging_studies_lifetime<=immunizations_lifetime
758 imaging_studies_lifetime<=medications_active-1
759 imaging_studies_lifetime<=procedures_lifetime
760 imaging_studies_lifetime<=lifetime_care_plans-1
761 imaging_studies_lifetime<=num_allergies^medications_lifetime_perc_covered
762 imaging_studies_lifetime>=num_allergies
763 imaging_studies_lifetime>=-active_care_plans+medications_active
764 imaging_studies_lifetime>=(num_allergies-1)^encounters_count
765 imaging_studies_lifetime>=-medications_active+procedures_lifetime
766 immunizations_lifetime<=encounters_count/active_conditions
767 immunizations_lifetime<=e^QOLS
768 immunizations_lifetime<=immunizations_lifetime_cost
769 immunizations_lifetime<=e^procedures_lifetime
770 immunizations_lifetime<=2*encounters_count
771 immunizations_lifetime<=procedures_lifetime+1
772 immunizations_lifetime<=ceil(2*encounters_lifetime_perc_covered)
773 immunizations_lifetime>=num_allergies
774 immunizations_lifetime>=-active_conditions+lifetime_conditions
775 immunizations_lifetime>=-active_care_plans+medications_active
776 immunizations_lifetime<=active_conditions
777 immunizations_lifetime<=immunizations_lifetime_cost
778 immunizations_lifetime<=ceil(encounters_lifetime_perc_covered)
779 immunizations_lifetime<=e^device_lifetime_length
780 immunizations_lifetime<=e^num_allergies
781 immunizations_lifetime>=imaging_studies_lifetime
782 immunizations_lifetime>=lifetime_care_plans-medications_lifetime_length
783
immunizations_lifetime>=ceil(active_care_plan_length)-medications_lifetime_cost
784 immunizations_lifetime>=minimum(immunizations_lifetime_cost,lifetime_care_pl
ans-1)
785 immunizations_lifetime>=minimum(active_care_plans,device_lifetime_length)
786 immunizations_lifetime>=-healthcare_coverage+medications_active
787 immunizations_lifetime<=active_care_plans
788 immunizations_lifetime<=active_conditions
789 immunizations_lifetime<=immunizations_lifetime_cost
790 immunizations_lifetime<=e^num_allergies
791 immunizations_lifetime<=e^healthcare_coverage
792 immunizations_lifetime>=imaging_studies_lifetime
793 immunizations_lifetime>=ceil(medications_lifetime_perc_covered)
794 immunizations_lifetime>=log(immunizations_lifetime_cost)/(log(10)*medication
s_lifetime)
795 immunizations_lifetime_cost<=encounters_lifetime_payer_coverage^2
796 immunizations_lifetime_cost<=longitude^2/medications_active^2
797 immunizations_lifetime_cost<=10^active_care_plans*latitude
798 immunizations_lifetime_cost<=floor(encounters_lifetime_total_cost)+medicatio
ns_lifetime_length
```

```
799 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
800 immunizations_lifetime_cost<=medications_lifetime_length/DALY+1
801 immunizations_lifetime_cost<=10^(QALY^encounters_lifetime_perc_covered)
802 immunizations_lifetime_cost<=medications_lifetime_dispenses/sqrt(DALY)
803 immunizations_lifetime_cost>=num_allergies
804 immunizations_lifetime_cost>=maximum(mean_Low_Density_Lipoprotein_Cholestero
l,-healthcare_expenses)
805 immunizations_lifetime_cost>=DALY^2-medications_lifetime_dispenses
806 immunizations_lifetime_cost>=maximum(Systolic_Blood_Pressure,-healthcare_exp
enses)
807 immunizations_lifetime_cost>=maximum(Alkaline_phosphatase__Enzymatic_activit
y_volume__in_Serum,Plasma,-healthcare_expenses)
808 immunizations_lifetime_cost<=procedures_lifetime_cost
809 immunizations_lifetime_cost<=e^(e^(QOLS+1))
810 immunizations_lifetime_cost<=medications_lifetime_cost
811 immunizations_lifetime_cost<=sqrt(active_conditions)*medications_lifetime_di
spenses
812 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
813 immunizations_lifetime_cost<=(2*medications_lifetime_dispenses)^DALY
814 immunizations_lifetime_cost<=encounters_lifetime_payer_coverage-2*longitude
815 immunizations_lifetime_cost>=num_allergies
816 immunizations_lifetime_cost>=1/2*procedures_lifetime_cost/encounters_count
817 immunizations_lifetime_cost>=maximum(Systolic_Blood_Pressure,-healthcare_exp
enses)
818 immunizations_lifetime_cost>=(encounters_count-1)*num_allergies
819 immunizations_lifetime_cost>=sqrt(medications_lifetime_length*procedures_lif
etime)
820 immunizations_lifetime_cost>=lifetime_care_plan_length+log(procedures_lifeti
me_cost)
821 immunizations_lifetime_cost>=minimum(procedures_lifetime_cost,Systolic_Blood
_Pressure+1)
822
immunizations_lifetime_cost>=-medications_lifetime^2+lifetime_care_plan_length
823 immunizations_lifetime_cost>=procedures_lifetime_cost^sqrt(medications_lifet
ime_perc_covered)
824 immunizations_lifetime_cost<=log(e^healthcare_coverage)/log(10)
825 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
826 immunizations_lifetime_cost<=2*procedures_lifetime_cost
827 immunizations_lifetime_cost<=abs(-encounters_lifetime_total_cost+healthcare_
coverage)
828 immunizations_lifetime_cost<=10^sqrt(encounters_count)
829 immunizations_lifetime_cost<=sqrt(healthcare_expenses)+latitude
830 immunizations_lifetime_cost<=2*lifetime_care_plan_length/medications_lifetim
e_perc_covered
831
immunizations_lifetime_cost<=log(healthcare_expenses)+procedures_lifetime_cost
832 immunizations_lifetime_cost>=num_allergies
833
```

```
immunizations_lifetime_cost>=Systolic_Blood_Pressure^immunizations_lifetime-1
834 immunizations_lifetime_cost>=Sodium^num_allergies-1
835
immunizations_lifetime_cost>=2*active_care_plan_length*immunizations_lifetime
836 immunizations_lifetime_cost>=2*QALY*immunizations_lifetime
837 immunizations_lifetime_cost>=1/2*immunizations_lifetime*lifetime_care_plan_l
ength
838 immunizations_lifetime_cost>=sqrt(procedures_lifetime_cost)-lifetime_conditi
on_length
839 medications_lifetime<=2*10^e^immunizations_lifetime
840
medications_lifetime<=medications_lifetime_cost^2/medications_lifetime_length^2
841 medications_lifetime<=maximum(Platelet_distribution_width__Entitic_volume__i
n_Blood_by_Automated_count,e^active_conditions)
842 medications_lifetime<=maximum(active_conditions,1/num_allergies)
843 medications_lifetime<=floor(log(10^encounters_count))
844 medications_lifetime<=encounters_count+healthcare_coverage-1
845
medications_lifetime<=floor(active_condition_length)+immunizations_lifetime_cost
846 medications_lifetime<=(DALY-encounters_count)^2
847
medications_lifetime<=immunizations_lifetime_cost+lifetime_care_plan_length-1
848 medications_lifetime<=10^e^(1/device_lifetime_length)
849 medications_lifetime>=num_allergies
850 medications_lifetime>=medications_active
851 medications_lifetime>=active_care_plans-1
852 medications_lifetime>=(lifetime_care_plans-1)^immunizations_lifetime
853 medications_lifetime>=2*active_care_plans-lifetime_conditions
854 medications_lifetime>=active_condition_length-e^lifetime_conditions
855 medications_lifetime>=2*medications_active-2
856 medications_lifetime>=maximum(Alanine_aminotransferase__Enzymatic_activity_v
olume__in_Serum,Plasma,-healthcare_expenses)
857 medications_lifetime>=-lifetime_conditions+1/2*procedures_lifetime
858
medications_lifetime>=minimum(medications_lifetime_cost,1/2*lifetime_conditions)
859 medications_lifetime<=encounters_lifetime_total_cost
860 medications_lifetime<=medications_lifetime_cost
861 medications_lifetime<=sqrt(log(10^medications_lifetime_dispenses))
862 medications_lifetime<=sqrt(medications_lifetime_cost)/QOLS
863 medications_lifetime<=e^healthcare_coverage
864 medications_lifetime<=10^active_conditions
865 medications_lifetime<=maximum(medications_active,1/device_lifetime_length)
866 medications_lifetime<=abs(age-medications_lifetime_dispenses)
867 medications_lifetime<=-longitude+procedures_lifetime_cost-1
868 medications_lifetime<=e^(maximum(num_allergies,lifetime_conditions))
869 medications_lifetime>=minimum(active_care_plan_length,1/medications_active)
870 medications_lifetime>=minimum(encounters_count,2*device_lifetime_length)
871 medications_lifetime>=medications_active
```

```
872 medications_lifetime>=immunizations_lifetime
873 medications_lifetime>=procedures_lifetime-1
874 medications_lifetime>=lifetime_care_plan_length+longitude+1
875 medications_lifetime>=Pain_severity___0_10_verbal_numeric_rating__Score____R
eported^immunizations_lifetime
876 medications_lifetime>=minimum(immunizations_lifetime_cost,1/Pain_severity___
0_10_verbal_numeric_rating__Score____Reported)
877 medications_lifetime>=10^lifetime_care_plans/medications_lifetime_length
878 medications_lifetime<=10^active_care_plans/immunizations_lifetime_cost
879 medications_lifetime<=medications_lifetime_cost
880 medications_lifetime<=1/2*healthcare_coverage/active_conditions
881 medications_lifetime<=ceil(10^(1/medications_lifetime_perc_covered))
882 medications_lifetime<=10^lifetime_care_plans
883
medications_lifetime<=floor(medications_lifetime_dispenses/active_care_plans)
884 medications_lifetime<=1/2*active_care_plan_length^2+1
885 medications_lifetime>=num_allergies
886 medications_lifetime>=active_care_plans-1
887 medications_lifetime>=ceil(medications_lifetime_perc_covered)
888 medications_lifetime>=medications_active
889 medications_lifetime>=ceil(medications_lifetime_perc_covered)*lifetime_care_
plan_length
890 medications_lifetime>=immunizations_lifetime_cost+2*longitude
891 medications_lifetime_cost<=medications_lifetime_length^2
892 medications_lifetime_cost<=encounters_lifetime_total_cost^2
893 medications_lifetime_cost<=-longitude*medications_lifetime_length
894 medications_lifetime_cost<=(healthcare_expenses-
medications_lifetime_length)*active_care_plans
895 medications_lifetime_cost<=age^log(latitude)
896
medications_lifetime_cost<=encounters_lifetime_payer_coverage*e^encounters_count
897 medications_lifetime_cost<=(1/medications_lifetime_perc_covered)^lifetime_ca
re_plan_length
898 medications_lifetime_cost<=10^medications_lifetime*encounters_lifetime_total
_cost
899 medications_lifetime_cost<=healthcare_coverage^2/lifetime_condition_length
900 medications_lifetime_cost<=1/4*latitude^4
901 medications_lifetime_cost>=num_allergies
902
medications_lifetime_cost>=sqrt(healthcare_expenses*medications_lifetime_length)
903 medications_lifetime_cost>=(DALY+1)*medications_lifetime_length
904 medications_lifetime_cost>=maximum(Body_Height,mean_DALY)^2
905 medications_lifetime_cost>=-2*encounters_lifetime_total_cost+procedures_life
time_cost
906
medications_lifetime_cost>=healthcare_coverage*log(immunizations_lifetime_cost)
907 medications_lifetime_cost>=medications_lifetime^e^immunizations_lifetime
908 medications_lifetime_cost>=2*age*medications_lifetime_dispenses
```

```
909
medications_lifetime_cost>=10^procedures_lifetime*immunizations_lifetime_cost
910 medications_lifetime_cost>=encounters_count^2*medications_active^2
911 medications_lifetime_cost<=-healthcare_coverage+1/2*healthcare_expenses
912 medications_lifetime_cost<=10^encounters_count*latitude
913 medications_lifetime_cost<=healthcare_expenses*medications_lifetime
914 medications_lifetime_cost<=healthcare_expenses/sqrt(medications_active)
915
medications_lifetime_cost<=10^active_care_plan_length/active_condition_length
916 medications_lifetime_cost<=e^encounters_count/procedures_lifetime
917 medications_lifetime_cost<=e^(encounters_lifetime_perc_covered*medications_l
ifetime_dispenses)
918 medications_lifetime_cost<=10^active_care_plans*healthcare_coverage
919 medications_lifetime_cost<=10^encounters_count/lifetime_condition_length
920 medications_lifetime_cost>=num_allergies
921 medications_lifetime_cost>=encounters_lifetime_total_cost*log(medications_li
fetime_dispenses)/log(10)
922 medications_lifetime_cost>=QALY^2*active_conditions
923 medications_lifetime_cost>=1/2*DALY*procedures_lifetime_cost
924 medications_lifetime_cost>=10^procedures_lifetime*active_condition_length
925 medications_lifetime_cost>=1/2*encounters_lifetime_payer_coverage*lifetime_c
ondition_length
926 medications_lifetime_cost>=age^(log(medications_lifetime_dispenses)/log(10))
927 medications_lifetime_cost>=medications_lifetime^2/encounters_lifetime_perc_c
overed^2
928 medications_lifetime_cost>=minimum(medications_lifetime_dispenses,Respirator
y_rate)^2
929 medications_lifetime_cost>=medications_lifetime_dispenses^2*medications_life
time_perc_covered^2
930 medications_lifetime_cost<=2*e^(10^active_conditions)
931 medications_lifetime_cost<=medications_lifetime_length^2
932 medications_lifetime_cost<=e^encounters_count/active_care_plan_length
933 medications_lifetime_cost<=encounters_lifetime_payer_coverage^sqrt(medicatio
ns_lifetime)
934 medications_lifetime_cost<=sqrt(active_conditions)*healthcare_expenses
935 medications_lifetime_cost<=sqrt(10^(10^active_care_plans))
936 medications_lifetime_cost<=(e^QALY)^encounters_lifetime_perc_covered
937 medications_lifetime_cost<=2*latitude*medications_lifetime_length
938 medications_lifetime_cost<=(log(QALY)/log(10))^age
939 medications_lifetime_cost>=(2*age)^procedures_lifetime
940 medications_lifetime_cost>=(active_care_plan_length+1)*encounters_lifetime_p
ayer_coverage
941 medications_lifetime_cost>=(2*active_condition_length)^medications_active
942 medications_lifetime_cost>=healthcare_expenses/sqrt(medications_lifetime_dis
penses)
943 medications_lifetime_cost>=lifetime_condition_length^(log(encounters_count)/
log(10))
944
```

```
medications_lifetime_cost>=encounters_lifetime_total_cost*lifetime_care_plans^2
945 medications_lifetime_cost>=2*immunizations_lifetime_cost^2
946
medications_lifetime_cost>=healthcare_coverage^2/encounters_lifetime_total_cost
947 medications_lifetime_cost>=healthcare_expenses^sqrt(medications_lifetime_per
c_covered)
948 medications_lifetime_cost>=lifetime_care_plan_length^e^QOLS
949 medications_lifetime_perc_covered<=active_care_plans
950 medications_lifetime_perc_covered<=active_conditions
951 medications_lifetime_perc_covered<=immunizations_lifetime
952 medications_lifetime_perc_covered<=floor(encounters_count/DALY)
953 medications_lifetime_perc_covered<=(e^DALY-1)^2
954 medications_lifetime_perc_covered<=num_allergies^device_lifetime_length
955 medications_lifetime_perc_covered<=log(medications_lifetime)/log(10)
956 medications_lifetime_perc_covered<=abs(log(DALY)-1)
957 medications_lifetime_perc_covered<=device_lifetime_length^num_allergies
958 medications_lifetime_perc_covered<=log(latitude+1)/log(10)-1
959 medications_lifetime_perc_covered>=num_allergies
960 medications_lifetime_perc_covered>=log(encounters_lifetime_perc_covered*proc
edures_lifetime)
961 medications_lifetime_perc_covered>=log(medications_lifetime)/log(10)-lifetim
e_care_plans
962 medications_lifetime_perc_covered>=log(log(medications_lifetime))-1
963
medications_lifetime_perc_covered<=longitude^2/encounters_lifetime_total_cost
964 medications_lifetime_perc_covered<=active_conditions
965 medications_lifetime_perc_covered<=2*e^(-medications_active)
966 medications_lifetime_perc_covered<=minimum(healthcare_expenses,Pain_severity
___0_10_verbal_numeric_rating__Score____Reported)
967 medications_lifetime_perc_covered<=num_allergies^procedures_lifetime
968 medications_lifetime_perc_covered<=ceil(QOLS)
969
medications_lifetime_perc_covered<=abs(log(1/2*immunizations_lifetime))/log(10)
970 medications_lifetime_perc_covered>=device_lifetime_length
971 medications_lifetime_perc_covered>=log(maximum(Erythrocytes____volume__in_Bl
ood_by_Automated_count,mean_QOLS))/log(10)
972 medications_lifetime_perc_covered>=log(encounters_count/QALY)/log(10)
973 medications_lifetime_perc_covered>=maximum(Bilirubin_total__Mass_volume__in_
Serum,Plasma,-healthcare_expenses)
974 medications_lifetime_perc_covered>=log(DALY)/log(10)-medications_active
975 medications_lifetime_perc_covered<=2*encounters_count/medications_lifetime
976 medications_lifetime_perc_covered<=1/sqrt(procedures_lifetime)
977 medications_lifetime_perc_covered<=1/2*log(encounters_count)/log(10)
978 medications_lifetime_perc_covered<=DALY
979
medications_lifetime_perc_covered<=floor(log(active_care_plan_length)/log(10))
980 medications_lifetime_perc_covered<=QOLS^(immunizations_lifetime-1)
981 medications_lifetime_perc_covered<=(log(active_conditions)/log(10))^encounte
```

rs_lifetime_perc_covered
982 medications_lifetime_perc_covered<=1/2*encounters_lifetime_payer_coverage/me
dications_lifetime_dispenses
983 medications_lifetime_perc_covered<=immunizations_lifetime^num_allergies
984 medications_lifetime_perc_covered<=-medications_active+medications_lifetime
985 medications_lifetime_perc_covered>=imaging_studies_lifetime
986 medications_lifetime_perc_covered>=log(encounters_lifetime_perc_covered)+num
_allergies
987 medications_lifetime_perc_covered>=immunizations_lifetime/10^encounters_life
time_perc_covered
988 medications_lifetime_perc_covered>=(1/(active_care_plan_length-latitude))
989 medications_lifetime_perc_covered>=log(maximum(Erythrocytes____volume__in_Bl
ood_by_Automated_count,mean_QOLS))/log(10)
990 medications_lifetime_perc_covered>=(1/(lifetime_care_plan_length+longitude))
991
medications_lifetime_perc_covered>=log(active_care_plan_length/latitude)/log(10)
992 medications_lifetime_length<=medications_lifetime_cost/(active_conditions+1)
993 medications_lifetime_length<=medications_lifetime_cost
994 medications_lifetime_length<=healthcare_expenses/(lifetime_care_plans*lifeti
me_conditions)
995 medications_lifetime_length<=encounters_lifetime_total_cost^2/lifetime_care_
plan_length^2
996 medications_lifetime_length<=10^active_condition_length/QALY
997 medications_lifetime_length<=2*encounters_lifetime_total_cost/procedures_lif
etime
998 medications_lifetime_length<=2*encounters_lifetime_perc_covered^longitude
999 medications_lifetime_length<=(encounters_lifetime_payer_coverage-1)*active_c
onditions
1000 medications_lifetime_length<=minimum(healthcare_expenses,10^Hemoglobin_A1c_
Hemoglobin_total_in_Blood)
1001 medications_lifetime_length<=healthcare_expenses^encounters_lifetime_perc_c
overed+encounters_lifetime_payer_coverage
1002 medications_lifetime_length>=num_allergies
1003 medications_lifetime_length>=4*medications_lifetime_dispenses
1004 medications_lifetime_length>=(medications_lifetime_cost-1)/lifetime_care_pl
an_length
1005 medications_lifetime_length>=encounters_lifetime_total_cost/log(medications
_lifetime_dispenses)
1006 medications_lifetime_length>=4*medications_lifetime_dispenses
1007 medications_lifetime_length<=1/2*healthcare_coverage-longitude
1008 medications_lifetime_length<=medications_lifetime_cost
1009 medications_lifetime_length<=1/4*(medications_lifetime_dispenses-2)^2
1010 medications_lifetime_length<=10^(log(medications_lifetime_cost)/log(10)-1)
1011 medications_lifetime_length<=10^(2*e^encounters_lifetime_perc_covered)
1012 medications_lifetime_length<=(medications_lifetime-
medications_lifetime_dispenses)^2
1013 medications_lifetime_length<=longitude^2-encounters_lifetime_payer_coverage
1014 medications_lifetime_length<=(encounters_lifetime_total_cost+1)/immunizatio

```
ns_lifetime
1015 medications_lifetime_length<=healthcare_expenses^medications_lifetime/medic
ations_lifetime_cost
1016 medications_lifetime_length>=num_allergies
1017 medications_lifetime_length>=4*medications_lifetime_dispenses
1018 medications_lifetime_length>=immunizations_lifetime_cost*log(healthcare_exp
enses)/log(10)
1019 medications_lifetime_length>=latitude^2*num_allergies^2
1020 medications_lifetime_length>=encounters_lifetime_payer_coverage*log(active_
care_plans)/log(10)
1021 medications_lifetime_length>=-encounters_lifetime_payer_coverage+e^lifetime
_care_plans
1022 medications_lifetime_length>=log(active_condition_length)*medications_lifet
ime_dispenses
1023 medications_lifetime_length>=DALY*ceil(immunizations_lifetime_cost)
1024 medications_lifetime_length>=log(encounters_lifetime_total_cost)*medication
s_lifetime_dispenses/log(10)
1025 medications_lifetime_length>=latitude^2*medications_lifetime_perc_covered^2
1026 medications_lifetime_length<=-encounters_lifetime_total_cost+healthcare_cov
erage-1
1027 medications_lifetime_length<=medications_lifetime_cost
1028 medications_lifetime_length<=QOLS^2*medications_lifetime_dispenses^2
1029 medications_lifetime_length<=encounters_lifetime_payer_coverage/sqrt(medica
tions_lifetime_perc_covered)
1030 medications_lifetime_length<=encounters_lifetime_payer_coverage+e^active_co
ndition_length
1031 medications_lifetime_length<=1/2*active_condition_length*encounters_lifetim
e_payer_coverage
1032 medications_lifetime_length<=encounters_lifetime_payer_coverage*e^medicatio
ns_lifetime
1033 medications_lifetime_length<=longitude^2/QOLS^2
1034 medications_lifetime_length<=log(QALY^medications_lifetime_dispenses)
1035 medications_lifetime_length>=device_lifetime_length
1036 medications_lifetime_length>=log(latitude)*medications_lifetime_dispenses
1037 medications_lifetime_length>=log(encounters_lifetime_total_cost)*medication
s_lifetime_dispenses/log(10)
1038 medications_lifetime_length>=log(active_condition_length)*medications_lifet
ime_dispenses
1039 medications_lifetime_length>=encounters_lifetime_payer_coverage*log(medicat
ions_active)
1040 medications_lifetime_length>=minimum(procedures_lifetime_cost,e^Calcium)
1041 medications_lifetime_length>=1/2*medications_lifetime_cost^encounters_lifet
ime_perc_covered
1042 medications_lifetime_length>=1/2*medications_lifetime_cost/lifetime_conditi
on_length
1043 medications_lifetime_dispenses<=healthcare_coverage
1044 medications_lifetime_dispenses<=medications_lifetime_length/sqrt(DALY)
1045 medications_lifetime_dispenses<=e^encounters_count-
```

```
lifetime_care_plan_length
1046 medications_lifetime_dispenses<=e^active_conditions/immunizations_lifetime
1047 medications_lifetime_dispenses<=10^(sqrt(active_conditions)+1)
1048 medications_lifetime_dispenses<=e^active_care_plan_length
1049 medications_lifetime_dispenses<=(active_condition_length-1)*lifetime_care_p
lan_length
1050 medications_lifetime_dispenses<=floor(1/4*medications_lifetime_length)
1051 medications_lifetime_dispenses<=sqrt(healthcare_coverage*lifetime_condition
_length)
1052 medications_lifetime_dispenses<=active_condition_length^floor(DALY)
1053 medications_lifetime_dispenses>=num_allergies
1054 medications_lifetime_dispenses>=medications_lifetime
1055 medications_lifetime_dispenses>=active_care_plan_length^2-encounters_lifeti
me_payer_coverage
1056
medications_lifetime_dispenses>=2*immunizations_lifetime_cost*medications_active
1057 medications_lifetime_dispenses>=lifetime_condition_length*log(medications_l
ifetime_length)/log(10)
1058 medications_lifetime_dispenses>=floor(medications_lifetime/encounters_lifet
ime_perc_covered)
1059 medications_lifetime_dispenses>=log(DALY)*medications_lifetime
1060 medications_lifetime_dispenses>=10^medications_active*medications_lifetime_
perc_covered
1061 medications_lifetime_dispenses>=medications_lifetime_perc_covered^2*procedu
res_lifetime_cost
1062 medications_lifetime_dispenses>=medications_lifetime_length/log(immunizatio
ns_lifetime_cost)
1063 medications_lifetime_dispenses<=sqrt(healthcare_expenses/medications_lifeti
me_perc_covered)
1064 medications_lifetime_dispenses<=medications_lifetime_cost
1065 medications_lifetime_dispenses<=maximum(Platelet_distribution_width__Entiti
c_volume__in_Blood_by_Automated_count,10^lifetime_conditions)
1066 medications_lifetime_dispenses<=encounters_lifetime_total_cost*log(10)/log(
lifetime_condition_length)
1067 medications_lifetime_dispenses<=medications_lifetime_length/log(latitude)
1068 medications_lifetime_dispenses<=QALY^2*active_care_plans
1069 medications_lifetime_dispenses<=10^sqrt(active_care_plan_length)
1070 medications_lifetime_dispenses<=(latitude-lifetime_care_plans)^2
1071 medications_lifetime_dispenses<=medications_lifetime_length/log(QALY)
1072 medications_lifetime_dispenses>=num_allergies
1073 medications_lifetime_dispenses>=log(DALY)*medications_lifetime
1074
medications_lifetime_dispenses>=medications_lifetime_length/(encounters_count+1)
1075 medications_lifetime_dispenses>=latitude*log(10)/log(DALY)
1076 medications_lifetime_dispenses>=sqrt(medications_lifetime_cost)-latitude
1077 medications_lifetime_dispenses>=DALY^2-QALY
1078 medications_lifetime_dispenses>=medications_active^log(encounters_lifetime_
total_cost)
```

```
1079 medications_lifetime_dispenses<=encounters_lifetime_total_cost
1080 medications_lifetime_dispenses<=encounters_lifetime_payer_coverage*e^(-enco
unters_lifetime_perc_covered)
1081 medications_lifetime_dispenses<=medications_lifetime_cost
1082 medications_lifetime_dispenses<=ceil(e^(lifetime_care_plans^2))
1083 medications_lifetime_dispenses<=(latitude-medications_active)^2
1084 medications_lifetime_dispenses<=1/2*10^log(encounters_count)
1085 medications_lifetime_dispenses<=1/2*(QALY+1)^2
1086
medications_lifetime_dispenses<=sqrt(healthcare_expenses)/immunizations_lifetime
1087 medications_lifetime_dispenses<=medications_lifetime_length/log(latitude)
1088 medications_lifetime_dispenses>=num_allergies
1089 medications_lifetime_dispenses>=medications_lifetime_length/(active_conditi
ons+1)
1090 medications_lifetime_dispenses>=encounters_lifetime_total_cost/(latitude-1)
1091 medications_lifetime_dispenses>=(procedures_lifetime_cost-1)/lifetime_care_
plan_length
1092 medications_lifetime_dispenses>=medications_lifetime_length/log(immunizatio
ns_lifetime_cost)
1093 medications_lifetime_dispenses>=encounters_lifetime_total_cost/10^DALY
1094 medications_lifetime_dispenses>=ceil(maximum(Platelets____volume__in_Blood_
by_Automated_count,mean_DALY))
1095 medications_lifetime_dispenses>=ceil(immunizations_lifetime_cost-
lifetime_condition_length)
1096 medications_lifetime_dispenses>=medications_lifetime_length^encounters_life
time_perc_covered-1
1097 medications_active<=active_care_plans
1098 medications_active<=ceil(log(latitude)/log(10))
1099 medications_active<=e^healthcare_coverage
1100 medications_active<=ceil(1/2*lifetime_care_plans)
1101 medications_active<=healthcare_expenses^QOLS
1102 medications_active<=active_conditions-num_allergies
1103 medications_active>=device_lifetime_length
1104 medications_active>=num_allergies-2
1105 medications_active>=ceil(medications_lifetime_perc_covered)
1106 medications_active>=immunizations_lifetime-num_allergies
1107 medications_active>=sqrt(procedures_lifetime)
1108 medications_active>=-immunizations_lifetime_cost+log(medications_lifetime)
1109
medications_active>=floor(active_care_plan_length)-lifetime_condition_length
1110 medications_active>=minimum(active_care_plans,Creatinine)-1
1111 medications_active>=floor(age+longitude)
1112 medications_active<=active_care_plans
1113 medications_active<=medications_lifetime
1114 medications_active<=active_care_plans-num_allergies
1115 medications_active<=active_conditions-1
1116 medications_active<=log(floor(DALY))^2
1117 medications_active<=floor(log(latitude))
```

```
1118 medications_active<=DALY*healthcare_expenses
1119 medications_active>=num_allergies
1120 medications_active>=(active_care_plans+1)*imaging_studies_lifetime
1121 medications_active>=2*num_allergies
1122 medications_active>=immunizations_lifetime^2-1
1123
medications_active>=-encounters_lifetime_payer_coverage+medications_lifetime
1124 medications_active>=log(medications_lifetime_cost^imaging_studies_lifetime)
/log(10)
1125
medications_active>=medications_lifetime_dispenses/(procedures_lifetime_cost-1)
1126 medications_active<=active_care_plans
1127 medications_active<=medications_lifetime
1128 medications_active<=floor(DALY)
1129 medications_active<=floor(log(latitude))
1130 medications_active<=ceil(10^encounters_lifetime_perc_covered)
1131 medications_active<=(active_care_plans-procedures_lifetime)^2
1132 medications_active<=(active_care_plans-1)^2
1133 medications_active>=device_lifetime_length
1134 medications_active>=-active_conditions+2*procedures_lifetime
1135 medications_active>=num_allergies-1
1136 medications_active>=sqrt(immunizations_lifetime)
1137 medications_active>=-DALY+lifetime_care_plans+1
1138 medications_active>=-active_conditions+lifetime_conditions
1139 medications_active>=minimum(active_care_plans,immunizations_lifetime)
1140 medications_active>=(active_care_plans-1)*num_allergies
1141 procedures_lifetime<=e^immunizations_lifetime
1142 procedures_lifetime<=active_care_plan_length
1143 procedures_lifetime<=procedures_lifetime_cost
1144 procedures_lifetime<=ceil(DALY)
1145 procedures_lifetime<=healthcare_expenses^medications_lifetime_perc_covered
1146 procedures_lifetime<=2*10^imaging_studies_lifetime
1147 procedures_lifetime>=device_lifetime_length
1148 procedures_lifetime>=imaging_studies_lifetime*lifetime_care_plans
1149 procedures_lifetime>=2*immunizations_lifetime
1150 procedures_lifetime>=minimum(immunizations_lifetime_cost,floor(Creatinine))
1151 procedures_lifetime<=active_care_plans
1152 procedures_lifetime<=immunizations_lifetime
1153 procedures_lifetime<=procedures_lifetime_cost
1154 procedures_lifetime>=device_lifetime_length
1155 procedures_lifetime>=imaging_studies_lifetime
1156 procedures_lifetime>=-active_conditions+num_allergies
1157 procedures_lifetime>=-imaging_studies_lifetime+immunizations_lifetime
1158 procedures_lifetime>=ceil(2*log(medications_active)/log(10))
1159 procedures_lifetime>=immunizations_lifetime^2-active_care_plans
1160 procedures_lifetime<=floor(log(healthcare_coverage)/log(10))
1161 procedures_lifetime<=encounters_count
1162 procedures_lifetime<=encounters_lifetime_payer_coverage
```

```
1163 procedures_lifetime<=procedures_lifetime_cost
1164 procedures_lifetime<=-active_care_plans+encounters_count
1165 procedures_lifetime<=10^immunizations_lifetime
1166 procedures_lifetime<=ceil(1/active_care_plans)
1167 procedures_lifetime>=device_lifetime_length
1168 procedures_lifetime>=minimum(num_allergies,immunizations_lifetime)
1169 procedures_lifetime>=minimum(immunizations_lifetime,medications_active)
1170 procedures_lifetime>=floor(log(procedures_lifetime_cost)/log(10)-1)
1171 procedures_lifetime>=minimum(procedures_lifetime_cost,floor(Creatinine))
1172 procedures_lifetime_cost<=sqrt(QALY)*medications_lifetime_cost
1173 procedures_lifetime_cost<=healthcare_expenses*procedures_lifetime
1174 procedures_lifetime_cost<=medications_lifetime_cost^2
1175 procedures_lifetime_cost<=sqrt(2)*sqrt(10^lifetime_condition_length)
1176 procedures_lifetime_cost<=(procedures_lifetime+1)*healthcare_coverage
1177 procedures_lifetime_cost<=minimum(healthcare_expenses,High_Density_Lipoprot
ein_Cholesterol^2)
1178
procedures_lifetime_cost<=e^(healthcare_coverage/medications_lifetime_dispenses)
1179 procedures_lifetime_cost>=num_allergies
1180 procedures_lifetime_cost>=sqrt(device_lifetime_length)*encounters_count
1181 procedures_lifetime_cost>=2*encounters_lifetime_payer_coverage-
healthcare_coverage
1182 procedures_lifetime_cost>=10^procedures_lifetime*num_allergies
1183 procedures_lifetime_cost>=2*lifetime_condition_length*num_allergies
1184 procedures_lifetime_cost>=log(10^procedures_lifetime)^2
1185 procedures_lifetime_cost>=e^active_care_plans*procedures_lifetime
1186 procedures_lifetime_cost<=2*healthcare_expenses/active_care_plan_length
1187 procedures_lifetime_cost<=2*healthcare_coverage
1188 procedures_lifetime_cost<=10^lifetime_care_plans*lifetime_condition_length
1189 procedures_lifetime_cost<=medications_lifetime_cost^2
1190 procedures_lifetime_cost<=healthcare_expenses*procedures_lifetime
1191 procedures_lifetime_cost<=(Body_Mass_Index^2)^procedures_lifetime
1192 procedures_lifetime_cost<=healthcare_coverage^2/lifetime_condition_length^2
1193 procedures_lifetime_cost<=10^lifetime_conditions+healthcare_coverage
1194 procedures_lifetime_cost<=healthcare_expenses/(immunizations_lifetime*medic
ations_lifetime_dispenses)
1195 procedures_lifetime_cost>=num_allergies
1196 procedures_lifetime_cost>=sqrt(procedures_lifetime)^active_conditions
1197 procedures_lifetime_cost>=-10^DALY+medications_lifetime_dispenses
1198 procedures_lifetime_cost>=10^(-healthcare_coverage+lifetime_conditions)
1199 procedures_lifetime_cost>=2*immunizations_lifetime_cost-
medications_lifetime_cost
1200
procedures_lifetime_cost>=-2*immunizations_lifetime_cost+2*medications_lifetime
1201 procedures_lifetime_cost<=age^2*encounters_count^2
1202 procedures_lifetime_cost<=healthcare_expenses*procedures_lifetime
1203 procedures_lifetime_cost<=minimum(healthcare_expenses,10^mean_Potassium)
1204 procedures_lifetime_cost<=healthcare_coverage^2/active_condition_length^2
```

```
1205 procedures_lifetime_cost<=healthcare_expenses*lifetime_care_plans
1206 procedures_lifetime_cost<=10^maximum(active_care_plans,procedures_lifetime)
1207 procedures_lifetime_cost<=healthcare_expenses^QOLS*encounters_lifetime_paye
r_coverage
1208 procedures_lifetime_cost>=num_allergies
1209 procedures_lifetime_cost>=(immunizations_lifetime-1)*healthcare_coverage
1210 procedures_lifetime_cost>=procedures_lifetime^sqrt(encounters_count)
1211 procedures_lifetime_cost>=DALY^2*procedures_lifetime
1212 procedures_lifetime_cost>=healthcare_expenses*procedures_lifetime/encounter
s_lifetime_payer_coverage
1213 QOLS<=active_conditions
1214 QOLS<=mean_QOLS
1215 QOLS>=mean_QOLS
1216 QOLS<=mean_QOLS
1217 QOLS<=medications_lifetime
1218 QOLS>=mean_QOLS
1219 QOLS<=mean_QOLS
1220 QOLS>=mean_QOLS
1221 QALY<=mean_QALY
1222 QALY>=mean_QALY
1223 QALY<=mean_QALY
1224 QALY>=mean_QALY
1225 QALY<=mean_QALY
1226 QALY>=mean_QALY
1227 DALY<=mean_DALY
1228 DALY>=QOLS
1229 DALY>=mean_DALY
1230 DALY<=mean_DALY
1231 DALY<=active_condition_length
1232 DALY>=mean_DALY
1233 DALY<=mean_DALY
1234 DALY>=device_lifetime_length
1235 DALY>=mean_DALY
1236 Diastolic_Blood_Pressure>=mean_Diastolic_Blood_Pressure
1237 Diastolic_Blood_Pressure>=ceil(mean_Diastolic_Blood_Pressure)
1238 Diastolic_Blood_Pressure>=1/2*encounters_count+procedures_lifetime
1239
Diastolic_Blood_Pressure>=Systolic_Blood_Pressure*log(immunizations_lifetime)
1240 Diastolic_Blood_Pressure>=mean_Diastolic_Blood_Pressure
1241 Diastolic_Blood_Pressure>=(active_care_plans-1)^Pain_severity___0_10_verbal
_numeric_rating__Score____Reported
1242 Diastolic_Blood_Pressure>=minimum(encounters_count,ceil(mean_Heart_rate))
1243 mean_DALY<=DALY
1244 mean_DALY>=num_allergies
1245 mean_DALY>=DALY
1246 mean_DALY<=DALY
1247 mean_DALY>=num_allergies
1248 mean_DALY>=DALY
```

1249 mean_DALY<=active_care_plan_length
1250 mean_DALY<=DALY
1251 mean_DALY>=num_allergies
1252 mean_DALY>=DALY
1253 mean_QALY<=QALY
1254 mean_QALY>=QALY
1255 mean_QALY<=QALY
1256 mean_QALY>=QALY
1257 mean_QALY<=QALY
1258 mean_QALY>=QALY
1259 mean_QOLS<=QOLS
1260 mean_QOLS<=encounters_count
1261 mean_QOLS>=QOLS
1262 mean_QOLS<=lifetime_care_plans
1263 mean_QOLS<=active_conditions
1264 mean_QOLS<=QOLS
1265 mean_QOLS>=QOLS
1266 mean_QOLS<=active_conditions
1267 mean_QOLS<=QOLS
1268 mean_QOLS>=QOLS
Not ICU
1 healthcare_expenses<=10^log(encounters_lifetime_total_cost+1)
2 healthcare_expenses<=10^sqrt(latitude-1)
3 healthcare_expenses<=QALY^2*lifetime_condition_length^2
4 healthcare_expenses<=e^(-active_care_plan_length+lifetime_condition_length)
5 healthcare_expenses<=(latitude-longitude)^active_conditions
6 healthcare_expenses<=1/2*lifetime_condition_length*medications_lifetime_cost
7 healthcare_expenses<=QALY^2*medications_lifetime_length
8 healthcare_expenses<=healthcare_coverage^(1/medications_lifetime_perc_covered)
9 healthcare_expenses<=healthcare_coverage*medications_lifetime_cost/medications
_lifetime_dispenses
10 healthcare_expenses>=Body_Mass_Index*encounters_count^2
11 healthcare_expenses>=immunizations_lifetime_cost^2*procedures_lifetime
12 healthcare_expenses>=healthcare_coverage*log(lifetime_condition_length)
13 healthcare_expenses>=e^(age/encounters_count)
14 healthcare_expenses>=e^Respiratory_rate/active_care_plans
15 healthcare_expenses>=Pain_severity___0_10_verbal_numeric_rating__Score____Rep
orted^2*healthcare_coverage
16 healthcare_expenses>=lifetime_care_plan_length^2*mean_Pain_severity___0_10_ve
rbal_numeric_rating__Score____Reported^2
17 healthcare_expenses>=(lifetime_condition_length+medications_lifetime)^2
18 healthcare_expenses>=e^(sqrt(2)*sqrt(Heart_rate))
19 healthcare_expenses>=(healthcare_coverage^2)^encounters_lifetime_perc_covered
20 healthcare_expenses<=encounters_lifetime_payer_coverage*longitude^2
21 healthcare_expenses<=10^sqrt(latitude-1)
22 healthcare_expenses<=10^(4*DALY^2)
23
healthcare_expenses<=healthcare_coverage^active_care_plans/medications_lifetime

```
24 healthcare_expenses<=healthcare_coverage*lifetime_care_plans/imaging_studies_
lifetime
25 healthcare_expenses<=1/2*latitude^encounters_count
26 healthcare_expenses<=e^(age/active_care_plans)
27 healthcare_expenses<=10^log(2*encounters_lifetime_payer_coverage)
28 healthcare_expenses<=1/2*QALY^4
29 healthcare_expenses>=healthcare_coverage^2/encounters_count^2
30 healthcare_expenses>=lifetime_care_plan_length^e^num_allergies
31
healthcare_expenses>=10^(lifetime_care_plans+medications_lifetime_perc_covered)
32 healthcare_expenses>=(active_conditions+1)^procedures_lifetime
33 healthcare_expenses>=1/2*immunizations_lifetime_cost^procedures_lifetime
34 healthcare_expenses>=minimum(procedures_lifetime_cost,Creatinine)^2
35 healthcare_expenses>=10^(QOLS+active_care_plans)
36 healthcare_expenses>=1/2*immunizations_lifetime_cost*procedures_lifetime_cost
37 healthcare_expenses>=active_conditions^(10^QOLS)
38 healthcare_expenses>=10^(-DALY+lifetime_conditions)
39 healthcare_expenses<=encounters_lifetime_total_cost*healthcare_coverage/medic
ations_active
40 healthcare_expenses<=healthcare_coverage^DALY/imaging_studies_lifetime
41 healthcare_expenses<=e^(1/2*floor(age))
42 healthcare_expenses<=-(encounters_lifetime_total_cost-
healthcare_coverage)*encounters_lifetime_base_cost
43 healthcare_expenses<=latitude^lifetime_conditions/active_conditions
44 healthcare_expenses<=10^abs(log(procedures_lifetime_cost))
45
healthcare_expenses<=healthcare_coverage*lifetime_condition_length/num_allergies
46 healthcare_expenses<=QALY^2*latitude^2
47 healthcare_expenses<=healthcare_coverage^active_care_plans/active_condition_l
ength
48 healthcare_expenses<=healthcare_coverage*lifetime_condition_length/imaging_st
udies_lifetime
49 healthcare_expenses>=(medications_lifetime-1)*medications_lifetime_length
50 healthcare_expenses>=(active_care_plan_length+lifetime_condition_length)^2
51 healthcare_expenses>=log(encounters_lifetime_total_cost)*procedures_lifetime_
cost/log(10)
52 healthcare_expenses>=10^e^(e^medications_lifetime_perc_covered)
53 healthcare_expenses>=10^(active_conditions-medications_lifetime)
54
healthcare_expenses>=device_lifetime_length^2*encounters_lifetime_payer_coverage
55 healthcare_expenses>=encounters_count^2*medications_lifetime
56 healthcare_expenses>=sqrt(medications_lifetime_dispenses)*procedures_lifetime
_cost
57 healthcare_expenses>=medications_lifetime_length^2/encounters_count^2
58 healthcare_expenses>=10^minimum(active_care_plans,Hemoglobin_A1c_Hemoglobin_t
otal_in_Blood)
59 healthcare_coverage<=healthcare_expenses/log(active_conditions)
60 healthcare_coverage<=encounters_lifetime_payer_coverage^(1/encounters_lifetim
```

```
e_perc_covered)
61 healthcare_coverage<=latitude^sqrt(medications_lifetime)
62 healthcare_coverage<=(2*encounters_lifetime_total_cost)^medications_active
63 healthcare_coverage<=minimum(healthcare_expenses,10^mean_Erythrocytes____volu
me__in_Blood_by_Automated_count)
64 healthcare_coverage<=active_conditions*e^encounters_count
65 healthcare_coverage<=e^(10^e^immunizations_lifetime)
66 healthcare_coverage<=10^floor(sqrt(active_condition_length))
67 healthcare_coverage<=(QOLS+1)^QALY
68 healthcare_coverage>=2*encounters_lifetime_payer_coverage-2*lifetime_care_pla
n_length
69 healthcare_coverage>=e^active_conditions/active_care_plan_length
70 healthcare_coverage>=(QALY+active_conditions)^2
71 healthcare_coverage>=procedures_lifetime^(1/encounters_lifetime_perc_covered)
72 healthcare_coverage>=healthcare_expenses/(encounters_lifetime_total_cost-1)
73 healthcare_coverage>=2*10^log(device_lifetime_length)
74 healthcare_coverage>=latitude^(1/encounters_lifetime_perc_covered)
75 healthcare_coverage>=10^log(ceil(active_care_plan_length))
76 healthcare_coverage>=medications_lifetime_length^2/age^2
77 healthcare_coverage>=active_care_plans^2*lifetime_condition_length
78 healthcare_coverage<=-(encounters_lifetime_payer_coverage-latitude)*longitude
79 healthcare_coverage<=healthcare_expenses/10^num_allergies
80 healthcare_coverage<=e^(10^e^immunizations_lifetime)
81 healthcare_coverage<=QALY*healthcare_expenses/medications_lifetime
82 healthcare_coverage<=10^encounters_count*age
83 healthcare_coverage<=healthcare_expenses^DALY/active_care_plan_length
84 healthcare_coverage<=lifetime_condition_length^2/medications_lifetime_perc_co
vered
85 healthcare_coverage<=e^(10^(1/imaging_studies_lifetime))
86 healthcare_coverage<=e^(age/medications_active)
87 healthcare_coverage>=(2*age)^device_lifetime_length
88 healthcare_coverage>=16*DALY^2
89 healthcare_coverage>=sqrt(QALY)*age
90 healthcare_coverage>=immunizations_lifetime_cost^2/lifetime_conditions
91 healthcare_coverage>=10^minimum(active_care_plans,mean_Potassium)
92 healthcare_coverage>=e^(latitude/active_care_plan_length)
93 healthcare_coverage>=healthcare_expenses/(QALY*lifetime_conditions)
94
healthcare_coverage>=healthcare_expenses*medications_lifetime_perc_covered/age
95 healthcare_coverage>=active_care_plans^(log(healthcare_expenses)/log(10))
96 healthcare_coverage>=10^(10^medications_lifetime_perc_covered-1)
97 healthcare_coverage<=healthcare_expenses/(active_conditions*medications_lifet
ime_perc_covered)
98 healthcare_coverage<=e^(10^e^immunizations_lifetime)
99 healthcare_coverage<=healthcare_expenses/medications_active^2
100 healthcare_coverage<=10^(sqrt(1/2)*sqrt(age))
101 healthcare_coverage<=10^e^(1/encounters_lifetime_perc_covered)
102 healthcare_coverage<=10^encounters_count/medications_lifetime_dispenses
```

```
103 healthcare_coverage<=e^(10^e^procedures_lifetime)
104
healthcare_coverage<=maximum(medications_lifetime_cost,healthcare_expenses/age)
105
healthcare_coverage>=10^(medications_active+medications_lifetime_perc_covered)
106 healthcare_coverage>=Heart_rate^immunizations_lifetime+1
107 healthcare_coverage>=10^log(ceil(active_care_plan_length))
108 healthcare_coverage>=(active_conditions+encounters_count)^2
109
healthcare_coverage>=lifetime_care_plan_length*sqrt(medications_lifetime_length)
110 healthcare_coverage>=lifetime_condition_length^e^medications_lifetime_perc_c
overed
111 healthcare_coverage>=1/4*(medications_lifetime-1)^2
112
healthcare_coverage>=maximum(Low_Density_Lipoprotein_Cholesterol,mean_DALY)^2
113 healthcare_coverage>=16*active_care_plans^4
114 healthcare_coverage>=maximum(Chloride,mean_DALY)^2
115 latitude<=healthcare_expenses/(DALY*medications_lifetime)
116 latitude<=sqrt(active_care_plans)*encounters_count
117 latitude<=maximum(encounters_count,active_care_plan_length-1)
118 latitude<=(immunizations_lifetime_cost-lifetime_care_plan_length)^2
119 latitude<=-active_conditions+age+1
120 latitude<=medications_lifetime_length/floor(QALY)
121 latitude<=active_care_plan_length/QOLS
122 latitude<=QALY/imaging_studies_lifetime
123 latitude<=minimum(healthcare_expenses,Alkaline_phosphatase__Enzymatic_activi
ty_volume__in_Serum,Plasma)
124 latitude<=minimum(healthcare_expenses,2*Carbon_Dioxide)
125 latitude>=e^(e^QOLS+1)
126 latitude>=active_condition_length*medications_lifetime_perc_covered-1
127 latitude>=ceil(lifetime_condition_length)/active_conditions
128 latitude>=(encounters_lifetime_perc_covered-1)*longitude
129 latitude>=2*QALY^encounters_lifetime_perc_covered
130 latitude>=10^(encounters_count/age)
131 latitude>=age^(2/log(10))
132 latitude>=(age^2)^(1/log(10))
133 latitude>=sqrt(encounters_lifetime_payer_coverage/active_conditions)
134 latitude<=1/2*sqrt(medications_lifetime_cost)-1
135 latitude<=2*active_care_plan_length+encounters_lifetime_perc_covered
136 latitude<=healthcare_expenses^encounters_lifetime_perc_covered+active_care_p
lan_length
137 latitude<=healthcare_expenses/encounters_lifetime_payer_coverage+medications
_lifetime_perc_covered
138 latitude<=maximum(active_condition_length,healthcare_expenses/procedures_lif
etime_cost)
139 latitude<=maximum(Erythrocyte_distribution_width__Entitic_volume__by_Automat
ed_count,healthcare_expenses^QOLS)
140 latitude<=medications_lifetime_dispenses/(procedures_lifetime+1)
```

```
141 latitude<=floor(lifetime_condition_length)/immunizations_lifetime
142 latitude<=10^medications_active*encounters_count
143 latitude<=log(e^sqrt(healthcare_coverage))/log(10)
144 latitude>=10^sqrt(log(active_conditions))
145 latitude>=1/2*immunizations_lifetime_cost-lifetime_care_plan_length
146 latitude>=(encounters_lifetime_perc_covered-1)^(-2)
147 latitude>=2*QALY/encounters_count
148 latitude>=log(10^(2*device_lifetime_length))
149 latitude>=-DALY+floor(active_condition_length)
150 latitude>=(active_condition_length-1)*QOLS
151 latitude>=active_care_plans^2+lifetime_care_plans
152 latitude>=-DALY^2+encounters_count
153 latitude>=floor(-DALY+active_condition_length)
154 latitude<=2*medications_lifetime_cost/medications_lifetime_length
155 latitude<=2*active_condition_length/immunizations_lifetime
156 latitude<=QALY*log(10)/log(active_care_plans)
157 latitude<=2*active_care_plan_length+medications_lifetime_dispenses
158 latitude<=maximum(healthcare_coverage,medications_lifetime)
159 latitude<=2*log(immunizations_lifetime_cost)^2
160 latitude<=sqrt(lifetime_care_plans)*lifetime_condition_length
161 latitude<=QALY+e^num_allergies
162 latitude<=1/2*lifetime_condition_length/num_allergies
163 latitude<=abs(encounters_lifetime_payer_coverage-
medications_lifetime_length)
164 latitude>=1/2*medications_lifetime_cost/encounters_lifetime_total_cost
165 latitude>=DALY+log(medications_lifetime_cost)
166 latitude>=e^(sqrt(2)*sqrt(medications_active))
167 latitude>=active_condition_length*e^(-QOLS)
168 latitude>=log(2*healthcare_expenses)^2/log(10)^2
169 latitude>=minimum(immunizations_lifetime_cost,1/2*Heart_rate)
170 latitude>=active_care_plan_length/(medications_lifetime_perc_covered+1)
171 latitude>=e^(e^QOLS+1)
172 latitude>=e^(lifetime_care_plans^encounters_lifetime_perc_covered)
173 latitude>=1/2*encounters_lifetime_payer_coverage/encounters_count
174 longitude<=-latitude/QOLS
175 longitude<=-QALY+2*active_conditions
176 longitude<=10^QOLS-QALY
177 longitude<=-QALY*QOLS
178 longitude<=-age+immunizations_lifetime_cost-1
179 longitude<=-QALY+medications_lifetime-1
180 longitude<=10^medications_active-lifetime_care_plan_length
181 longitude<=healthcare_coverage-1/2*immunizations_lifetime_cost
182 longitude<=-10^(encounters_lifetime_perc_covered+1)
183 longitude<=-1/2*lifetime_care_plan_length-1
184 longitude>=-minimum(healthcare_expenses,Diastolic_Blood_Pressure)
185 longitude>=-2*latitude+2*procedures_lifetime
186 longitude>=-(healthcare_expenses-
latitude)/encounters_lifetime_payer_coverage
```

```
187 longitude>=-(healthcare_coverage-latitude)/age
188 longitude>=-lifetime_condition_length/medications_lifetime_perc_covered
189 longitude>=-active_conditions*lifetime_condition_length
190 longitude>=QALY-1/2*encounters_lifetime_payer_coverage
191 longitude>=active_conditions-2*latitude
192 longitude>=-2*latitude+lifetime_conditions
193 longitude>=-sqrt(2)*sqrt(healthcare_coverage)
194 longitude<=QALY-2*latitude
195 longitude<=(-lifetime_care_plans)^active_care_plans
196
longitude<=minimum(healthcare_expenses,-High_Density_Lipoprotein_Cholesterol)
197 longitude<=active_conditions-1/2*encounters_count
198 longitude<=sqrt(active_condition_length)-age
199 longitude<=-1/4*immunizations_lifetime_cost
200 longitude<=-age+encounters_count-1
201 longitude<=active_conditions/log(medications_lifetime_perc_covered)
202 longitude<=-floor(active_care_plan_length)+lifetime_care_plans
203 longitude<=-sqrt(procedures_lifetime_cost)+active_care_plan_length
204 longitude>=-1/4*medications_lifetime^2
205 longitude>=log(medications_active)/log(10)-age
206 longitude>=-10^lifetime_conditions+encounters_count
207 longitude>=2*active_care_plans-2*latitude
208 longitude>=log(immunizations_lifetime_cost)/log(10)-age
209 longitude>=log(num_allergies)/log(10)-medications_lifetime
210 longitude>=-2*latitude+2*medications_active
211 longitude>=-minimum(healthcare_expenses,mean_Heart_rate)
212 longitude<=-1/4*immunizations_lifetime_cost
213 longitude<=-active_condition_length-2
214 longitude<=sqrt(lifetime_condition_length)-age
215 longitude<=-2*QALY+2*active_condition_length
216 longitude<=-2*QALY+medications_lifetime_dispenses
217 longitude<=encounters_count*log(QOLS)
218 longitude<=sqrt(medications_lifetime)-QALY
219 longitude<=-active_condition_length-procedures_lifetime
220 longitude<=1/QOLS-active_care_plan_length
221 longitude>=2*active_care_plans-2*latitude
222 longitude>=floor(active_condition_length)-lifetime_condition_length
223 longitude>=-age/encounters_lifetime_perc_covered
224 longitude>=-2*latitude+2*lifetime_care_plans
225 longitude>=-2*latitude+procedures_lifetime
226 longitude>=sqrt(medications_lifetime_dispenses)-lifetime_condition_length
227 longitude>=floor(active_condition_length-lifetime_condition_length)
228 longitude>=-minimum(healthcare_expenses,Low_Density_Lipoprotein_Cholesterol)
229 longitude>=-minimum(healthcare_expenses,mean_Diastolic_Blood_Pressure)
230 longitude>=-minimum(healthcare_expenses,mean_Heart_rate)
231 age<=maximum(encounters_count,-longitude)
232 age<=-longitude/imaging_studies_lifetime
233 age<=abs(latitude-lifetime_condition_length)
```

```
234 age<=maximum(active_condition_length,2*QALY)
235 age<=4*log(healthcare_coverage)^2/log(10)^2
236 age<=encounters_lifetime_perc_covered+2*latitude
237 age<=(log(medications_lifetime_length)+1)^2
238 age<=maximum(encounters_lifetime_total_cost,1/2*latitude)
239 age<=(latitude+1)/encounters_lifetime_perc_covered
240 age>=e^immunizations_lifetime*lifetime_conditions
241 age>=lifetime_conditions*log(medications_lifetime_length)/log(10)
242 age>=log(Respiratory_rate)/log(10)+QALY
243 age>=lifetime_condition_length^QOLS+1
244 age>=2*DALY-procedures_lifetime
245 age>=(Body_Weight+1)/medications_lifetime
246 age>=e^(-mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported+
procedures_lifetime)
247 age>=QALY+lifetime_care_plans
248 age>=Pain_severity___0_10_verbal_numeric_rating__Score____Reported*sqrt(life
time_condition_length)
249 age<=Heart_rate*healthcare_expenses/procedures_lifetime_cost
250 age<=2*Body_Mass_Index+2*encounters_count
251 age<=sqrt(latitude)+Diastolic_Blood_Pressure
252 age<=ceil(log(healthcare_coverage)^2)
253 age<=QALY*log(Diastolic_Blood_Pressure)/log(10)
254 age<=Systolic_Blood_Pressure^2/Body_Height
255 age<=-QALY+ceil(Body_Height)
256 age<=Body_Height/immunizations_lifetime
257 age<=maximum(mean_Diastolic_Blood_Pressure,10^medications_active)
258 age<=1/2*floor(mean_Respiratory_rate)^2
259 age>=latitude+1/2*procedures_lifetime
260 age>=DALY+QALY+1
261 age>=sqrt(medications_active)+active_condition_length
262 age>=log(immunizations_lifetime_cost)/log(10)+QALY
263 age>=minimum(encounters_count,mean_Estimated_Glomerular_Filtration_Rate-1)
264 age>=1/2*maximum(Heart_rate,mean_DALY)
265 age>=log(encounters_lifetime_payer_coverage)*medications_active
266 age>=log(medications_lifetime_dispenses)/log(10)+QALY
267 age<=healthcare_coverage/encounters_lifetime_total_cost+medications_lifetime
_dispenses
268 age<=floor(2*latitude)
269 age<=healthcare_coverage/lifetime_condition_length+active_care_plan_length
270 age<=DALY^2+QALY
271 age<=ceil(lifetime_condition_length)/imaging_studies_lifetime
272 age<=maximum(lifetime_care_plan_length,10^medications_active)
273
age<=maximum(Body_Weight,healthcare_expenses^encounters_lifetime_perc_covered)
274 age<=encounters_count^sqrt(active_conditions)
275 age<=2*latitude-2*medications_lifetime_perc_covered
276 age<=maximum(Body_Weight,ceil(immunizations_lifetime_cost))
277 age>=active_care_plan_length+1/2
```

```
278 age>=DALY+QALY+1
279 age>=10^(medications_lifetime_perc_covered+1)
280 age>=active_condition_length+num_allergies+1
281 age>=active_condition_length+lifetime_care_plans
282 age>=latitude/log(lifetime_care_plans)
283 age>=-log(medications_lifetime_length)+procedures_lifetime
284 age>=log(Alkaline_phosphatase__Enzymatic_activity_volume__in_Serum,Plasma^de
vice_lifetime_length)
285 age>=e^(log(lifetime_care_plans)^2)
286 num_allergies<=active_care_plans
287 num_allergies<=active_condition_length-device_lifetime_length
288 num_allergies<=procedures_lifetime
289 num_allergies<=floor(2*encounters_lifetime_perc_covered)
290 num_allergies<=e^device_lifetime_length
291 num_allergies<=1/2*active_care_plans-immunizations_lifetime
292 num_allergies<=ceil(medications_lifetime_perc_covered)
293 num_allergies<=floor(1/2*procedures_lifetime)
294 num_allergies>=device_lifetime_length
295 num_allergies<=imaging_studies_lifetime
296 num_allergies<=device_lifetime_length
297 num_allergies>=imaging_studies_lifetime
298 num_allergies<=active_care_plans
299 num_allergies<=device_lifetime_length
300 num_allergies<=imaging_studies_lifetime
301 num_allergies>=floor(device_lifetime_length)
302 num_allergies>=-device_lifetime_length
303 num_allergies>=device_lifetime_length^medications_lifetime_cost
304 active_care_plans<=lifetime_care_plans
305 active_care_plans<=-imaging_studies_lifetime+lifetime_care_plans
306 active_care_plans>=e^num_allergies
307 active_care_plans>=minimum(lifetime_care_plans,2*medications_active)
308 active_care_plans>=lifetime_care_plans/DALY
309 active_care_plans>=floor(log(active_conditions))
310 active_care_plans>=QOLS
311 active_care_plans>=lifetime_care_plans^immunizations_lifetime
312 active_care_plans>=minimum(lifetime_care_plans,medications_active)
313 active_care_plans>=lifetime_care_plans^imaging_studies_lifetime
314 active_care_plans<=lifetime_care_plans
315 active_care_plans<=active_conditions-imaging_studies_lifetime
316 active_care_plans<=lifetime_conditions/immunizations_lifetime
317 active_care_plans<=-immunizations_lifetime+lifetime_care_plans+1
318 active_care_plans>=2*immunizations_lifetime
319 active_care_plans>=-active_conditions+lifetime_conditions
320 active_care_plans>=Pain_severity___0_10_verbal_numeric_rating__Score____Repo
rted^immunizations_lifetime
321 active_care_plans>=-immunizations_lifetime+lifetime_care_plans-1
322 active_care_plans>=lifetime_care_plans^imaging_studies_lifetime
323 active_care_plans>=floor(10^medications_lifetime_perc_covered)
```

```
324 active_care_plans>=medications_active-2
325 active_care_plans>=2*lifetime_care_plans-lifetime_conditions
326 active_care_plans<=lifetime_care_plans
327 active_care_plans<=ceil(10^QOLS)
328 active_care_plans<=2*active_conditions-lifetime_conditions
329 active_care_plans>=-immunizations_lifetime+lifetime_care_plans
330 active_care_plans>=lifetime_care_plans-1
331 active_care_plans>=(1/QOLS)
332 active_care_plans>=immunizations_lifetime
333 active_care_plans>=lifetime_care_plans^num_allergies
334 active_care_plans>=lifetime_care_plans-medications_lifetime
335 active_care_plans>=-Body_Mass_Index+2*procedures_lifetime
336 active_care_plans>=minimum(lifetime_care_plans,Pain_severity___0_10_verbal_n
umeric_rating__Score____Reported)
337 active_care_plans>=procedures_lifetime/lifetime_care_plans
338 lifetime_care_plans<=active_care_plans
339 lifetime_care_plans>=num_allergies
340 lifetime_care_plans>=active_care_plans
341 lifetime_care_plans>=minimum(active_conditions,log(latitude))
342 lifetime_care_plans<=active_care_plans
343 lifetime_care_plans>=active_care_plans
344 lifetime_care_plans>=floor(device_lifetime_length-1)
345 lifetime_care_plans>=1/2*procedures_lifetime-1
346 lifetime_care_plans>=minimum(DALY,medications_active+1)
347 lifetime_care_plans<=lifetime_conditions
348 lifetime_care_plans<=floor(sqrt(age))
349 lifetime_care_plans<=maximum(active_care_plans,procedures_lifetime_cost)
350 lifetime_care_plans<=active_care_plans+2
351 lifetime_care_plans<=lifetime_conditions-1/2*medications_active
352 lifetime_care_plans<=(active_care_plans+1)/imaging_studies_lifetime
353 lifetime_care_plans<=minimum(healthcare_expenses,floor(mean_History_of_Hospi
talizations_Outpatient_visits))
354 lifetime_care_plans<=active_conditions+procedures_lifetime
355 lifetime_care_plans<=maximum(medications_lifetime,procedures_lifetime)
356
lifetime_care_plans<=ceil(active_care_plans/encounters_lifetime_perc_covered)
357 lifetime_care_plans>=active_care_plans
358 lifetime_care_plans>=active_care_plans+2*num_allergies
359 lifetime_care_plans>=ceil(-QALY+active_care_plan_length)
360 active_care_plan_length<=log(medications_lifetime_length)/log(10)-longitude
361 active_care_plan_length<=lifetime_care_plan_length
362 active_care_plan_length<=lifetime_condition_length
363 active_care_plan_length<=healthcare_expenses^QOLS-
immunizations_lifetime_cost
364 active_care_plan_length<=minimum(healthcare_expenses,2*Alanine_aminotransfer
ase__Enzymatic_activity_volume__in_Serum,Plasma)
365 active_care_plan_length<=-log(device_lifetime_length)/log(10)+active_conditi
on_length
```

```
366 active_care_plan_length<=healthcare_coverage/(lifetime_condition_length+1)
367 active_care_plan_length<=active_condition_length/imaging_studies_lifetime
368 active_care_plan_length<=minimum(healthcare_expenses,Protein__Mass_volume__i
n_Serum,Plasma)
369 active_care_plan_length<=QALY-log(device_lifetime_length)
370 active_care_plan_length>=num_allergies
371 active_care_plan_length>=QOLS*sqrt(medications_lifetime)
372
active_care_plan_length>=-immunizations_lifetime_cost+lifetime_care_plan_length
373 active_care_plan_length>=floor(QOLS)*lifetime_care_plan_length
374 active_care_plan_length>=active_condition_length-procedures_lifetime_cost
375 active_care_plan_length>=active_condition_length*imaging_studies_lifetime
376 active_care_plan_length>=minimum(lifetime_care_plan_length,active_condition_
length)-1
377 active_care_plan_length<=active_condition_length
378 active_care_plan_length<=longitude^2/active_condition_length
379 active_care_plan_length<=e^medications_active*latitude
380 active_care_plan_length>=(immunizations_lifetime+1)^medications_active
381 active_care_plan_length>=lifetime_care_plan_length/active_care_plans
382 active_care_plan_length>=e^active_care_plans-procedures_lifetime_cost
383
active_care_plan_length>=healthcare_expenses^QOLS/encounters_lifetime_total_cost
384 active_care_plan_length>=(sqrt(lifetime_conditions)-1)^2
385 active_care_plan_length>=1/2*maximum(High_Density_Lipoprotein_Cholesterol,me
an_QOLS)
386 active_care_plan_length>=minimum(active_condition_length,1/2*lifetime_care_p
lan_length)
387
active_care_plan_length>=log(10)*medications_lifetime/log(healthcare_expenses)
388 active_care_plan_length>=sqrt(medications_lifetime_length)-immunizations_lif
etime_cost
389 active_care_plan_length<=encounters_count+latitude
390 active_care_plan_length<=lifetime_care_plan_length
391 active_care_plan_length<=maximum(latitude,active_condition_length)
392 active_care_plan_length<=log(healthcare_coverage)/imaging_studies_lifetime
393 active_care_plan_length<=maximum(active_condition_length,QALY)
394 active_care_plan_length<=floor(sqrt(2)*sqrt(encounters_lifetime_total_cost))
395 active_care_plan_length<=healthcare_expenses/procedures_lifetime_cost-
latitude
396 active_care_plan_length>=log(healthcare_coverage)+procedures_lifetime
397
active_care_plan_length>=active_condition_length*log(active_care_plans)/log(10)
398 active_care_plan_length>=QALY-latitude
399 active_care_plan_length>=lifetime_care_plan_length/active_care_plans
400 active_care_plan_length>=minimum(immunizations_lifetime_cost,active_conditio
ns^2)
401 active_care_plan_length>=minimum(active_condition_length,Creatinine)
402 active_care_plan_length>=e^(2*num_allergies)-1
```

```
403 lifetime_care_plan_length<=healthcare_expenses/encounters_lifetime_payer_cov
erage+encounters_lifetime_perc_covered
404
lifetime_care_plan_length<=(lifetime_condition_length+1)/immunizations_lifetime
405 lifetime_care_plan_length<=maximum(immunizations_lifetime_cost,sqrt(healthca
re_coverage))
406 lifetime_care_plan_length<=active_care_plan_length^active_care_plans
407 lifetime_care_plan_length<=1/2*lifetime_condition_length+1/2*medications_lif
etime
408 lifetime_care_plan_length<=10^(encounters_count/procedures_lifetime)
409 lifetime_care_plan_length<=minimum(healthcare_expenses,2*High_Density_Lipopr
otein_Cholesterol)
410 lifetime_care_plan_length<=maximum(mean_Low_Density_Lipoprotein_Cholesterol,
1/device_lifetime_length)
411 lifetime_care_plan_length<=1/2*encounters_lifetime_perc_covered*medications_
lifetime_length
412 lifetime_care_plan_length<=active_care_plan_length^2/lifetime_conditions
413
lifetime_care_plan_length>=minimum(encounters_count,1/immunizations_lifetime)
414 lifetime_care_plan_length>=QOLS*e^num_allergies
415 lifetime_care_plan_length>=maximum(Protein__Mass_volume__in_Serum,Plasma,mea
n_DALY)
416 lifetime_care_plan_length>=medications_active^2+active_conditions
417 lifetime_care_plan_length>=(active_care_plans-1)*DALY
418 lifetime_care_plan_length>=floor(QALY^QOLS)
419 lifetime_care_plan_length>=1/2*immunizations_lifetime_cost-latitude
420 lifetime_care_plan_length>=latitude*log(10)/log(QALY)
421
lifetime_care_plan_length>=encounters_lifetime_perc_covered*e^active_care_plans
422 lifetime_care_plan_length>=immunizations_lifetime_cost*medications_lifetime_
perc_covered^2
423 lifetime_care_plan_length<=floor(DALY*latitude)
424 lifetime_care_plan_length<=active_care_plan_length^2
425 lifetime_care_plan_length<=minimum(healthcare_expenses,10^mean_Pain_severity
___0_10_verbal_numeric_rating__Score____Reported)
426 lifetime_care_plan_length<=sqrt(healthcare_coverage)+QALY
427 lifetime_care_plan_length<=active_care_plan_length^active_care_plans
428 lifetime_care_plan_length<=10^(active_condition_length/active_conditions)
429 lifetime_care_plan_length<=2*active_care_plan_length-longitude
430 lifetime_care_plan_length<=active_care_plan_length*log(encounters_lifetime_p
ayer_coverage)/log(10)
431 lifetime_care_plan_length<=(10^encounters_lifetime_perc_covered)^lifetime_co
nditions
432 lifetime_care_plan_length<=log(lifetime_condition_length^age)/log(10)
433 lifetime_care_plan_length>=log(medications_lifetime)/log(10)+active_care_pla
n_length
434 lifetime_care_plan_length>=encounters_lifetime_payer_coverage^sqrt(medicatio
ns_lifetime_perc_covered)
```

```
435 lifetime_care_plan_length>=device_lifetime_length*sqrt(medications_active)
436 lifetime_care_plan_length>=1/16*active_care_plans^4
437 lifetime_care_plan_length>=(Respiratory_rate-1)^immunizations_lifetime
438 lifetime_care_plan_length>=minimum(age,e^lifetime_care_plans)
439 lifetime_care_plan_length>=encounters_count/(DALY+1)
440 lifetime_care_plan_length>=2*maximum(MCHC__Mass_volume__by_Automated_count,m
ean_DALY)
441 lifetime_care_plan_length>=log(2*medications_lifetime_cost)-1
442 lifetime_care_plan_length>=log(10^(10^imaging_studies_lifetime))
443 lifetime_care_plan_length<=(QALY-1)*active_care_plans
444 lifetime_care_plan_length<=e^(10^sqrt(DALY))
445
lifetime_care_plan_length<=healthcare_expenses^encounters_lifetime_perc_covered-
DALY
446 lifetime_care_plan_length<=maximum(Chloride,10^medications_active)
447 lifetime_care_plan_length<=minimum(healthcare_expenses,ceil(Platelet_distrib
ution_width__Entitic_volume__in_Blood_by_Automated_count))
448 lifetime_care_plan_length<=active_care_plan_length^active_care_plans
449 lifetime_care_plan_length<=active_care_plans*encounters_count+1
450 lifetime_care_plan_length<=floor(encounters_lifetime_total_cost/device_lifet
ime_length)
451
lifetime_care_plan_length<=medications_lifetime_length^2/medications_lifetime^2
452 lifetime_care_plan_length<=medications_lifetime_dispenses/sqrt(active_condit
ion_length)
453 lifetime_care_plan_length>=active_care_plan_length*log(procedures_lifetime)/
log(10)
454 lifetime_care_plan_length>=(2*Heart_rate)^medications_lifetime_perc_covered
455 lifetime_care_plan_length>=e^(encounters_lifetime_perc_covered+1)+1
456 lifetime_care_plan_length>=(-mean_Calcium)^num_allergies
457 lifetime_care_plan_length>=medications_lifetime/log(active_care_plan_length)
458 lifetime_care_plan_length>=age-procedures_lifetime_cost-1
459 lifetime_care_plan_length>=sqrt(DALY*immunizations_lifetime_cost)
460 lifetime_care_plan_length>=2*maximum(Glomerular_filtration_rate_1_73_sq_M_pr
edicted,mean_QOLS)
461 lifetime_care_plan_length>=1/2*sqrt(10^num_allergies)
462 lifetime_care_plan_length>=(medications_active-
medications_lifetime_perc_covered)^2
463 active_conditions<=lifetime_conditions
464 active_conditions<=encounters_count
465 active_conditions<=floor(age/medications_active)
466 active_conditions>=QOLS
467 active_conditions>=2*active_care_plans
468 active_conditions>=lifetime_conditions-1
469 active_conditions>=lifetime_conditions-procedures_lifetime
470 active_conditions>=minimum(lifetime_conditions,immunizations_lifetime_cost)
471 active_conditions>=minimum(lifetime_conditions,medications_active^2)
472 active_conditions<=lifetime_conditions
```

```
473 active_conditions<=encounters_count
474 active_conditions<=floor(e^DALY)
475 active_conditions<=lifetime_conditions-num_allergies
476 active_conditions<=ceil(log(healthcare_expenses))
477 active_conditions>=active_care_plans+1
478 active_conditions>=lifetime_conditions-2
479 active_conditions>=lifetime_conditions/active_care_plans
480 active_conditions>=lifetime_care_plans-1
481 active_conditions>=ceil(10^medications_lifetime_perc_covered)
482 active_conditions>=lifetime_conditions-medications_active
483 active_conditions>=-immunizations_lifetime+lifetime_conditions-1
484 active_conditions>=minimum(lifetime_conditions,sqrt(medications_lifetime))
485 active_conditions>=minimum(lifetime_conditions,Globulin__Mass_volume__in_Ser
um_by_calculation)
486 active_conditions<=lifetime_conditions
487 active_conditions<=medications_lifetime/imaging_studies_lifetime
488 active_conditions<=lifetime_conditions+medications_active-1
489 active_conditions<=2*lifetime_conditions-2*procedures_lifetime
490 active_conditions<=2/num_allergies+2
491 active_conditions>=-lifetime_care_plans+lifetime_conditions
492 active_conditions>=lifetime_conditions-2
493 active_conditions>=lifetime_conditions^imaging_studies_lifetime
494 active_conditions>=-immunizations_lifetime_cost+lifetime_conditions
495 active_conditions>=2*active_care_plans-1
496 active_conditions>=minimum(lifetime_conditions,1/medications_active)
497 active_conditions>=floor(sqrt(active_care_plan_length))
498 active_conditions>=minimum(lifetime_conditions,1/medications_lifetime_perc_c
overed)
499 lifetime_conditions<=active_care_plans+active_conditions
500 lifetime_conditions<=10^e^procedures_lifetime
501 lifetime_conditions<=active_conditions^2
502 lifetime_conditions<=encounters_count
503 lifetime_conditions<=active_care_plans/num_allergies
504 lifetime_conditions<=-active_care_plans+ceil(active_care_plan_length)
505 lifetime_conditions<=active_conditions^active_care_plans
506 lifetime_conditions<=maximum(active_conditions,medications_lifetime)
507 lifetime_conditions<=maximum(healthcare_coverage,medications_active)
508 lifetime_conditions<=(active_care_plans+1)^2
509 lifetime_conditions>=active_conditions
510 lifetime_conditions>=lifetime_care_plans
511 lifetime_conditions>=ceil(active_condition_length)/encounters_count
512 lifetime_conditions>=2*active_care_plans/medications_active
513 lifetime_conditions<=floor(log(e^latitude)/log(10))
514
lifetime_conditions<=floor(active_conditions/medications_lifetime_perc_covered)
515 lifetime_conditions<=encounters_count
516 lifetime_conditions<=active_conditions^lifetime_care_plans
517 lifetime_conditions<=10^e^medications_active
```

```
518 lifetime_conditions<=maximum(healthcare_coverage,active_conditions)
519 lifetime_conditions<=active_conditions^medications_lifetime
520 lifetime_conditions<=maximum(active_conditions,e^procedures_lifetime)
521 lifetime_conditions<=(active_conditions-1)^2
522 lifetime_conditions>=num_allergies
523 lifetime_conditions>=active_conditions
524 lifetime_conditions>=lifetime_care_plans-1
525 lifetime_conditions>=ceil(DALY)-immunizations_lifetime_cost
526 lifetime_conditions>=2*active_care_plans-2
527 lifetime_conditions>=2*active_care_plans-healthcare_coverage
528 lifetime_conditions>=floor(age+longitude)
529 lifetime_conditions<=maximum(active_conditions,immunizations_lifetime_cost)
530 lifetime_conditions<=active_conditions/QOLS
531 lifetime_conditions<=encounters_count-1
532
lifetime_conditions<=floor(healthcare_coverage^encounters_lifetime_perc_covered)
533 lifetime_conditions<=10^active_care_plans+1
534 lifetime_conditions<=maximum(Triglycerides,ceil(active_conditions))
535 lifetime_conditions<=active_conditions/num_allergies
536 lifetime_conditions>=active_conditions
537 active_condition_length<=e^(sqrt(QALY)-1)
538 active_condition_length<=lifetime_care_plan_length
539 active_condition_length<=1/2*sqrt(healthcare_coverage)+1/2
540 active_condition_length<=log(medications_lifetime_cost)/log(10)+active_care_
plan_length
541 active_condition_length<=(age-1)/device_lifetime_length
542 active_condition_length<=2*e^medications_lifetime-1
543
active_condition_length<=maximum(active_care_plan_length,e^active_care_plans)
544 active_condition_length<=2*log(medications_lifetime_cost)^2/log(10)^2
545 active_condition_length<=maximum(active_care_plan_length,QALY)
546 active_condition_length<=log(active_conditions)^latitude
547 active_condition_length>=sqrt(sqrt(1/2)*sqrt(healthcare_coverage))
548 active_condition_length>=ceil(active_care_plan_length)-medications_lifetime
549
active_condition_length>=minimum(active_care_plan_length,active_conditions^2)
550 active_condition_length>=minimum(active_care_plan_length,2*device_lifetime_l
ength)
551 active_condition_length>=1/2*10^(num_allergies-1)
552 active_condition_length>=healthcare_expenses*medications_lifetime_perc_cover
ed/healthcare_coverage
553
active_condition_length>=minimum(active_care_plan_length,e^medications_active)
554 active_condition_length>=QOLS+1/2*procedures_lifetime
555 active_condition_length>=latitude/DALY-1
556 active_condition_length>=1/2*encounters_count/DALY
557 active_condition_length<=healthcare_expenses^medications_lifetime_perc_cover
ed*DALY
```

558 active_condition_length<=sqrt(healthcare_coverage)-latitude
559 active_condition_length<=(lifetime_care_plan_length+longitude)^2
560 active_condition_length<=-2*active_care_plans+age
561 active_condition_length<=-(encounters_lifetime_total_cost-
healthcare_expenses)/encounters_lifetime_payer_coverage
562 active_condition_length<=(healthcare_expenses-
procedures_lifetime_cost)/encounters_lifetime_payer_coverage
563
active_condition_length<=active_conditions^2/medications_lifetime_perc_covered^2
564 active_condition_length<=sqrt(QOLS)-longitude
565 active_condition_length<=10^DALY+mean_DALY
566 active_condition_length<=e^(e^(e^encounters_lifetime_perc_covered))
567 active_condition_length>=1/2*log(healthcare_expenses)^2/log(10)^2
568 active_condition_length>=lifetime_condition_length/active_conditions
569 active_condition_length>=minimum(active_care_plan_length,1/2*lifetime_care_p
lan_length)
570 active_condition_length>=e^(lifetime_condition_length^(1/4))
571 active_condition_length>=ceil(active_care_plan_length)-medications_active
572 active_condition_length>=active_conditions*log(procedures_lifetime_cost)
573 active_condition_length>=-sqrt(medications_active)+active_care_plan_length
574
active_condition_length>=minimum(active_care_plan_length,lifetime_conditions^2)
575 active_condition_length>=active_care_plan_length^imaging_studies_lifetime
576 active_condition_length>=QALY-e^active_conditions
577 active_condition_length<=-active_care_plans+age
578 active_condition_length<=lifetime_condition_length
579 active_condition_length<=4*log(encounters_lifetime_total_cost)^2/log(10)^2
580 active_condition_length<=healthcare_expenses^QOLS-mean_QOLS
581 active_condition_length<=(healthcare_coverage-1)^(1/log(10))
582 active_condition_length<=(QALY-1)/medications_lifetime_perc_covered
583 active_condition_length<=2*latitude/imaging_studies_lifetime
584 active_condition_length<=maximum(active_care_plan_length,1/device_lifetime_l
ength)
585 active_condition_length<=minimum(healthcare_expenses,Protein__Mass_volume__i
n_Serum,Plasma)
586 active_condition_length<=encounters_count*healthcare_expenses/healthcare_cov
erage
587 active_condition_length>=minimum(active_care_plan_length,encounters_count)
588 active_condition_length>=sqrt(Systolic_Blood_Pressure+immunizations_lifetime
_cost)
589 active_condition_length>=age/(Hemoglobin_A1c_Hemoglobin_total_in_Blood-1)
590 active_condition_length>=active_care_plan_length/mean_Pain_severity___0_10_v
erbal_numeric_rating__Score____Reported
591 active_condition_length>=Diastolic_Blood_Pressure*log(10)/log(healthcare_exp
enses)
592 active_condition_length>=e^procedures_lifetime*medications_active
593 active_condition_length>=active_care_plan_length-medications_lifetime_cost
594 lifetime_condition_length<=2*healthcare_coverage/active_care_plan_length

```
595 lifetime_condition_length<=encounters_lifetime_perc_covered*latitude^2
596 lifetime_condition_length<=e^(sqrt(latitude+1))
597 lifetime_condition_length<=ceil(active_care_plan_length)*lifetime_conditions
598 lifetime_condition_length<=ceil(1/4*lifetime_care_plan_length^2)
599 lifetime_condition_length<=QALY*lifetime_care_plans^2
600 lifetime_condition_length<=(medications_lifetime+1)*QALY
601 lifetime_condition_length<=encounters_lifetime_perc_covered+1/2*medications_
lifetime_dispenses
602 lifetime_condition_length<=e^(-encounters_lifetime_perc_covered+lifetime_con
ditions)
603 lifetime_condition_length<=QOLS^2*medications_lifetime_length
604 lifetime_condition_length>=(sqrt(QALY)-1)^2
605 lifetime_condition_length>=encounters_lifetime_payer_coverage^2/medications_
lifetime_cost
606 lifetime_condition_length>=encounters_lifetime_payer_coverage^2/healthcare_e
xpenses
607 lifetime_condition_length>=(lifetime_conditions+1)*DALY
608 lifetime_condition_length>=sqrt(medications_lifetime_dispenses)-2
609 lifetime_condition_length>=log(active_care_plans)^active_conditions
610 lifetime_condition_length>=immunizations_lifetime_cost-
procedures_lifetime_cost+1
611 lifetime_condition_length>=10^(log(10)/log(encounters_count))
612 lifetime_condition_length>=log(procedures_lifetime_cost^procedures_lifetime)
613 lifetime_condition_length>=2*encounters_count-2*lifetime_care_plan_length
614 lifetime_condition_length<=minimum(healthcare_expenses,mean_Estimated_Glomer
ular_Filtration_Rate^2)
615 lifetime_condition_length<=active_care_plan_length^active_conditions
616 lifetime_condition_length<=-(active_care_plan_length-
healthcare_coverage)/latitude
617 lifetime_condition_length<=QALY*log(medications_lifetime_length)
618 lifetime_condition_length<=age*log(healthcare_expenses)/log(10)
619 lifetime_condition_length<=maximum(immunizations_lifetime_cost,encounters_co
unt^2)
620
lifetime_condition_length<=-sqrt(healthcare_coverage)+procedures_lifetime_cost
621 lifetime_condition_length<=active_conditions*latitude+1
622 lifetime_condition_length<=healthcare_coverage/encounters_count+medications_
lifetime
623 lifetime_condition_length<=medications_lifetime_dispenses/10^encounters_life
time_perc_covered
624 lifetime_condition_length>=immunizations_lifetime_cost-latitude-1
625 lifetime_condition_length>=1/2*encounters_count-1/2*encounters_lifetime_perc
_covered
626 lifetime_condition_length>=2*maximum(Protein__Mass_volume__in_Serum,Plasma,m
ean_DALY)
627 lifetime_condition_length>=DALY^2-encounters_lifetime_payer_coverage
628
lifetime_condition_length>=(log(mean_Glucose)/log(10))^device_lifetime_length
```

```
629 lifetime_condition_length>=latitude-medications_lifetime-1
630
lifetime_condition_length>=active_condition_length*e^imaging_studies_lifetime
631 lifetime_condition_length>=2*lifetime_care_plan_length*num_allergies
632 lifetime_condition_length>=2*maximum(mean_Microalbumin_Creatinine_Ratio,mean
_QOLS)
633 lifetime_condition_length>=minimum(immunizations_lifetime_cost,High_Density_
Lipoprotein_Cholesterol)
634 lifetime_condition_length<=sqrt(10^DALY-1)
635 lifetime_condition_length<=healthcare_expenses/(age*latitude)
636 lifetime_condition_length<=Body_Mass_Index^2+1
637 lifetime_condition_length<=lifetime_care_plan_length*log(mean_Systolic_Blood
_Pressure)
638 lifetime_condition_length<=maximum(lifetime_care_plan_length,e^active_condit
ions)
639
lifetime_condition_length<=medications_lifetime_dispenses/medications_active-1
640
lifetime_condition_length<=2*encounters_count/medications_lifetime_perc_covered
641 lifetime_condition_length<=Heart_rate^2*encounters_lifetime_perc_covered^2
642 lifetime_condition_length<=4*mean_Systolic_Blood_Pressure+4
643 lifetime_condition_length<=sqrt(medications_lifetime_cost)/immunizations_lif
etime
644 lifetime_condition_length>=(encounters_lifetime_perc_covered+1)^lifetime_con
ditions
645 lifetime_condition_length>=2*ceil(age)
646 lifetime_condition_length>=e^(log(medications_lifetime)-1)
647 lifetime_condition_length>=(log(healthcare_coverage)-1)^2
648
lifetime_condition_length>=ceil(lifetime_care_plan_length)+lifetime_conditions
649 lifetime_condition_length>=sqrt(device_lifetime_length)*latitude
650 lifetime_condition_length>=Body_Height^imaging_studies_lifetime
651 lifetime_condition_length>=e^(sqrt(1/2)*sqrt(active_condition_length))
652 lifetime_condition_length>=1/2*10^e^QOLS
653 lifetime_condition_length>=2*procedures_lifetime_cost/encounters_count
654 device_lifetime_length<=active_care_plan_length-
log(lifetime_care_plan_length)
655 device_lifetime_length<=lifetime_care_plan_length^2/medications_lifetime
656 device_lifetime_length<=(1/2*procedures_lifetime_cost)^medications_lifetime_
perc_covered
657 device_lifetime_length<=immunizations_lifetime_cost
658 device_lifetime_length<=minimum(healthcare_expenses,floor(Bilirubin_total__M
ass_volume__in_Serum,Plasma))
659 device_lifetime_length<=DALY^healthcare_expenses
660 device_lifetime_length<=floor(1/imaging_studies_lifetime)
661 device_lifetime_length>=num_allergies
662 device_lifetime_length<=medications_lifetime_cost^longitude
663 device_lifetime_length<=2*immunizations_lifetime_cost/DALY
```

```
664 device_lifetime_length<=immunizations_lifetime_cost
665 device_lifetime_length<=procedures_lifetime_cost
666 device_lifetime_length>=-num_allergies
667 device_lifetime_length>=-healthcare_coverage
668 device_lifetime_length>=log(num_allergies)/log(10)
669 device_lifetime_length<=1/2*immunizations_lifetime_cost/active_conditions
670 device_lifetime_length<=healthcare_coverage
671 device_lifetime_length<=immunizations_lifetime_cost
672 device_lifetime_length<=procedures_lifetime_cost^longitude
673 device_lifetime_length<=DALY^2
674 device_lifetime_length<=floor(1/imaging_studies_lifetime)
675 device_lifetime_length<=log(active_care_plans)^healthcare_expenses
676 device_lifetime_length<=-active_conditions+medications_lifetime
677 device_lifetime_length<=2*medications_active-2
678 device_lifetime_length<=floor(1/procedures_lifetime)
679 device_lifetime_length>=-imaging_studies_lifetime
680 device_lifetime_length>=-num_allergies
681 device_lifetime_length>=maximum(Total_score__MMSE_,mean_QOLS)-1
682 device_lifetime_length>=-sqrt(QALY)+medications_active
683 encounters_count<=lifetime_condition_length
684 encounters_count<=-ceil(longitude)+immunizations_lifetime_cost
685 encounters_count<=maximum(active_care_plans,medications_lifetime_cost)
686 encounters_count<=2*active_care_plans+medications_lifetime
687 encounters_count<=log(healthcare_expenses)/log(10)+medications_lifetime
688 encounters_count<=10^sqrt(active_care_plans+1)
689 encounters_count<=-sqrt(active_care_plan_length)+lifetime_condition_length
690
encounters_count<=minimum(healthcare_expenses,2*mean_Diastolic_Blood_Pressure)
691 encounters_count<=2*10^(1/encounters_lifetime_perc_covered)
692 encounters_count<=maximum(active_care_plans,medications_lifetime^2)
693
encounters_count>=minimum(mean_Diastolic_Blood_Pressure,1/medications_active)
694 encounters_count>=Pain_severity___0_10_verbal_numeric_rating__Score____Repor
ted^(mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported-1)
695 encounters_count>=-ceil(lifetime_condition_length)+medications_lifetime
696 encounters_count>=active_conditions^2-procedures_lifetime_cost
697 encounters_count>=2*active_care_plans
698 encounters_count>=Diastolic_Blood_Pressure*e^(-medications_active)
699 encounters_count>=floor(Body_Weight)-immunizations_lifetime_cost
700 encounters_count>=maximum(Estimated_Glomerular_Filtration_Rate,mean_Pain_sev
erity___0_10_verbal_numeric_rating__Score____Reported)
701 encounters_count>=log(lifetime_care_plan_length)^procedures_lifetime
702 encounters_count<=10^(encounters_lifetime_total_cost/medications_lifetime_di
spenses)
703 encounters_count<=-2*active_care_plans+2*lifetime_care_plan_length
704 encounters_count<=maximum(latitude,medications_lifetime+1)
705 encounters_count<=2*sqrt(2)*sqrt(encounters_lifetime_payer_coverage)
706 encounters_count<=10^procedures_lifetime*DALY
```

```
707 encounters_count<=(latitude+1)/encounters_lifetime_perc_covered
708 encounters_count<=ceil(10^(1/encounters_lifetime_perc_covered))
709 encounters_count<=maximum(active_conditions,procedures_lifetime_cost)
710 encounters_count<=log(healthcare_coverage)+medications_lifetime
711
encounters_count<=encounters_lifetime_total_cost/sqrt(procedures_lifetime_cost)
712 encounters_count>=ceil(DALY)
713 encounters_count>=Respiratory_rate/DALY
714 encounters_count>=-2*Heart_rate+mean_Systolic_Blood_Pressure
715 encounters_count>=minimum(medications_lifetime,10^Pain_severity___0_10_verba
l_numeric_rating__Score____Reported)
716 encounters_count>=medications_lifetime/active_care_plans+1
717 encounters_count>=(lifetime_conditions+1)*procedures_lifetime
718 encounters_count>=(2*mean_Pain_severity___0_10_verbal_numeric_rating__Score_
___Reported)^procedures_lifetime
719 encounters_count>=floor(age)^imaging_studies_lifetime
720 encounters_count>=-1/2*latitude+1/2*medications_lifetime
721 encounters_count>=active_conditions^(mean_Pain_severity___0_10_verbal_numeri
c_rating__Score____Reported-1)
722 encounters_count<=floor(log(e^lifetime_condition_length)/log(10))
723 encounters_count<=maximum(age,medications_lifetime)
724 encounters_count<=abs(-QALY+lifetime_condition_length)
725 encounters_count<=floor(age)/imaging_studies_lifetime
726 encounters_count<=QALY+medications_lifetime
727 encounters_count<=minimum(healthcare_expenses,2*mean_Microalbumin_Creatinine
_Ratio)
728 encounters_count<=ceil(active_care_plan_length)^2
729 encounters_count<=e^(2*e^active_care_plans)
730 encounters_count<=active_condition_length^2/medications_active^2
731 encounters_count<=floor(QALY)+medications_lifetime
732 encounters_count>=2*active_care_plans
733 encounters_count>=2*lifetime_care_plans
734 encounters_count>=(active_care_plans-1)*procedures_lifetime
735 encounters_count>=-lifetime_care_plan_length+medications_lifetime+1
736 encounters_count>=ceil(sqrt(device_lifetime_length))
737 encounters_count>=-DALY^2+medications_lifetime
738 encounters_count>=floor(medications_lifetime_cost/healthcare_coverage)
739 encounters_count>=e^(lifetime_care_plan_length/age)
740 encounters_count>=1/4*medications_lifetime
741 encounters_count>=2*maximum(Microalbumin_Creatinine_Ratio,mean_QOLS)
742 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
743 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
744 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
745 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
746 encounters_lifetime_total_cost<=encounters_lifetime_base_cost
747 encounters_lifetime_total_cost>=encounters_lifetime_base_cost
748 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
749 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
```

```
750 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
751 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
752 encounters_lifetime_base_cost<=encounters_lifetime_total_cost
753 encounters_lifetime_base_cost>=encounters_lifetime_total_cost
754 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
ounters_lifetime_perc_covered
755 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_perc_covered*en
counters_lifetime_total_cost)
756 encounters_lifetime_payer_coverage>=num_allergies
757 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
758 encounters_lifetime_payer_coverage>=-DALY^2+medications_lifetime_dispenses
759 encounters_lifetime_payer_coverage>=floor(encounters_lifetime_perc_covered*e
ncounters_lifetime_total_cost)
760 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
ounters_lifetime_perc_covered
761 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_perc_covered*en
counters_lifetime_total_cost)
762 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
763 encounters_lifetime_payer_coverage>=floor(encounters_lifetime_perc_covered*e
ncounters_lifetime_total_cost)
764 encounters_lifetime_payer_coverage<=ceil(encounters_lifetime_total_cost)*enc
ounters_lifetime_perc_covered
765
encounters_lifetime_payer_coverage<=e^(sqrt(2)*sqrt(lifetime_care_plan_length))
766 encounters_lifetime_payer_coverage>=encounters_lifetime_perc_covered*floor(e
ncounters_lifetime_total_cost)
767 encounters_lifetime_payer_coverage>=floor(encounters_lifetime_perc_covered*e
ncounters_lifetime_total_cost)
768 encounters_lifetime_perc_covered<=ceil(encounters_lifetime_payer_coverage)/e
ncounters_lifetime_total_cost
769 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/floor(e
ncounters_lifetime_total_cost)
770 encounters_lifetime_perc_covered>=floor(encounters_lifetime_payer_coverage)/
encounters_lifetime_total_cost
771 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/ceil(en
counters_lifetime_total_cost)
772 encounters_lifetime_perc_covered<=healthcare_coverage
773 encounters_lifetime_perc_covered<=active_care_plans
774 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/(encoun
ters_lifetime_total_cost-1)
775 encounters_lifetime_perc_covered>=floor(encounters_lifetime_payer_coverage)/
encounters_lifetime_total_cost
776 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/ceil(en
counters_lifetime_total_cost)
777 encounters_lifetime_perc_covered<=encounters_lifetime_payer_coverage/floor(e
ncounters_lifetime_total_cost)
```

```
778 encounters_lifetime_perc_covered<=log(2*lifetime_care_plan_length+2)
779 encounters_lifetime_perc_covered>=floor(encounters_lifetime_payer_coverage)/
encounters_lifetime_total_cost
780 encounters_lifetime_perc_covered>=encounters_lifetime_payer_coverage/ceil(en
counters_lifetime_total_cost)
781 imaging_studies_lifetime<=procedures_lifetime
782 imaging_studies_lifetime<=medications_lifetime
783 imaging_studies_lifetime<=immunizations_lifetime_cost
784 imaging_studies_lifetime<=floor(1/DALY)
785 imaging_studies_lifetime<=2*floor(QOLS)
786 imaging_studies_lifetime>=num_allergies
787
imaging_studies_lifetime>=floor(medications_lifetime/lifetime_condition_length)
788 imaging_studies_lifetime<=active_care_plans
789 imaging_studies_lifetime<=device_lifetime_length
790 imaging_studies_lifetime<=medications_active
791 imaging_studies_lifetime<=floor(device_lifetime_length)
792 imaging_studies_lifetime>=-device_lifetime_length
793 imaging_studies_lifetime>=-num_allergies
794 imaging_studies_lifetime>=-active_care_plans+1/2*lifetime_care_plans
795 imaging_studies_lifetime<=medications_lifetime
796 imaging_studies_lifetime<=immunizations_lifetime
797 imaging_studies_lifetime<=procedures_lifetime
798 imaging_studies_lifetime<=DALY
799 imaging_studies_lifetime<=num_allergies^Pain_severity___0_10_verbal_numeric_
rating__Score____Reported
800 imaging_studies_lifetime<=ceil(medications_lifetime_perc_covered)
801 imaging_studies_lifetime>=-num_allergies
802 imaging_studies_lifetime>=log(num_allergies)/log(10)
803 imaging_studies_lifetime>=floor(log(procedures_lifetime)/log(10))
804 immunizations_lifetime<=healthcare_coverage
805 immunizations_lifetime<=ceil(log(active_conditions)/log(10))
806 immunizations_lifetime<=immunizations_lifetime_cost
807 immunizations_lifetime<=procedures_lifetime
808 immunizations_lifetime<=active_care_plans-imaging_studies_lifetime
809 immunizations_lifetime<=log(10)/log(procedures_lifetime)
810 immunizations_lifetime<=(1/QOLS)
811 immunizations_lifetime<=minimum(healthcare_expenses,Pain_severity___0_10_ver
bal_numeric_rating__Score____Reported)
812 immunizations_lifetime>=num_allergies
813 immunizations_lifetime>=floor(QOLS)
814 immunizations_lifetime>=active_care_plans-medications_lifetime
815 immunizations_lifetime>=minimum(immunizations_lifetime_cost,e^num_allergies)
816 immunizations_lifetime>=2*active_conditions-encounters_count
817 immunizations_lifetime>=floor(1/medications_active)
818 immunizations_lifetime<=active_care_plans
819 immunizations_lifetime<=immunizations_lifetime_cost
820 immunizations_lifetime<=medications_active
```

```
821 immunizations_lifetime<=e^num_allergies
822 immunizations_lifetime>=num_allergies
823 immunizations_lifetime>=imaging_studies_lifetime
824 immunizations_lifetime>=2*num_allergies
825 immunizations_lifetime>=num_allergies^medications_lifetime
826 immunizations_lifetime>=minimum(immunizations_lifetime_cost,1/2*procedures_l
ifetime)
827 immunizations_lifetime>=minimum(immunizations_lifetime_cost,num_allergies+1)
828 immunizations_lifetime>=floor(log(1/2*immunizations_lifetime_cost)/log(10))
829 immunizations_lifetime<=active_care_plans
830 immunizations_lifetime<=immunizations_lifetime_cost
831 immunizations_lifetime<=procedures_lifetime
832 immunizations_lifetime<=(1/QOLS)
833 immunizations_lifetime<=(1/imaging_studies_lifetime)
834 immunizations_lifetime<=e^medications_active
835 immunizations_lifetime<=floor(log(active_conditions))
836 immunizations_lifetime>=num_allergies
837 immunizations_lifetime>=-active_care_plans+lifetime_care_plans
838 immunizations_lifetime>=minimum(immunizations_lifetime_cost,e^num_allergies)
839 immunizations_lifetime>=floor(log(procedures_lifetime)/log(10))
840 immunizations_lifetime>=floor(1/medications_active)
841 immunizations_lifetime>=-active_care_plans+medications_active-1
842 immunizations_lifetime>=floor(encounters_count/lifetime_care_plan_length)
843 immunizations_lifetime_cost<=encounters_lifetime_payer_coverage-log(age)
844 immunizations_lifetime_cost<=active_condition_length^e^encounters_lifetime_p
erc_covered
845 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
846 immunizations_lifetime_cost<=minimum(healthcare_expenses,mean_Sodium+1)
847 immunizations_lifetime_cost<=(medications_lifetime_dispenses+1)/medications_
active
848 immunizations_lifetime_cost<=maximum(mean_Sodium,healthcare_expenses/medicat
ions_lifetime_length)
849 immunizations_lifetime_cost>=num_allergies
850 immunizations_lifetime_cost>=2*QALY*immunizations_lifetime
851 immunizations_lifetime_cost>=log(immunizations_lifetime)*medications_lifetim
e_dispenses/log(10)
852 immunizations_lifetime_cost>=2*lifetime_care_plan_length-
medications_lifetime_cost
853
immunizations_lifetime_cost>=sqrt(encounters_lifetime_total_cost*num_allergies)
854 immunizations_lifetime_cost>=num_allergies^(active_care_plans+1)
855 immunizations_lifetime_cost>=ceil(DALY)*device_lifetime_length
856 immunizations_lifetime_cost<=-2*longitude-1
857 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
858 immunizations_lifetime_cost<=healthcare_coverage/(QALY-1)
859 immunizations_lifetime_cost<=maximum(Sodium,healthcare_expenses/encounters_l
ifetime_payer_coverage)
860 immunizations_lifetime_cost<=healthcare_expenses/procedures_lifetime_cost+la
```

```
titude
861
immunizations_lifetime_cost<=e^(-medications_active)*medications_lifetime_length
862 immunizations_lifetime_cost<=medications_lifetime_dispenses/sqrt(device_life
time_length)
863 immunizations_lifetime_cost>=num_allergies
864 immunizations_lifetime_cost>=maximum(Systolic_Blood_Pressure,-healthcare_exp
enses)
865 immunizations_lifetime_cost>=maximum(mean_Low_Density_Lipoprotein_Cholestero
l,-healthcare_expenses)
866 immunizations_lifetime_cost>=maximum(Glomerular_filtration_rate_1_73_sq_M_pr
edicted,-healthcare_expenses)
867 immunizations_lifetime_cost>=-sqrt(healthcare_coverage)+encounters_count
868 immunizations_lifetime_cost>=device_lifetime_length^2-latitude
869 immunizations_lifetime_cost>=log(procedures_lifetime_cost^device_lifetime_le
ngth)
870 immunizations_lifetime_cost<=healthcare_expenses*immunizations_lifetime
871 immunizations_lifetime_cost<=QALY^2+DALY
872 immunizations_lifetime_cost<=minimum(healthcare_expenses,2*mean_Sodium)
873 immunizations_lifetime_cost<=(2*Body_Weight)^immunizations_lifetime
874 immunizations_lifetime_cost<=e^(encounters_lifetime_payer_coverage/lifetime_
condition_length)
875 immunizations_lifetime_cost<=healthcare_coverage/age+1
876 immunizations_lifetime_cost<=2*lifetime_care_plan_length/imaging_studies_lif
etime
877 immunizations_lifetime_cost>=num_allergies
878 immunizations_lifetime_cost>=maximum(Systolic_Blood_Pressure,-healthcare_exp
enses)
879 immunizations_lifetime_cost>=-encounters_count+1/2*medications_lifetime
880 immunizations_lifetime_cost>=1/2*encounters_lifetime_payer_coverage*num_alle
rgies
881
immunizations_lifetime_cost>=immunizations_lifetime^(active_care_plan_length+1)
882 immunizations_lifetime_cost>=log(10)*longitude/log(DALY)
883 immunizations_lifetime_cost>=mean_Sodium^imaging_studies_lifetime-1
884 medications_lifetime<=medications_lifetime_length/active_conditions-1
885 medications_lifetime<=10^num_allergies*encounters_count
886 medications_lifetime<=active_conditions*ceil(QALY)
887 medications_lifetime<=10^(e^active_care_plans-1)
888 medications_lifetime<=maximum(procedures_lifetime_cost,2*active_care_plan_le
ngth)
889 medications_lifetime<=encounters_count^active_care_plans
890 medications_lifetime<=maximum(Body_Height,e^immunizations_lifetime_cost)
891 medications_lifetime<=QALY+e^active_care_plans
892 medications_lifetime<=e^(encounters_count/active_conditions)
893 medications_lifetime<=1/16*encounters_count^2
894 medications_lifetime>=log(Body_Weight^procedures_lifetime)
895 medications_lifetime>=active_care_plans
```

```
896 medications_lifetime>=QALY/10^DALY
897 medications_lifetime>=1/2*procedures_lifetime_cost/QALY
898 medications_lifetime>=2*encounters_count-2*latitude
899 medications_lifetime>=DALY^e^QOLS
900 medications_lifetime>=(Carbon_Dioxide^2)^imaging_studies_lifetime
901 medications_lifetime>=Diastolic_Blood_Pressure^(1/2*num_allergies)
902 medications_lifetime>=floor(active_care_plan_length/active_care_plans)
903 medications_lifetime>=ceil(medications_lifetime_length^medications_lifetime_
perc_covered)
904 medications_lifetime<=medications_lifetime_dispenses
905 medications_lifetime<=floor(active_condition_length)/num_allergies
906 medications_lifetime<=DALY*floor(active_care_plan_length)
907 medications_lifetime<=1/4*(encounters_count-1)^2
908 medications_lifetime<=abs(encounters_count-medications_lifetime_dispenses)
909 medications_lifetime<=e^(medications_lifetime_length^QOLS)
910
medications_lifetime<=floor(encounters_count/medications_lifetime_perc_covered)
911 medications_lifetime<=active_care_plan_length*log(healthcare_coverage)
912 medications_lifetime<=2*10^log(active_conditions)
913 medications_lifetime<=floor(1/2*latitude)^2
914 medications_lifetime>=active_care_plans
915 medications_lifetime>=(encounters_lifetime_perc_covered+1)*device_lifetime_l
ength
916 medications_lifetime>=(log(DALY)/log(10))^mean_DALY
917 medications_lifetime>=-ceil(DALY)+encounters_count
918 medications_lifetime>=e^(DALY^medications_lifetime_perc_covered)
919 medications_lifetime>=-e^active_conditions+immunizations_lifetime_cost
920 medications_lifetime>=2*10^sqrt(immunizations_lifetime)
921
medications_lifetime>=minimum(immunizations_lifetime_cost,encounters_count-1)
922 medications_lifetime>=10^procedures_lifetime/healthcare_expenses
923 medications_lifetime>=floor(QALY)-procedures_lifetime_cost
924 medications_lifetime<=10^(log(encounters_count)^2/log(10)^2)
925 medications_lifetime<=maximum(procedures_lifetime_cost,encounters_count+1)
926 medications_lifetime<=10^log(sqrt(lifetime_condition_length))
927 medications_lifetime<=(encounters_count-1)^active_care_plans
928 medications_lifetime<=log(num_allergies)^active_care_plan_length
929 medications_lifetime<=medications_active^healthcare_expenses
930
medications_lifetime<=e^(-immunizations_lifetime)*medications_lifetime_dispenses
931 medications_lifetime<=e^(QALY-lifetime_conditions)
932 medications_lifetime<=maximum(lifetime_condition_length,healthcare_expenses^
medications_lifetime_perc_covered)
933 medications_lifetime<=minimum(healthcare_expenses,2*MCH__Entitic_mass__by_Au
tomated_count)
934 medications_lifetime>=num_allergies
935 medications_lifetime>=medications_active
936 medications_lifetime>=encounters_count-log(healthcare_expenses)
```

```
937 medications_lifetime>=-active_care_plan_length+1/2*lifetime_care_plan_length
938
medications_lifetime>=sqrt(procedures_lifetime_cost)-lifetime_condition_length
939 medications_lifetime>=lifetime_care_plan_length*log(procedures_lifetime)
940 medications_lifetime>=-2*active_conditions+encounters_count
941 medications_lifetime>=-2*QALY+2*encounters_count
942 medications_lifetime_cost<=1/2*encounters_lifetime_payer_coverage*medication
s_lifetime_dispenses
943 medications_lifetime_cost<=sqrt(active_care_plans)*healthcare_expenses
944 medications_lifetime_cost<=latitude^sqrt(medications_lifetime_dispenses)
945 medications_lifetime_cost<=2*latitude*medications_lifetime_length
946 medications_lifetime_cost<=encounters_lifetime_total_cost*sqrt(healthcare_co
verage)
947 medications_lifetime_cost<=sqrt(encounters_lifetime_payer_coverage)*healthca
re_coverage
948
medications_lifetime_cost<=2*active_condition_length*medications_lifetime_length
949 medications_lifetime_cost<=1/2*age^lifetime_conditions
950 medications_lifetime_cost<=encounters_lifetime_total_cost^2/encounters_count
951 medications_lifetime_cost<=healthcare_coverage*lifetime_condition_length/med
ications_active
952 medications_lifetime_cost>=num_allergies
953 medications_lifetime_cost>=minimum(immunizations_lifetime_cost,medications_l
ifetime_length)^2
954 medications_lifetime_cost>=DALY^(log(medications_lifetime_length)/log(10))
955
medications_lifetime_cost>=encounters_lifetime_total_cost*medications_active^2
956 medications_lifetime_cost>=device_lifetime_length^2*longitude^2
957 medications_lifetime_cost>=encounters_lifetime_total_cost*log(medications_li
fetime_length)
958 medications_lifetime_cost>=2*healthcare_coverage-procedures_lifetime_cost
959
medications_lifetime_cost>=medications_lifetime_dispenses^2/active_care_plans^2
960 medications_lifetime_cost>=1/2*active_condition_length*medications_lifetime_
length
961 medications_lifetime_cost>=(medications_lifetime_dispenses^2)^QOLS
962
medications_lifetime_cost<=QALY*healthcare_expenses/immunizations_lifetime_cost
963 medications_lifetime_cost<=e^(sqrt(2)*sqrt(medications_lifetime_dispenses))
964 medications_lifetime_cost<=2*healthcare_expenses/medications_lifetime_perc_c
overed
965 medications_lifetime_cost<=healthcare_expenses/medications_lifetime_perc_cov
ered+procedures_lifetime_cost
966 medications_lifetime_cost<=active_conditions^2*healthcare_coverage
967 medications_lifetime_cost<=10^e^(10^encounters_lifetime_perc_covered)
968 medications_lifetime_cost<=e^encounters_count*lifetime_care_plan_length
969 medications_lifetime_cost<=10^(encounters_count/immunizations_lifetime)
970 medications_lifetime_cost<=minimum(healthcare_expenses,Platelets____volume__
```

```
in_Blood_by_Automated_count)^2
971 medications_lifetime_cost<=10^(2*lifetime_care_plans+1)
972 medications_lifetime_cost>=(latitude+1)*medications_lifetime_length
973 medications_lifetime_cost>=lifetime_condition_length^2*medications_active
974 medications_lifetime_cost>=(QALY-lifetime_condition_length)^2
975 medications_lifetime_cost>=2*healthcare_coverage-procedures_lifetime_cost
976 medications_lifetime_cost>=10^(log(healthcare_expenses)/log(10)-1)
977 medications_lifetime_cost>=(2*encounters_lifetime_perc_covered)^QALY
978 medications_lifetime_cost>=2*medications_lifetime_length/lifetime_condition_
length
979 medications_lifetime_cost>=2*immunizations_lifetime_cost*lifetime_condition_
length
980 medications_lifetime_cost<=active_condition_length*healthcare_expenses/immun
izations_lifetime_cost
981 medications_lifetime_cost<=10^sqrt(QALY-1)
982 medications_lifetime_cost<=1/2*10^log(medications_lifetime_length)
983 medications_lifetime_cost<=sqrt(10^encounters_count)-1
984 medications_lifetime_cost<=2*QALY*medications_lifetime_length
985
medications_lifetime_cost<=10^active_conditions/encounters_lifetime_perc_covered
986 medications_lifetime_cost<=active_conditions*healthcare_coverage/imaging_stu
dies_lifetime
987 medications_lifetime_cost<=healthcare_expenses/sqrt(active_care_plans)
988 medications_lifetime_cost<=(e^latitude)^QOLS
989 medications_lifetime_cost>=num_allergies
990 medications_lifetime_cost>=medications_lifetime_dispenses^2/encounters_count
991 medications_lifetime_cost>=encounters_lifetime_payer_coverage*sqrt(medicatio
ns_lifetime_dispenses)
992 medications_lifetime_cost>=healthcare_expenses*medications_active/lifetime_c
are_plan_length
993 medications_lifetime_cost>=DALY^(log(medications_lifetime_length)/log(10))
994 medications_lifetime_cost>=1/2*active_care_plan_length*medications_lifetime_
length
995 medications_lifetime_cost>=medications_lifetime^(log(lifetime_care_plan_leng
th)/log(10))
996 medications_lifetime_cost>=medications_active^sqrt(latitude)
997 medications_lifetime_perc_covered<=healthcare_coverage
998 medications_lifetime_perc_covered<=4*encounters_lifetime_perc_covered^2
999 medications_lifetime_perc_covered<=active_care_plans^(log(QOLS)/log(10))
1000 medications_lifetime_perc_covered<=(log(lifetime_conditions)/log(10))^activ
e_care_plans
1001 medications_lifetime_perc_covered<=-medications_active+medications_lifetime
1002 medications_lifetime_perc_covered<=ceil(QOLS)
1003 medications_lifetime_perc_covered<=encounters_lifetime_total_cost/age^2
1004 medications_lifetime_perc_covered<=log(e^active_care_plans-1)
1005 medications_lifetime_perc_covered<=floor(lifetime_condition_length/age)
1006 medications_lifetime_perc_covered<=log(1/2*medications_active)/log(10)+1
1007 medications_lifetime_perc_covered>=num_allergies
```

```
1008
medications_lifetime_perc_covered>=log(procedures_lifetime/latitude)/log(10)
1009 medications_lifetime_perc_covered>=log(active_care_plan_length/latitude)
1010 medications_lifetime_perc_covered>=(1/(QALY+longitude))
1011 medications_lifetime_perc_covered<=procedures_lifetime
1012 medications_lifetime_perc_covered<=immunizations_lifetime
1013 medications_lifetime_perc_covered<=2*QALY/encounters_count
1014 medications_lifetime_perc_covered<=Systolic_Blood_Pressure^2/procedures_lif
etime_cost
1015 medications_lifetime_perc_covered<=1/4*active_care_plans
1016 medications_lifetime_perc_covered<=medications_active-1
1017 medications_lifetime_perc_covered<=QOLS/sqrt(Pain_severity___0_10_verbal_nu
meric_rating__Score____Reported)
1018 medications_lifetime_perc_covered<=maximum(Hemoglobin_A1c_Hemoglobin_total_
in_Blood,1/Pain_severity___0_10_verbal_numeric_rating__Score____Reported)
1019 medications_lifetime_perc_covered<=mean_Respiratory_rate/10^immunizations_l
ifetime
1020 medications_lifetime_perc_covered>=-num_allergies
1021 medications_lifetime_perc_covered>=-healthcare_coverage
1022
medications_lifetime_perc_covered>=num_allergies/log(active_care_plan_length)
1023 medications_lifetime_perc_covered>=log(ceil(log(active_conditions)/log(10))
)/log(10)
1024 medications_lifetime_perc_covered>=1/log(procedures_lifetime)-1
1025 medications_lifetime_perc_covered>=log(medications_active)/log(10)-immuniza
tions_lifetime
1026 medications_lifetime_perc_covered>=log(active_condition_length)/log(10)-med
ications_active
1027 medications_lifetime_perc_covered>=log(lifetime_conditions)^2/log(10)^2-1
1028 medications_lifetime_perc_covered<=active_care_plans
1029 medications_lifetime_perc_covered<=-1/age+QOLS
1030 medications_lifetime_perc_covered<=(num_allergies-1)^(-2)
1031
medications_lifetime_perc_covered<=lifetime_care_plan_length/encounters_count
1032 medications_lifetime_perc_covered<=immunizations_lifetime^(-2)
1033 medications_lifetime_perc_covered<=log(healthcare_coverage/medications_life
time_length)/log(10)
1034 medications_lifetime_perc_covered<=sqrt(DALY)+mean_DALY
1035 medications_lifetime_perc_covered<=maximum(Sodium,ceil(num_allergies))
1036 medications_lifetime_perc_covered<=1/sqrt(floor(device_lifetime_length))
1037 medications_lifetime_perc_covered<=e^(procedures_lifetime/longitude)
1038 medications_lifetime_perc_covered>=num_allergies
1039
medications_lifetime_perc_covered>=log(1/2*sqrt(medications_active))/log(10)
1040 medications_lifetime_perc_covered>=log(1/DALY)-1
1041 medications_lifetime_perc_covered>=(1/floor(device_lifetime_length-1))
1042
medications_lifetime_perc_covered>=-sqrt(active_conditions)+active_care_plans
```

1043 medications_lifetime_perc_covered>=1/2*active_care_plans-3/2
1044 medications_lifetime_length<=(latitude-1)*lifetime_condition_length
1045 medications_lifetime_length<=medications_lifetime_cost
1046 medications_lifetime_length<=(age-1)*lifetime_care_plan_length
1047 medications_lifetime_length<=ceil(e^medications_lifetime_dispenses)
1048 medications_lifetime_length<=medications_lifetime_cost/log(medications_life
time_dispenses)
1049 medications_lifetime_length<=longitude^2/encounters_lifetime_perc_covered
1050 medications_lifetime_length<=1/4*(lifetime_condition_length-1)^2
1051 medications_lifetime_length<=10^log(ceil(QALY))
1052 medications_lifetime_length<=1/2*encounters_lifetime_payer_coverage+1/2*hea
lthcare_coverage
1053 medications_lifetime_length>=4*latitude+1
1054 medications_lifetime_length>=2*DALY*immunizations_lifetime_cost
1055 medications_lifetime_length>=(ceil(active_care_plan_length)+1)^2
1056 medications_lifetime_length>=(active_conditions+1)*medications_lifetime
1057 medications_lifetime_length>=-active_condition_length+1/2*encounters_lifeti
me_payer_coverage
1058 medications_lifetime_length>=e^(e^sqrt(num_allergies))
1059 medications_lifetime_length>=2*e^(1/2*active_conditions)
1060 medications_lifetime_length>=minimum(encounters_count,Estimated_Glomerular_
Filtration_Rate)^2
1061 medications_lifetime_length>=minimum(QALY,Respiratory_rate)^2
1062 medications_lifetime_length>=log(encounters_lifetime_payer_coverage)*medica
tions_lifetime_dispenses/log(10)
1063 medications_lifetime_length<=log(encounters_lifetime_payer_coverage)^active
_conditions
1064 medications_lifetime_length<=medications_lifetime^log(encounters_lifetime_t
otal_cost)
1065
medications_lifetime_length<=1/2*healthcare_expenses/active_care_plan_length
1066 medications_lifetime_length<=healthcare_coverage^(log(lifetime_care_plan_le
ngth)/log(10))
1067 medications_lifetime_length<=-encounters_lifetime_total_cost+healthcare_cov
erage-1
1068 medications_lifetime_length<=active_condition_length^2/medications_lifetime
_perc_covered
1069
medications_lifetime_length<=10^lifetime_care_plans/imaging_studies_lifetime
1070 medications_lifetime_length<=(2*active_condition_length+1)^2
1071
medications_lifetime_length<=healthcare_expenses/(age*immunizations_lifetime)
1072 medications_lifetime_length<=encounters_lifetime_payer_coverage*log(medicat
ions_lifetime_cost)/log(10)
1073
medications_lifetime_length>=active_care_plan_length^2+lifetime_condition_length
1074 medications_lifetime_length>=procedures_lifetime_cost/sqrt(encounters_lifet
ime_total_cost)

```
1075 medications_lifetime_length>=1/4*encounters_count^2+1
1076 medications_lifetime_length>=(DALY-1)*immunizations_lifetime_cost
1077 medications_lifetime_length>=sqrt(procedures_lifetime_cost)^immunizations_l
ifetime
1078 medications_lifetime_length>=encounters_lifetime_payer_coverage/(QOLS+1)
1079 medications_lifetime_length>=log(active_care_plan_length)*medications_lifet
ime_dispenses
1080 medications_lifetime_length>=log(active_condition_length)*medications_lifet
ime_dispenses
1081 medications_lifetime_length>=(medications_lifetime^2)^num_allergies
1082 medications_lifetime_length>=8*DALY^2
1083 medications_lifetime_length<=latitude^2/imaging_studies_lifetime
1084 medications_lifetime_length<=medications_lifetime_cost
1085 medications_lifetime_length<=10^e^(1/encounters_lifetime_perc_covered)
1086 medications_lifetime_length<=maximum(encounters_lifetime_total_cost,age^2)
1087 medications_lifetime_length<=healthcare_expenses/procedures_lifetime-
medications_lifetime_dispenses
1088 medications_lifetime_length<=10^(active_care_plan_length^QOLS)
1089 medications_lifetime_length<=(ceil(lifetime_care_plan_length)+1)^2
1090 medications_lifetime_length<=1/2*healthcare_coverage+medications_lifetime_d
ispenses
1091 medications_lifetime_length<=age^2/medications_lifetime_perc_covered
1092 medications_lifetime_length<=encounters_lifetime_payer_coverage^(1/2*encoun
ters_count)
1093 medications_lifetime_length>=log(latitude)*medications_lifetime_dispenses
1094 medications_lifetime_length>=immunizations_lifetime_cost^(1/log(10))
1095 medications_lifetime_length>=log(active_condition_length)*medications_lifet
ime_dispenses
1096 medications_lifetime_length>=1/2*minimum(encounters_lifetime_payer_coverage
,DXA__T_score__Bone_density)
1097 medications_lifetime_length>=(-encounters_count)^medications_active
1098 medications_lifetime_length>=immunizations_lifetime^sqrt(age)
1099 medications_lifetime_length>=latitude^2-procedures_lifetime_cost
1100 medications_lifetime_length>=procedures_lifetime^(active_care_plans-1)
1101 medications_lifetime_dispenses<=log(10)*medications_lifetime_length/log(enc
ounters_lifetime_payer_coverage)
1102 medications_lifetime_dispenses<=sqrt(healthcare_expenses)/medications_lifet
ime_perc_covered
1103 medications_lifetime_dispenses<=active_care_plan_length*active_conditions^2
1104 medications_lifetime_dispenses<=age*floor(latitude)
1105 medications_lifetime_dispenses<=(DALY+medications_lifetime)^2
1106 medications_lifetime_dispenses<=10^(medications_lifetime_length/lifetime_co
ndition_length)
1107 medications_lifetime_dispenses<=healthcare_coverage/active_conditions-
medications_lifetime
1108
medications_lifetime_dispenses<=10^(log(lifetime_condition_length)/log(10)+1)
1109 medications_lifetime_dispenses<=medications_lifetime_length/log(active_care
```

```
_plan_length)
1110 medications_lifetime_dispenses<=(healthcare_expenses/encounters_lifetime_to
tal_cost)^DALY
1111 medications_lifetime_dispenses>=medications_lifetime_length/log(Systolic_Bl
ood_Pressure)
1112 medications_lifetime_dispenses>=ceil(-active_care_plan_length+lifetime_cond
ition_length)
1113
medications_lifetime_dispenses>=healthcare_coverage/Systolic_Blood_Pressure+1
1114 medications_lifetime_dispenses>=1/2*medications_lifetime_length^encounters_
lifetime_perc_covered
1115
medications_lifetime_dispenses>=Diastolic_Blood_Pressure^2/active_conditions^2
1116
medications_lifetime_dispenses>=1/2*healthcare_coverage/active_condition_length
1117 medications_lifetime_dispenses>=10^(medications_active^medications_lifetime
_perc_covered)
1118 medications_lifetime_dispenses>=log(Heart_rate)^num_allergies
1119 medications_lifetime_dispenses>=log(Body_Weight)^active_care_plans
1120 medications_lifetime_dispenses<=log(10^(10^active_care_plans))
1121 medications_lifetime_dispenses<=(latitude+medications_active)^2
1122 medications_lifetime_dispenses<=healthcare_expenses^encounters_lifetime_per
c_covered/immunizations_lifetime
1123 medications_lifetime_dispenses<=e^active_care_plan_length
1124 medications_lifetime_dispenses<=1/2*e^(encounters_count+1)
1125 medications_lifetime_dispenses<=10^medications_lifetime-encounters_count
1126 medications_lifetime_dispenses<=healthcare_coverage/(lifetime_conditions+1)
1127 medications_lifetime_dispenses<=healthcare_expenses/(DALY*active_care_plan_
length)
1128 medications_lifetime_dispenses<=(encounters_count^2)^DALY
1129
medications_lifetime_dispenses<=(1/2*active_condition_length)^medications_active
1130 medications_lifetime_dispenses>=ceil(sqrt(encounters_lifetime_total_cost))
1131 medications_lifetime_dispenses>=2*minimum(procedures_lifetime_cost,Triglyce
rides)
1132
medications_lifetime_dispenses>=2*encounters_count+2*lifetime_condition_length
1133 medications_lifetime_dispenses>=10^(log(encounters_lifetime_payer_coverage)
/log(10)-1)
1134 medications_lifetime_dispenses>=log(lifetime_condition_length)*medications_
lifetime/log(10)
1135 medications_lifetime_dispenses>=immunizations_lifetime*sqrt(medications_lif
etime_cost)
1136 medications_lifetime_dispenses>=1/2*encounters_lifetime_total_cost^medicati
ons_lifetime_perc_covered
1137 medications_lifetime_dispenses>=medications_lifetime_length/log(immunizatio
ns_lifetime_cost)
1138 medications_lifetime_dispenses>=active_care_plan_length*log(medications_lif
```

```
etime_cost)
1139 medications_lifetime_dispenses<=1/4*medications_lifetime_length-1
1140 medications_lifetime_dispenses<=healthcare_expenses/age+lifetime_care_plan_
length
1141 medications_lifetime_dispenses<=minimum(healthcare_expenses,FEV1_FVC^2)
1142 medications_lifetime_dispenses<=maximum(Body_Height,10^active_conditions)
1143
medications_lifetime_dispenses<=encounters_lifetime_payer_coverage*log(QALY)
1144
medications_lifetime_dispenses<=10^(active_care_plan_length/procedures_lifetime)
1145 medications_lifetime_dispenses<=active_conditions*sqrt(medications_lifetime
_cost)
1146 medications_lifetime_dispenses<=medications_lifetime_length/log(active_care
_plan_length)
1147 medications_lifetime_dispenses<=medications_lifetime_length/log(active_cond
ition_length)
1148 medications_lifetime_dispenses<=log(10)*medications_lifetime_length/log(enc
ounters_lifetime_payer_coverage)
1149 medications_lifetime_dispenses>=sqrt(minimum(medications_lifetime_cost,Crea
tinine))
1150 medications_lifetime_dispenses>=(QALY-1)*procedures_lifetime
1151 medications_lifetime_dispenses>=log(QALY)^medications_active
1152 medications_lifetime_dispenses>=Diastolic_Blood_Pressure^sqrt(immunizations
_lifetime)
1153 medications_lifetime_dispenses>=immunizations_lifetime_cost^2/lifetime_cond
ition_length
1154 medications_lifetime_dispenses>=age^(1/DALY)
1155 medications_lifetime_dispenses>=10^QOLS*lifetime_care_plan_length
1156 medications_lifetime_dispenses>=active_care_plan_length^ceil(device_lifetim
e_length)
1157 medications_lifetime_dispenses>=(active_care_plan_length-
active_condition_length)^2
1158 medications_lifetime_dispenses>=floor(sqrt(1/2)*sqrt(healthcare_coverage))
1159 medications_active<=maximum(Triglycerides,active_care_plans+1)
1160 medications_active<=2*active_care_plans
1161 medications_active<=medications_lifetime
1162 medications_active<=minimum(healthcare_expenses,floor(Hemoglobin_A1c_Hemogl
obin_total_in_Blood))
1163 medications_active<=minimum(healthcare_expenses,ceil(Erythrocytes____volume
__in_Blood_by_Automated_count))
1164 medications_active<=maximum(QALY,ceil(num_allergies))
1165 medications_active<=floor(log(healthcare_expenses)/log(10))
1166 medications_active>=num_allergies
1167 medications_active>=floor(maximum(Prostate_specific_Ag__Mass_volume__in_Ser
um,Plasma,mean_QOLS))
1168 medications_active>=num_allergies/QOLS
1169 medications_active>=2*active_conditions-encounters_count
1170 medications_active>=floor(QOLS)
```

```
1171 medications_active>=floor(encounters_lifetime_perc_covered)
1172 medications_active>=num_allergies^procedures_lifetime
1173 medications_active>=-Pain_severity___0_10_verbal_numeric_rating__Score____R
eported+lifetime_care_plans
1174 medications_active>=2*QALY+2*longitude
1175 medications_active<=floor(sqrt(QALY))
1176 medications_active<=encounters_count
1177 medications_active<=encounters_lifetime_payer_coverage
1178 medications_active<=medications_lifetime
1179 medications_active<=ceil(log(healthcare_expenses)/log(10))
1180 medications_active<=maximum(immunizations_lifetime_cost,1/encounters_lifeti
me_perc_covered)
1181 medications_active<=maximum(active_care_plans,10^encounters_lifetime_perc_c
overed)
1182 medications_active<=abs(encounters_count+longitude)
1183 medications_active<=minimum(healthcare_expenses,floor(Leukocytes____volume_
_in_Blood_by_Automated_count))
1184 medications_active<=2*immunizations_lifetime_cost^medications_lifetime_perc
_covered
1185 medications_active>=num_allergies
1186 medications_active>=floor(log(medications_lifetime)/log(10))
1187 medications_active>=2*num_allergies
1188 medications_active>=2*ceil(medications_lifetime_perc_covered)
1189 medications_active>=active_care_plans-2
1190 medications_active>=floor(log(DALY))
1191 medications_active>=minimum(immunizations_lifetime,procedures_lifetime)
1192 medications_active>=-ceil(DALY)+procedures_lifetime
1193 medications_active>=1/2*lifetime_care_plans-1
1194 medications_active>=maximum(Pain_severity___0_10_verbal_numeric_rating__Sco
re____Reported,mean_QOLS)-1
1195 medications_active<=active_care_plans^healthcare_expenses
1196 medications_active<=active_care_plans/immunizations_lifetime
1197 medications_active<=ceil(log(age))
1198 medications_active<=medications_lifetime
1199 medications_active<=(log(device_lifetime_length)/log(10))^medications_lifet
ime_length
1200 medications_active<=floor(1/2*encounters_count)
1201 medications_active<=log(QOLS)*longitude/log(10)
1202 medications_active>=2*num_allergies
1203 medications_active>=num_allergies+1
1204 medications_active>=active_care_plans^imaging_studies_lifetime
1205 medications_active>=2*immunizations_lifetime
1206 medications_active>=-active_care_plans+lifetime_care_plans
1207 medications_active>=2/active_care_plans
1208 medications_active>=minimum(active_care_plans,-Respiratory_rate)
1209 medications_active>=ceil(active_care_plan_length-active_condition_length)
1210
medications_active>=ceil(immunizations_lifetime_cost/lifetime_care_plan_length)
```

```
1211 medications_active>=immunizations_lifetime^2+1
1212 procedures_lifetime<=healthcare_coverage
1213
procedures_lifetime<=sqrt(medications_lifetime_cost/active_care_plan_length)
1214 procedures_lifetime<=maximum(Systolic_Blood_Pressure,active_care_plans-1)
1215 procedures_lifetime<=procedures_lifetime_cost
1216 procedures_lifetime<=active_conditions^2
1217 procedures_lifetime<=floor(log(10^latitude))
1218 procedures_lifetime<=healthcare_expenses^medications_lifetime_perc_covered*
active_care_plans
1219 procedures_lifetime<=maximum(Protein__Mass_volume__in_Urine_by_Test_strip,l
og(medications_lifetime))
1220 procedures_lifetime<=minimum(healthcare_expenses,floor(Erythrocytes____volu
me__in_Blood_by_Automated_count))
1221 procedures_lifetime>=num_allergies
1222 procedures_lifetime>=(lifetime_conditions-1)*imaging_studies_lifetime
1223 procedures_lifetime>=active_care_plans*imaging_studies_lifetime
1224 procedures_lifetime>=-active_care_plans+medications_active
1225 procedures_lifetime>=procedures_lifetime_cost/lifetime_condition_length^2
1226
procedures_lifetime>=minimum(immunizations_lifetime,procedures_lifetime_cost)
1227 procedures_lifetime<=lifetime_conditions
1228 procedures_lifetime<=active_care_plan_length
1229 procedures_lifetime<=encounters_lifetime_payer_coverage
1230 procedures_lifetime<=immunizations_lifetime_cost
1231 procedures_lifetime<=(1/num_allergies)
1232 procedures_lifetime<=healthcare_expenses^medications_lifetime_perc_covered
1233 procedures_lifetime<=e^device_lifetime_length+medications_active
1234 procedures_lifetime<=mean_Pain_severity___0_10_verbal_numeric_rating__Score
____Reported^immunizations_lifetime_cost
1235 procedures_lifetime<=maximum(Glomerular_filtration_rate_1_73_sq_M_predicted
,ceil(active_care_plans))
1236 procedures_lifetime>=num_allergies
1237 procedures_lifetime>=lifetime_condition_length^medications_lifetime_perc_co
vered-1
1238 procedures_lifetime>=ceil(medications_lifetime_perc_covered)
1239 procedures_lifetime>=-healthcare_coverage+medications_active
1240 procedures_lifetime>=2*ceil(device_lifetime_length)
1241 procedures_lifetime>=-active_care_plans+medications_active
1242 procedures_lifetime<=active_care_plans
1243 procedures_lifetime<=Heart_rate-floor(active_condition_length)
1244 procedures_lifetime<=procedures_lifetime_cost
1245 procedures_lifetime<=lifetime_conditions/mean_Pain_severity___0_10_verbal_n
umeric_rating__Score____Reported
1246 procedures_lifetime<=ceil(DALY)
1247 procedures_lifetime<=maximum(Triglycerides,Pain_severity___0_10_verbal_nume
ric_rating__Score____Reported+1)
1248 procedures_lifetime<=active_care_plans/immunizations_lifetime
```

```
1249 procedures_lifetime<=-Respiratory_rate+medications_lifetime-1
1250 procedures_lifetime>=num_allergies
1251 procedures_lifetime>=immunizations_lifetime-1
1252 procedures_lifetime>=sqrt(procedures_lifetime_cost)/QALY
1253 procedures_lifetime>=minimum(procedures_lifetime_cost,e^num_allergies)
1254 procedures_lifetime_cost<=active_care_plan_length*healthcare_expenses/encou
nters_count
1255 procedures_lifetime_cost<=healthcare_coverage^2
1256 procedures_lifetime_cost<=healthcare_expenses*immunizations_lifetime
1257 procedures_lifetime_cost<=10^active_conditions+encounters_count
1258 procedures_lifetime_cost<=healthcare_expenses/medications_active+encounters
_lifetime_payer_coverage
1259 procedures_lifetime_cost<=healthcare_expenses*procedures_lifetime
1260 procedures_lifetime_cost<=(healthcare_expenses^2)^QOLS
1261 procedures_lifetime_cost<=(Urea_Nitrogen^2)^procedures_lifetime
1262 procedures_lifetime_cost>=num_allergies
1263 procedures_lifetime_cost>=-active_care_plan_length^2+medications_lifetime_d
ispenses
1264 procedures_lifetime_cost>=-lifetime_condition_length+2*medications_lifetime
1265 procedures_lifetime_cost>=ceil(encounters_lifetime_payer_coverage-
medications_lifetime_length)
1266 procedures_lifetime_cost>=healthcare_expenses*num_allergies/QALY
1267
procedures_lifetime_cost>=healthcare_expenses^encounters_lifetime_perc_covered-
healthcare_coverage
1268 procedures_lifetime_cost>=10^DALY*device_lifetime_length
1269 procedures_lifetime_cost>=(procedures_lifetime-1)*medications_lifetime
1270
procedures_lifetime_cost>=encounters_lifetime_total_cost-1/2*healthcare_coverage
1271 procedures_lifetime_cost<=healthcare_expenses/medications_lifetime+Diastoli
c_Blood_Pressure
1272 procedures_lifetime_cost<=e^encounters_count+medications_lifetime_dispenses
1273 procedures_lifetime_cost<=(Body_Mass_Index^2)^procedures_lifetime
1274 procedures_lifetime_cost<=(Systolic_Blood_Pressure+encounters_count)^2
1275 procedures_lifetime_cost<=healthcare_expenses/(DALY*lifetime_care_plans)
1276 procedures_lifetime_cost<=healthcare_expenses*procedures_lifetime
1277
procedures_lifetime_cost<=ceil(encounters_lifetime_total_cost)^active_care_plans
1278 procedures_lifetime_cost<=2*e^sqrt(Diastolic_Blood_Pressure)
1279 procedures_lifetime_cost>=device_lifetime_length
1280 procedures_lifetime_cost>=longitude/log(DALY)
1281 procedures_lifetime_cost>=log(10^procedures_lifetime)^2
1282 procedures_lifetime_cost>=active_care_plan_length^2-healthcare_coverage
1283 procedures_lifetime_cost>=(immunizations_lifetime-1)*encounters_lifetime_pa
yer_coverage
1284 procedures_lifetime_cost>=-QALY^2+medications_lifetime_dispenses
1285 procedures_lifetime_cost<=active_care_plans*healthcare_expenses/lifetime_ca
re_plans
```

```
1286 procedures_lifetime_cost<=healthcare_expenses*procedures_lifetime
1287 procedures_lifetime_cost<=healthcare_expenses*immunizations_lifetime
1288 procedures_lifetime_cost<=(healthcare_expenses/encounters_lifetime_total_co
st)^lifetime_care_plans
1289 procedures_lifetime_cost<=2*immunizations_lifetime_cost*lifetime_condition_
length
1290 procedures_lifetime_cost<=maximum(medications_lifetime_dispenses,e^encounte
rs_count)
1291 procedures_lifetime_cost<=10^(immunizations_lifetime+medications_lifetime)
1292 procedures_lifetime_cost<=active_condition_length*healthcare_expenses/encou
nters_count
1293 procedures_lifetime_cost<=healthcare_expenses^QOLS+healthcare_coverage
1294 procedures_lifetime_cost>=num_allergies
1295 procedures_lifetime_cost>=1/2*immunizations_lifetime_cost/DALY
1296 procedures_lifetime_cost>=2*lifetime_condition_length*procedures_lifetime
1297 procedures_lifetime_cost>=immunizations_lifetime_cost*log(encounters_count)
/log(10)
1298 procedures_lifetime_cost>=latitude^2*num_allergies^2
1299 procedures_lifetime_cost>=encounters_count*procedures_lifetime^2
1300 procedures_lifetime_cost>=e^lifetime_care_plans-
medications_lifetime_dispenses
1301 procedures_lifetime_cost>=-10^DALY+medications_lifetime_dispenses
1302 QOLS<=mean_QOLS
1303 QOLS>=mean_QOLS
1304 QOLS<=mean_QOLS
1305 QOLS<=DALY
1306 QOLS>=mean_QOLS
1307 QOLS<=lifetime_care_plans
1308 QOLS<=mean_QOLS
1309 QOLS>=mean_QOLS
1310 QALY<=mean_QALY
1311 QALY>=mean_QALY
1312 QALY<=mean_QALY
1313 QALY<=mean_QALY
1314 QALY>=mean_QALY
1315 DALY<=mean_DALY
1316 DALY>=mean_DALY
1317 DALY<=mean_DALY
1318 DALY<=active_care_plan_length
1319 DALY>=mean_DALY
1320 DALY<=mean_DALY
1321 DALY<=active_care_plan_length
1322 DALY>=mean_DALY
1323 Body_Weight<=ceil(mean_Body_Weight)+encounters_lifetime_perc_covered
1324 Body_Weight<=maximum(lifetime_care_plan_length,mean_Body_Weight)
1325 Body_Weight<=maximum(encounters_count,mean_Body_Weight)
1326 Body_Weight<=mean_Body_Weight/imaging_studies_lifetime
1327 Body_Weight<=mean_Body_Weight+mean_Pain_severity___0_10_verbal_numeric_rati
```

```
ng__Score____Reported-1
1328 Body_Weight<=QALY*active_care_plans+1
1329 Body_Weight>=mean_Body_Weight
1330
Pain_severity___0_10_verbal_numeric_rating__Score____Reported<=active_care_plans
1331 Pain_severity___0_10_verbal_numeric_rating__Score____Reported<=medications_
active
1332 Pain_severity___0_10_verbal_numeric_rating__Score____Reported<=floor(10^enc
ounters_lifetime_perc_covered)
1333 Pain_severity___0_10_verbal_numeric_rating__Score____Reported<=1/2*lifetime
_conditions
1334 Pain_severity___0_10_verbal_numeric_rating__Score____Reported<=ceil(mean_Pa
in_severity___0_10_verbal_numeric_rating__Score____Reported)
1335 Body_Height<=mean_Body_Height
1336 mean_Body_Height>=Body_Height
1337 mean_Body_Mass_Index>=floor(Body_Mass_Index)
1338 mean_Body_Mass_Index>=Body_Mass_Index-procedures_lifetime
1339 mean_Body_Mass_Index>=Body_Mass_Index^num_allergies
1340 mean_Body_Mass_Index>=minimum(Body_Mass_Index,1/2*active_condition_length)
1341 mean_Body_Mass_Index>=Body_Mass_Index-1/2*DALY
1342 mean_Body_Mass_Index>=Body_Mass_Index/Pain_severity___0_10_verbal_numeric_r
ating__Score____Reported
1343 mean_Body_Mass_Index>=minimum(Body_Mass_Index,Creatinine)
1344 mean_DALY<=DALY
1345 mean_DALY>=DALY
1346 mean_DALY<=DALY
1347 mean_DALY>=DALY
1348 mean_DALY<=DALY
1349 mean_DALY>=imaging_studies_lifetime
1350 mean_DALY>=DALY
1351 mean_Heart_rate<=maximum(encounters_count,Heart_rate)
1352 mean_Heart_rate<=10^(QALY^(1/4))
1353 mean_Heart_rate<=maximum(lifetime_care_plan_length,Heart_rate)
1354 mean_Heart_rate<=maximum(lifetime_condition_length,Heart_rate)
1355 mean_Heart_rate<=Heart_rate^active_care_plans
1356 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported<=active_
conditions
1357 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported<=Pain_se
verity___0_10_verbal_numeric_rating__Score____Reported
1358 mean_Pain_severity___0_10_verbal_numeric_rating__Score____Reported<=immuniz
ations_lifetime_cost^2/encounters_lifetime_total_cost
1359 mean_QALY<=QALY
1360 mean_QALY>=QALY
1361 mean_QALY<=QALY
1362 mean_QALY>=QALY
1363 mean_QALY<=QALY
1364 mean_QALY>=QALY
1365 mean_QOLS<=active_care_plans
```

```
1366 mean_QOLS<=medications_active
1367 mean_QOLS<=QOLS
1368 mean_QOLS>=QOLS
1369 mean_QOLS<=QOLS
1370 mean_QOLS>=QOLS
1371 mean_QOLS<=lifetime_care_plans
1372 mean_QOLS<=QOLS
1373 mean_QOLS>=QOLS
1374 mean_Systolic_Blood_Pressure>=minimum(procedures_lifetime_cost,Systolic_Blo
od_Pressure)
1375 mean_Systolic_Blood_Pressure>=floor(latitude)*mean_Pain_severity___0_10_ver
bal_numeric_rating__Score____Reported
1376 mean_Systolic_Blood_Pressure>=Systolic_Blood_Pressure/active_care_plans
1377 mean_Systolic_Blood_Pressure>=2*active_conditions+mean_Heart_rate
1378 mean_Systolic_Blood_Pressure>=minimum(lifetime_care_plan_length,Systolic_Bl
ood_Pressure)
1379 mean_Systolic_Blood_Pressure>=Systolic_Blood_Pressure-
immunizations_lifetime_cost
1380 mean_Systolic_Blood_Pressure>=-Systolic_Blood_Pressure+encounters_count
Number of not ICU, ICU properties
1380 1268

/Users/jpbrooks/opt/anaconda3/envs/sage/lib/python3.7/site-
packages/sage/repl/ipython_kernel/__main__.py:187: RuntimeWarning: overflow
encountered in double_scalars
/Users/jpbrooks/opt/anaconda3/envs/sage/lib/python3.7/site-
packages/sage/repl/ipython_kernel/__main__.py:40: RuntimeWarning: overflow
encountered in exp
/Users/jpbrooks/opt/anaconda3/envs/sage/lib/python3.7/site-
packages/sage/repl/ipython_kernel/__main__.py:171: RuntimeWarning: overflow
encountered in double_scalars

Property Conjectures
7
healthcare_coverage_geq_e_to_the_power_open_bracket_2_times_10_to_the_power_medi
cations_lifetime_perc_covered_close_bracket
(icu_status)->(healthcare_coverage>=e^(2*10^medications_lifetime_perc_covered))
0.9337755919020931
healthcare_expenses_leq_e_to_the_power_open_bracket__minus_DALY_plus_QALY_close_
bracket
(icu_status)->(healthcare_expenses<=e^(-DALY+QALY))
0.9349005424954792
healthcare_expenses_geq_procedures_lifetime_to_the_power_e_to_the_power_immuniza
tions_lifetime
(icu_status)->(healthcare_expenses>=procedures_lifetime^e^immunizations_lifetime
)
0.9244444444444444
healthcare_coverage_leq_open_bracket_encounters_lifetime_total_cost_minus_1_clos
e_bracket_times_age
```

```
(icu_status)->(healthcare_coverage<=(encounters_lifetime_total_cost-1)*age)
0.9833876221498371
healthcare_coverage_geq_encounters_lifetime_total_cost_times_sqrtopen_bracket_im
munizations_lifetime_close_bracket
(icu_status)->(healthcare_coverage>=encounters_lifetime_total_cost*sqrt(immuniza
tions_lifetime))
0.924896265560166
healthcare_coverage_geq_e_to_the_power_open_bracket_sqrtopen_bracket_QALY_close_
bracket_plus_1_close_bracket
(icu_status)->(healthcare_coverage>=e^(sqrt(QALY)+1))
0.9304008378558507
latitude_geq_lifetime_condition_length_divided_by_open_bracket_medications_lifet
ime_plus_1_close_bracket
(icu_status)->(latitude>=lifetime_condition_length/(medications_lifetime+1))
0.9573904179408766
6
Hyperglycemia__disorder_
(Hyperglycemia__disorder_)->(icu_status)
0.09877273399378973
Coronary_Heart_Disease
(Coronary_Heart_Disease)->(icu_status)
0.12874184109835696
~medications_lifetime_leq_maximumopen_bracket_Platelet_distribution_width__Entit
ic_volume__in_Blood_by_Automated_count_or_e_to_the_power_active_conditions_close
_bracket
(~(medications_lifetime<=maximum(Platelet_distribution_width__Entitic_volume__in
_Blood_by_Automated_count,e^active_conditions)))->(icu_status)
0.040218270008084075
~latitude_leq_maximumopen_bracket_QALY_or_inverse_of_device_lifetime_length_clos
e_bracket
(~(latitude<=maximum(QALY,1/device_lifetime_length)))->(icu_status)
0.0591016548463357
Tobacco_smoking_status_NHISFormer_smoker
(Tobacco_smoking_status_NHISFormer_smoker)->(icu_status)
0.08455859923128546
~lifetime_care_plan_length_leq_encounters_lifetime_payer_coverage_divided_by_sqr
topen_bracket_latitude_close_bracket
(~(lifetime_care_plan_length<=encounters_lifetime_payer_coverage/sqrt(latitude))
)->(icu_status)
0.03428086550700042
```

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