Supplementary Materials

**********CODE**********

```
DROP MATERIALIZED VIEW IF EXISTS kdigo_creat CASCADE;
CREATE MATERIALIZED VIEW kdigo_creat as
-- Extract all creatinine values from labevents around patient's ICU stay
with cr as
(
select
      ie.icustay_id
   , ie.intime, ie.outtime
   , le.valuenum as creat
   , le.charttime
   from icustays ie
   left join labevents le
      on ie.subject_id = le.subject_id
      and le.ITEMID = 50912
      and le.VALUENUM is not null
      and le.CHARTTIME between (ie.intime - interval '7' day) and (ie.intime + interval '7' day)
)
-- add in the lowest value in the previous 48 hours/7 days
SELECT
   cr.icustay_id
   , cr.charttime
   , cr.creat
   , MIN(cr48.creat) AS creat_low_past_48hr
   , MIN(cr7.creat) AS creat_low_past_7day
FROM cr
-- add in all creatinine values in the last 48 hours
LEFT JOIN cr cr48
   ON cr.icustay_id = cr48.icustay_id
   AND cr48.charttime <    cr.charttime
   AND cr48.charttime >= (cr.charttime - INTERVAL '48' HOUR)
-- add in all creatinine values in the last 7 days hours
LEFT JOIN cr cr7
   ON cr.icustay_id = cr7.icustay_id
   AND cr7.charttime <    cr.charttime
   AND cr7.charttime >= (cr.charttime - INTERVAL '7' DAY)
GROUP BY cr.icustay_id, cr.charttime, cr.creat
ORDER BY cr.icustay_id, cr.charttime, cr.creat;

-- This query checks if the patient had AKI according to KDIGO.
-- AKI is calculated every time a creatinine or urine output measurement occurs.
-- Baseline creatinine is defined as the lowest creatinine in the past 7 days.
```

```
DROP MATERIALIZED VIEW IF EXISTS kdigo_stages CASCADE;
CREATE MATERIALIZED VIEW kdigo_stages AS
-- get creatinine stages
with cr_stg AS
(
    SELECT
        cr.icustay_id
        , cr.charttime
        , cr.creat
        , case
            -- 3x baseline
            when cr.creat >= (cr.creat_low_past_7day*3.0) then 3
            -- *OR* cr >= 4.0 with associated increase
            when cr.creat >= 4
            -- For patients reaching Stage 3 by SCr >4.0 mg/dl
            -- require that the patient first achieve ... acute increase >= 0.3 within 48 hr
            -- *or* an increase of >= 1.5 times baseline
            and (cr.creat_low_past_48hr <= 3.7 OR cr.creat >= (1.5*cr.creat_low_past_7day))
                then 3
            -- TODO: initiation of RRT
            when cr.creat >= (cr.creat_low_past_7day*2.0) then 2
            when cr.creat >= (cr.creat_low_past_48hr+0.3) then 1
            when cr.creat >= (cr.creat_low_past_7day*1.5) then 1
        else 0 end as aki_stage_creat
    FROM kdigo_creat cr
)
-- stages for UO / creat
, uo_stg as
(
    select
            uo.icustay_id
        , uo.charttime
        , uo.weight
        , uo.uo_rt_6hr
        , uo.uo_rt_12hr
        , uo.uo_rt_24hr
        -- AKI stages according to urine output
        , CASE
            WHEN uo.uo_rt_6hr IS NULL THEN NULL
            -- require patient to be in ICU for at least 6 hours to stage UO
            WHEN uo.charttime <= ie.intime + interval '6' hour THEN 0
            -- require the UO rate to be calculated over half the period
            -- i.e. for uo rate over 24 hours, require documentation at least 12 hr apart
```

```
            WHEN uo.uo_tm_24hr >= 11 AND uo.uo_rt_24hr < 0.3 THEN 3
            WHEN uo.uo_tm_12hr >= 5 AND uo.uo_rt_12hr = 0 THEN 3
            WHEN uo.uo_tm_12hr >= 5 AND uo.uo_rt_12hr < 0.5 THEN 2
            WHEN uo.uo_tm_6hr >= 2 AND uo.uo_rt_6hr  < 0.5 THEN 1
        ELSE 0 END AS aki_stage_uo
    from kdigo_uo uo
    INNER JOIN icustays ie
        ON uo.icustay_id = ie.icustay_id
)
-- get all charttimes documented
, tm_stg AS
(
        SELECT
            icustay_id, charttime
        FROM cr_stg
        UNION
        SELECT
            icustay_id, charttime
        FROM uo_stg
)
select
        ie.icustay_id
    , tm.charttime
    , cr.creat
    , cr.aki_stage_creat
    , uo.uo_rt_6hr
    , uo.uo_rt_12hr
    , uo.uo_rt_24hr
    , uo.aki_stage_uo
    -- Classify AKI using both creatinine/urine output criteria
    , GREATEST(cr.aki_stage_creat, uo.aki_stage_uo) AS aki_stage
FROM icustays ie
-- get all possible charttimes as listed in tm_stg
LEFT JOIN tm_stg tm
    ON ie.icustay_id = tm.icustay_id
LEFT JOIN cr_stg cr
    ON ie.icustay_id = cr.icustay_id
    AND tm.charttime = cr.charttime
LEFT JOIN uo_stg uo
    ON ie.icustay_id = uo.icustay_id
    AND tm.charttime = uo.charttime
order by ie.icustay_id, tm.charttime;

-- This query checks if the patient had AKI during the first 7 days of their ICU
```

```
-- stay according to the KDIGO guideline.
-- https://kdigo.org/wp-content/uploads/2016/10/KDIGO-2012-AKI-Guideline-English.pdf

DROP MATERIALIZED VIEW IF EXISTS kdigo_stages_7day;
CREATE MATERIALIZED VIEW kdigo_stages_7day AS
-- get the worst staging of creatinine in the first 48 hours
WITH cr_aki AS
(
  SELECT
    k.icustay_id
    , k.charttime
    , k.creat
    , k.aki_stage_creat
    , ROW_NUMBER() OVER (PARTITION BY k.icustay_id ORDER BY k.aki_stage_creat
DESC, k.creat DESC) AS rn
  FROM icustays ie
  INNER JOIN kdigo_stages k
    ON ie.icustay_id = k.icustay_id
  WHERE k.charttime > (ie.intime - interval '6' hour)
  AND k.charttime <= (ie.intime + interval '7' day)
  AND k.aki_stage_creat IS NOT NULL
)
-- get the worst staging of urine output in the first 48 hours
, uo_aki AS
(
  SELECT
    k.icustay_id
    , k.charttime
    , k.uo_rt_6hr, k.uo_rt_12hr, k.uo_rt_24hr
    , k.aki_stage_uo
    , ROW_NUMBER() OVER
    (
      PARTITION BY k.icustay_id
      ORDER BY k.aki_stage_uo DESC, k.uo_rt_24hr DESC, k.uo_rt_12hr DESC, k.uo_rt_6hr
DESC
    ) AS rn
  FROM icustays ie
  INNER JOIN kdigo_stages k
    ON ie.icustay_id = k.icustay_id
  WHERE k.charttime > (ie.intime - interval '6' hour)
  AND k.charttime <= (ie.intime + interval '7' day)
  AND k.aki_stage_uo IS NOT NULL
)
-- final table is aki_stage, include worst cr/uo for convenience
```

```
select
      ie.icustay_id
    , cr.charttime as charttime_creat
    , cr.creat
    , cr.aki_stage_creat
    , uo.charttime as charttime_uo
    , uo.uo_rt_6hr
    , uo.uo_rt_12hr
    , uo.uo_rt_24hr
    , uo.aki_stage_uo

    -- Classify AKI using both creatinine/urine output criteria
    , GREATEST(cr.aki_stage_creat,uo.aki_stage_uo) AS aki_stage_7day
    , CASE WHEN GREATEST(cr.aki_stage_creat, uo.aki_stage_uo) > 0 THEN 1 ELSE 0 END AS
aki_7day

FROM icustays ie
LEFT JOIN cr_aki cr
    ON ie.icustay_id = cr.icustay_id
    AND cr.rn = 1
LEFT JOIN uo_aki uo
    ON ie.icustay_id = uo.icustay_id
    AND uo.rn = 1
order by ie.icustay_id;
********************************************************************************
```