CEPAC-Pediatric Patient Simulation Flow Chart
(United States and International)

Senior Programmer: Taige Hou
Ordering of Patient Simulation in CEPAC Pediatrics Model

1. Simulate Patient
2. Begin Month Updater 10a
3. Maternal Status Updater 15a
4. Feeding Updater 18a
5. Pediatric Postpartum Infection Updater 20a
6. Pediatric Diagnosis Updater 20a1
7. Acute OI Updater 50a
8. Seroconversion Updater 55a
9. Pediatric Mortality Updater 60a
10. CD4/HVL Updater 70a
11. Drug Efficacy Updater 100a
12. CD4 Test Updater 110a/b
13. HVL Test Updater 120a/b
14. Clinic Visit Updater 130a
15. End Month Updater 140a/b

If Patient Still Alive:

If Death Occurs:

Return
Begin Month Updater

Update State:
Set QOL Multiplier (1.0)
Set NonAIDS Death Rate Mult (1.0)
Set Curr True OI (none)
Clear Mortality Risks

Is this the first month?

Yes

Tracing:
Initial Patient State
(gender, age, visit type, HIV state,
matrial status, age of seroreversion, RF/BF status)

No

Is HIV Positive?

Yes

Update State:
Update Initial Distributions

Tracing:
Initial Disease State
(CD4, HVL, OI history)

No

Return

Note: All usual CEPAC elements
(ART, prophylaxis, lost-to-follow-up,
etc.) apply only if in care.
Feeding Updater – 18a

Is child replacement feeding?

- No
  - Is it time to stop replacement feeding? (end of infant feeding period)
    - Yes: Update State: Not Infant Feeding (i.e., no EBF, MBF, CBF, or RBF)
    - No: Is child complementary feeding?
      - Yes:
        - Time to switch to complementary feeding?
          - Yes: Update State: Complementary Breastfeeding
          - No: Return
      - No: Is mother alive?
        - Yes: Is it time to stop breastfeeding?
          - Yes: Update State: Not Infant Feeding (i.e., no EBF, MBF, CBF, or RBF)
          - No: Is child replaced feeding?
            - Yes:
              - Time to switch to complementary feeding?
                - Yes: Update State: Complementary Breastfeeding
                - No: Return
            - No: Return
Pediatric Postpartum Infection Updater

20a

IU/IP-infected?

Yes

Return

No

Is mother alive?

No

Baby replacement fed?

Yes

Update State: PP infected

No

Is mother infected?

No

Roll for PP infection

Yes

No
Pediatric Diagnosis Updater – 20a1

1. **Already diagnosed and in care?**
   - Yes
   - No
   - Previously detected HIV+
     - Yes
     - Is it time for an EID visit?
     - Yes
     - Return
     - No
     - Is it time for an immunization visit?
     - Yes
     - Roll for linkage to care
     - Yes
     - Set Linked State: (true, Screening)
     - Tracing: Pediatric Diagnosis Linkage
     - Schedule Initial Clinic Visit 150a
   - No
   - Was patient previously detected HIV+
     - Yes
     - Does physician know patient is detected?
       - Yes
       - Return
       - No
     - No
   - Arrives at appointment?
     - Yes
     - Pediatric Initial/Confirmatory Diagnosis Subroutine 20a2
     - No
     - Was patient previously detected HIV+
       - Yes
       - Return
       - No
   - Initial positive result received?
     - Yes
     - Pediatric Initial/Confirmatory Diagnosis Subroutine 20a2
     - No
   - Confirmatory positive result received?
     - Yes
     - Status Update: Detected HIV-Infected
     - Roll for linkage to care
     - Yes
       - Set Linked State: (true, Screening)
       - Tracing: Pediatric Diagnosis Linkage
       - Schedule Initial Clinic Visit 150a
     - No

Pediatric Initial/Confirmatory Diagnosis Subroutine – 20a2

Is offered HIV test?  
Yes  
Accepts test offer?  
Yes  
Result negative?  
No  
Positive result returned?  
No  
Negative result returned?  
No  
Return  
Positive result return cost  
Update State: Positive diagnosis received (initial or confirmatory)
Drug Toxicity Updater – 30a

Drug Toxicity Updater
30a

Has taken ART?

Yes → ART Toxicity Subroutine
30b

No

Is on at least one proph?

Yes → Proph Toxicity Subroutine
30c

No

Return
For each active toxicity effect:
- Check month of toxicity
  - Initial
  - Still on ART subreg causing tox?
    - Yes
      - Tracing: ART Toxicity (name, severity, reg, subreg)
      - Update State: Set ART Toxicity (tox effect) Schedule Emergency Clinic Visit (curr month)
    - No
      - Update State: Remove Toxicity Effect
- Toxicity has risk of acute mortality?
  - Yes
    - Update State: Add Mortality Risk (ART tox, prob death)
  - No
- QOL effects still occur
  - Yes
    - Update State: Accum QOL Mult (tox QOL)
  - No
- Cost effects still occur
  - Yes
    - Update State: Incrt Costs Toxicity (tox cost)
  - No
- Chronic death effects still occur
  - Yes
    - Update State: Accum Non-AIDS Death Rate (tox chronic death incr)
  - No
- All effects have stopped
  - Yes
    - Update State: Remove Toxicity Effect
  - No

Return
Proph Toxicity Subroutine

For each OI:

Is on Proph for OI?

Yes → Is month of toxicity?

Yes → Calculate prob of neither a major or minor toxicity occurring

No → No

Roll for no toxicity

Yes → Roll for toxicity being major

No → Set: Calculate prob of each tox type occurring and not the other, normalize to get a distribution

Yes → Update State:
Set Proph Toxicity (major, OI)
Accum QOL Mult (tox QOL)
Incr Costs Toxicity (tox cost)

Tracing:
Major Toxicity (OI, type, num)

No → Toxicity has mortality risk?

Yes → Update State:
Add Mortality Risk (proph tox, prob death)

No → Switch proph for major tox?

Yes → Update State:
Schedule Emergency Clinic Visit (curr month)

No → No

Yes → Update State:
Schedule Emergency Clinic Visit (curr month)

Switch proph for minor tox?

Yes → Update State:
Schedule Emergency Clinic Visit (curr month)

No → No

Return

Update State:
Set Proph Toxicity (minor, OI)
Accum QOL Mult (tox QOL)
Incr Costs Toxicity (tox cost)

Tracing:
Minor Toxicity (OI, type, num)
Determine Acute OI Subroutine and Determine Death By OI Subroutine – 50b

For each OI (x)
  - If on proph for OI x?
    - Yes → For each OI (y)
      - If efficacy for OI y is > prev max
        - No
        - Set: Max efficacy for OI y
      - Yes
    - No
  - No
  - For each OI
    - Calculate prob of OI, modify by fraction of benefit and ART effect if on ART
    - Modify prob of OI by max efficacy, proph non-compliance, proph resistance
    - Multiply prob of No OIs by (1 – prob OI)
  - Roll for No OIs
    - Yes → Return none
    - No
  - Set: Calculate prob of only this OI as prob of this OI multiplied by (1 – prob OI) of each other OI
  - Add prob of only this OI to sum of probs
  - Roll and Set: Type of OI from calculated distribution
  - Return OI type

Determine Death By OI Subroutine – 50b

Set: Calculate prob of death by OI, modify by fraction of benefit

Set: Modify prob of death by OI, modify by proph resistance mortality factor

OI has risk of mortality?
  - No
  - Yes
  - Update State: Add Mortality Risk (OI type, prob death)

Return
Seroreversion Updater – 55a

1. **Already seroreverted?**
   - Yes: Return
   - No: Is it time for seroreversion?

2. **Is it time for seroreversion?**
   - Yes: Update state: seroreverted
   - No: Return
Pediatric Mortality Updater

Set:
Calculate prob of non-AIDS death, modify by non-AIDS death increase and replacement feeding/maternal mortality multipliers

Update State:
Add Mortality Risk (non-AIDS, prob death)

If HIV Negative?
Yes

Set:
Calculate prob of chronic AIDS death, modify by fraction of benefit and ART effect if on ART

Update State:
Add Mortality Risk (chronic AIDS, prob death)

For each mortality risk

Set:
Multiply prob of No Death by (1 – prob mortality risk)

Roll for No Death
Yes → Return
No

For each mortality risk

Set:
Calculate prob of this mortality risk causing death by converting it to a rate

Set:
Add rate of this mortality risk to sum of rates

For each mortality risk

Set:
Normalize each mortality rate by the sum of rates

Roll and Set: Roll for cause of death from calculated distribution

Update State:
Set Cause of Death (cause)

Is death from ART toxicity?
No

Update State:
Incr Misc Costs (ART toxicity death)

Yes

Return
CD4/HVL Updater – 70a

Has drawn patient specific CD4 decline increment?

Set: Set Patient Specific CD4 decline increment

If Curr HVL = Target HVL?

Update State: Set True HVL Strata (curr HVL – HVL change)

Update State: Set True HVL Strata (curr HVL + HVL change)

Update State: Set True HVL Strata (curr HVL – HVL change)

Has set overall CD4 envelope?

Has set regimen CD4 envelope?

Update State: Set Overall CD4 Envelope (slope)

Update State: Set Regimen CD4 Envelope (slope)

Roll and Set: Set CD4 bound as minimum CD4 minus natural history monthly CD4 decline (roll) minus patient specific CD4 decline increment

Is on ART?

Yes

Set: Calculate prob of HVL change from efficacy of current regimen

Set: Calculate prob of HVL change from failure of prev regimen

Roll for HVL change

Yes

Target HVL < Curr HVL

Yes

Update State: Set True HVL Strata (curr HVL – HVL change)

Update State: Set True HVL Strata (curr HVL + HVL change)

No

Update State: Set True HVL Strata (curr HVL – HVL change)

Update State: Set True HVL Strata (curr HVL + HVL change)

Is on ART?

Yes

Set: Calculate prob of HVL change from efficacy of current regimen

Set: Calculate prob of HVL change from failure of prev regimen

Roll for HVL change

Yes

Target HVL < Curr HVL

No

Update State: Set True HVL Strata (curr HVL – HVL change)

Update State: Set True HVL Strata (curr HVL + HVL change)

No

Update State: Set True HVL Strata (curr HVL – HVL change)

Update State: Set True HVL Strata (curr HVL + HVL change)

Is suppressed or partial suppress?

Yes

Roll and Set: Set slope as curr regimen CD4 slope plus monthly std dev (roll)

Roll and Set: Set slope as natural history monthly CD4 decline times failed ART multiplier plus monthly std dev (roll)

Set: Set slope as natural history monthly CD4 decline times off-ART multiplier

No

Set: Set slope as natural history monthly CD4 decline

Is curr CD4 + slope < bound?

Yes

Update State: Set True CD4 (CD4 bound)

No

Update State: Set True CD4 (CD4 bound)

Has previously been on ART?

Yes

Has set regimen CD4 envelope?

Yes

Update State: Set Regimen CD4 Envelope (slope)

No

Update State: Set Overall CD4 Envelope (slope)

Roll and Set: Set slope as natural history monthly CD4 decline times off-ART multiplier plus monthly std dev (roll)

Roll and Set: Set slope as curr regimen CD4 slope plus monthly std dev (roll)

Is on ART?

No

Has set overall CD4 envelope?

Yes

Update State: Set Overall CD4 Envelope (slope)

Has set regimen CD4 envelope?

No

Update State: Set Regimen CD4 Envelope (slope)

Roll and Set: Set slope as natural history monthly CD4 decline times off-ART multiplier plus monthly std dev (roll)

Roll and Set: Set slope as curr regimen CD4 slope plus monthly std dev (roll)

Is suppressed or partial suppress?

No

Has drawn patient specific CD4 decline increment?

Set: Set Patient Specific CD4 decline increment

Yes

Is on ART?

Has set overall CD4 envelope?

No

Update State: Set Overall CD4 Envelope (slope)

Has set regimen CD4 envelope?

Yes

Update State: Set Regimen CD4 Envelope (slope)

Roll and Set: Set slope as natural history monthly CD4 decline times off-ART multiplier plus monthly std dev (roll)

Roll and Set: Set slope as curr regimen CD4 slope plus monthly std dev (roll)
Drug Efficacy Updater – 100a

Drug Efficacy Updater

100a

Is on ART?

Yes → ART Efficacy Subroutine

100b

No

Has established CD4 envelope?

Yes → ART Envelope Efficacy Subroutine

100b

No

Is on at least one proph?

Yes → Proph Efficacy Subroutine

100c

No

Return
Proph Efficacy Subroutine

100c

For each OI:

- Past max months on proph?
  - Yes: Update State: Set Proph Resistance (OI)
  - No: Past months to switch proph?
    - Yes: Set resistance time for proph
    - No: Is on proph and not resistant?
      - Yes: Set resistance time for proph
      - No: Is patient proph non-compliant?
        - Yes: Calculate: Modify resistance time by degree of non-compliance
        - No: On proph past resistance time?
          - Yes: Roll for Resistance
          - No: Update State: Set Proph Resistance (OI)

- Return

TB Proph Efficacy Subroutine

100c

- Roll for TB proph dropout
  - Yes
  - No: Update State: Stop Curr TB Proph
  - Tracing: TB Proph Dropout (num)

- Return
Is on ART and not month of init?

No

Failed test by % drop?

No

Failed test by below pre-ART nadir?

No

Failed test by CD4 (OR) bounds?

No

Failed previous CD4 tests?

Yes

Update State: Reset ART Failed CD4 Tests

No

Test was to confirm clinical failure?

Yes

Update State: Reset ART Failed OIs

No

Update State: Schedule CD4 Test

Will have next test?

Yes

Update State: Schedule CD4 Test if avail

(never)

No

Update State: Schedule CD4 Test

(never)

Set:

Calculate testing interval from

CD4 strata and ART state

Past months on ART for fail?

Yes

Update State: Incr ART Failed CD4 Tests

No

Needs HVL test to confirm failure?

Yes

HVL Test Updater

120a/b

No

At num tests for immun failure?

Yes

Update State: Schedule Emergency Clinic Visit (curr month)

No

At num tests confirm clinical failure?

Yes

Update State: Schedule Emergency Clinic Visit (curr month)

No

Is regular CD4 test?

Yes

Will have next test?

Yes

Update State: Schedule CD4 Test

(never)

No

Update State: Schedule CD4 Test if avail

(curr + interval)

Return
Is past month of next HVL test?

- No
  - Is on ART?
    - No
      - Prompt: Roll and Set
        - Roll for observed HVL with testing error of either one strata below, one above, or correct value
    - Yes
      - Confirm ART failure outside regular visit?
        - No
          - Return
        - Yes
          - Need HVL test for num failed?
            - No
              - Return
            - Yes
              - Update State:
                - Set Observed HVL (obsv HVL)
                - Incr HVL Test Costs (test cost)
      - Update State:
        - Schedule Emergency Clinic Visit (curr month)

- Yes
  - Had HVL test this month?
    - Yes
      - Return
    - No
      - Is past month of next HVL test?
        - No
          - Return
        - Yes
          - Is on ART?
            - Yes
              - Confirm ART failure outside regular visit?
                - Yes
                  - Need HVL test confirm immun failure?
                    - No
                      - Return
                    - Yes
                      - Need HVL test confirm clinical failure?
                        - No
                          - Return
                        - Yes
                          - Next Page
            - No
              - Need HVL test confirm clinical failure?
                - Yes
                  - Next Page
                - No
                  - Return
  - Return

Months on ART < num init HVL tests

- No
  - Return
- Yes
  - Update State:
    - Schedule Emergency Clinic Visit (curr month)
Clinic Visit Updater – 130a

Will Attend Clinic This Month – 150a

Return

Yes

OI Detection Subroutine – 130b

Update State:
Incr Clinic Visit Costs (visit cost)
Incr Num Clinic Visits

Tracing:
Clinic Visit (cost)

Treat emergency visits as regular?

No

This visit was scheduled?

No

Update State:
Schedule Regular Clinic Visit (curr + interval)

Yes

Update State:
Schedule Emergency Clinic Visit (never)

Yes

Visit was an emergency one?

No

No

Yes

ART Program Subroutine – 130c/d/e

Proph Program Subroutine – 130h

Update State:
Reset Clinic Visit State (had visit, num OIs, etc.)
OI Detection Subroutine – 130b

For each OI

Has acute OI?
  Yes
  Update State: Incr Num Observed OIs (OI, 1)
  Tracing: Observed OI (OI)
  Is on ART?
    No
    Past month to count for ART fail?
      No
      OI type matches ART fail at OI?
        No
        Update State: Incr Num ART failed OIs
        Needs CD4 test to confirm failure?
          Yes
          CD4 Test Updater 110a/b
          Needs HVL test to confirm failure?
            Yes
            HVL Test Updater 120a/b
            No
          No
        No
      Yes
      Needs CD4 test to confirm failure?
        Yes
        CD4 Test Updater 110a/b
        Needs HVL test to confirm failure?
          Yes
          HVL Test Updater 120a/b
          No
        No
  No
  Roll for prob of OI detection

Is first visit and has history of OI?
  No
  Roll for prob of OI detection
  Yes
  Roll for prob of OI detection

Had true OI since last visit?
  Yes

Return
ART Program Subroutine 130c/d/e

May receive ART? No → Return

Is on ART and failure not yet observed?

Yes → Evaluate Fail ART Subroutine 130f/130fp

Fail → Tracing: ARTObserved Failure (fail type) → Update State: Set ART Observed Failure (fail type)

No Fail → Roll for should restart regimen?

Yes → Update State: Set Next ART Regimen (curr reg)

No → Evaluate Stop ART Subroutine 130f/130fp

Stop → Set: Stop Curr ART = stop type

Should stop current ART?

Yes → Next Page

No → Update State: Stop Curr ART (stop type) Set Target HVL (setpoint)

Has available next regimen?

Yes → Next Page

No → Update State: Set Month Of Next CD Test if avail (curr month + post-ART interval) Set Month Of Next HVL Test if avail (curr month + post-ART interval)

Next Page
ART Program Subroutine – 130e

Is on ART?

Yes

Started new regimen this month?

Yes

Set: Start Subreg = true
Next Subreg = 0

No

Has toxicity causing subreg switch?

Yes

Set: Start Subreg = true
Next Subreg = next from tox

No

Past time for regular subreg switch?

Yes

Set: Start Subreg = true
Next Subreg = next from tox

No

Start Subreg?

Yes

Update State: Start Next ART Subregimen (next subreg)

No

Tracing: Start ART Subregimen (reg, subreg)

Is an ART non-responder?

Yes

For each possible toxicity:

No

Roll for future toxicity occurring

Yes

Update State: Add Toxicity Effect (severity, tox id, time to tox)

On Adherence Intervention?

Yes

Eligible for Adherence Intervention?

No

Update State: Increment response for current regimen

Yes

Tracing: Init Adherence Intervention

Return

No

Return

Prev Page

No

Return

Prev Page

Yes

No
Evaluate Start ART Subroutine

**130f**

- Has available next regimen?
  - Yes
  - Past min month # for ART start?
    - Yes
    - Past months since prev stop for ART start?
      - Yes
      - Return false
    - No
  - No
- No

Evaluate Fail ART Subroutine

**130f**

- Exceed num OIs for ART failure?
  - Yes
  - Also use confirmatory HVL tests?
    - Yes
    - Exceed num confirm HVL tests?
      - Yes
      - Return fail clinic
      - No
      - Also use confirmatory CD4 tests?
        - Yes
        - Exceed num confirm CD4 tests?
          - Yes
          - Return fail clinic
          - No
        - No
        - No
  - No
- No

Evaluate Stop ART Subroutine

**130f**

- Exceed max Months on ART?
  - Yes
  - Return stop max months
  - No
  - Has major toxicity causing stop?
    - Yes
    - Return stop maj tox
    - No
  - Return no stop
  - No
  - Has observed ART failure?
    - Yes
    - Return no stop
    - No
- No
Proph Program Subroutine – 130h

May receive proph? 
- Yes: For each OI
  - If observed OI since last visit?
    - Yes: If on proph for this OI?
      - No: Has secondary proph available?
        - No: Update State: Set Next Proph (none)
        - Yes: Update State: Set Next Proph (OI, secondary, num)
      - Yes: Update State: Stop Curr Proph (OI)
    - No: Has toxicity causing switch?
      - Yes: Update State: Stop Curr Proph (OI)
      - No: Is month to switch proph?
        - Yes: Update State: Stop Curr Proph (OI)
        - No: Evaluate Stop Proph Subroutine 130i/130ip

- No: For each OI
  - If on proph for this OI?
    - Yes: Evaluate Stop Proph Subroutine 130i/130ip
    - No: Evaluate Start Proph Subroutine 130i/130ip

- Return
Evaluate Start Proph Subroutine and Evaluate Stop Proph Subroutine – 130i

Evaluate Start Proph Subroutine 130i

Has available next proph?

Yes

Past min month # for proph start?

Yes

No

Return false

No

Evaluate Stop Proph Subroutine 130i

Past max month # for proph stop?

Yes

No

Past max months on proph for stop?

Yes

No

Return true

Within current CD4 bounds?

Yes

Within minimum CD4 bounds?

Yes

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

History of at least one w/ hist OI?

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

No history of all w/o hist OIs?

Yes

No

Within minimum CD4 bounds?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

History of at least one w/ hist OI?

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?

Yes

No

Set: Passed One Criteria = true

Set: Failed One Criteria = true

Set: Passed One Criteria = true

Set: Failed One Criteria = true

No history of all w/o hist OIs?

Yes

No

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Set: Failed One Criteria = true

Using OR eval and passed at least one?

Yes

No

Using AND eval and failed none?
Evaluate Peds Start Proph Subroutine and Evaluate Peds Stop Proph Subroutine – 130ip

Evaluate Peds Start Proph Subroutine 130ip

Has available next proph? No

Yes

Return false

Evaluate Peds Stop Proph Subroutine 130ip

Past max months on proph for stop? Yes Return true

No

Set:
Passed First Criteria = true
Set:
Passed First Criteria = false

Yes

Within Age Bounds?
No

Set:
Passed Second Criteria = true
Set:
Passed Second Criteria = false

Yes

Within curr CD4% bounds?
No

Set:
Passed Third Criteria = true
Set:
Passed Third Criteria = false

Yes

History of at least one w/ hist OI?
No

Set:
Passed Third Criteria = true
Set:
Passed Third Criteria = false

No history of all w/o hist OIs?

Yes

Set:
Passed Third Criteria = true
Set:
Passed Third Criteria = false

No

Matches And/Or Criteria for start proph?

Yes

Return true

Return false

No

Set:
Passed First Criteria = true
Set:
Passed First Criteria = false

Yes

Above Age Threshold?
No

Set:
Passed Second Criteria = true
Set:
Passed Second Criteria = false

Above CD4% threshold?
No

Set:
Passed Third Criteria = true
Set:
Passed Third Criteria = false

Yes

History of at least one w/ hist OI?
No

Set:
Passed Third Criteria = true
Set:
Passed Third Criteria = false

No history of all w/o hist OIs?

Yes

Set:
Passed Third Criteria = true
Set:
Passed Third Criteria = false

No

Matches And/Or Criteria for start proph?

Yes

Return true

Return false
End Month Updater – 140a

Is HIV positive?

Yes

Update State: Incr Misc Costs (HIV-neg routine care, percent)

No

Is detected HIV positive?

Yes

Update State: Incr Misc Costs (HIV undetected month, percent)

No

Update State: Incr Misc Costs (routine care, percent)

Is on ART?

Yes

Set: Set monthly cost, modify by prob of fill Rx for non-resonders

Incur full cost if month of regimen start

No

Update State: Incr ART Costs (ART monthly cost)

Is on Adherence Intervention?

Yes

Is past intervention cost duration?

No

Update State: Incr Intervention Cost (Intervention monthly cost)

Yes

For each OI

Is on proph for this OI?

Yes

Update State: Incr Proph Costs (proph monthly cost)

No

Update State: Incr Misc Costs (peds, percent)

Is on TB proph?

Yes

Update State: Incr TB Proph Costs (TB proph monthly cost)

No

Update State: Incr Misc Costs (OI death cost)

Is on TB treatment?

Yes

Update State: Incr TB Treatment Costs (TB treatment monthly cost, ART mult)

No

Death from OI?

Yes

Death from chronic AIDS?

No

Is detected HIV positive?

No

Death from non AIDS?

Yes

Is HIV positive?

No

Death from CHRMs?

Yes

Death occurred?

No

Using Simplified Peds Model?

Yes

Set: Calculate peds cost based on HIV status, infection method, and ART status

No

Set: Calculate routine care cost as maximum cost of care from all OIs that patient has a history of

Update State: Incr Misc Costs (OI death undetected cost)

Update State: Incr Misc Costs (chrAIDS death undetected cost)

Update State: Incr Misc Costs (nonAIDS death HIV neg cost)

Update State: Incr Misc Costs (nonAIDS death undetected cost)

Update State: Incr Misc Costs (CHRMs death cost)
Get Partial Suppress Target HVL

Set:
numStrata = Setpoint HVL - Suppress HVL - 1

numStrata < 1
True → Return Setpoint HVL
False

numStrata > 3
True → Set:
numStrata = 3
False

For each i: 1..numStrata

Roll for HVL drop of i
Yes → Return Setpoint HVL - i
No → False

Return Setpoint HVL