Electronic Health Record (EHR) instructions

How to access and/or set up the REVEAL 2.0 Risk Calculator in the Epic® EHR systems
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The process outlined in this resource is variable, and not all steps will apply to every health system. Any steps or settings that are not part of a health system’s standard process should be excluded or modified accordingly. Any questions should be directed to the appropriate service provider. The practice is solely responsible for implementing, testing, monitoring, and ongoing operation of any EHR tools.

The instructions are not intended to replace your health system’s processes or protocols, nor are they an endorsement or recommendation. Any decision related to patient care should be made by the respective healthcare provider(s).

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The REVEAL 2.0 Risk Calculator includes 2 key sections to help you assess the risk status of your patients:

**Section 1: The questions**
- Each question is individually scored

**Section 2: The Scoring Algorithm**
- Responses to at least 7 of the 13 questions are required to calculate a risk score
- All individual results are added together to calculate the REVEAL 2.0 Risk Score

**Score Interpretation**
- Low risk: 0-6
- Intermediate risk: 7-8
- High risk: ≥9

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**REVEAL 2.0 Risk Calculator Instructions**

There are 3 options to set up the REVEAL 2.0 Risk Calculator in the Epic EHR:
- Access it from the UserWeb and work with the Epic representatives to install it in your health system’s Epic instance
- Build and set up the calculator as a Flowsheet
- Build and set up the calculator as a SmartForm
Epic’s UserWeb contains examples of how other health systems have created the REVEAL 2.0 Risk Calculator as a flowsheet.

1. Access the Epic UserWeb and enter Reveal 2 in the search field. All available matches will display build information.

2. Consult your health system’s EHR clinical analyst to assess, copy, and test the build from the Epic UserWeb Community Library (security access credentials may be required).

3. Your EHR clinical analyst can work with both Epic representatives (the representative from your health system and the representative from the health system who posted the original calculator) to import the calculator in your Epic build.

4. Once the flowsheet is available, complete testing to make sure all functionality works as expected.
Step 1: Create the Flowsheet

1. Access the flowsheet build tool by clicking Epic Icon > Tools > Patient Care Tools > Doc Flowsheet Builder

2. Create a FlowSheet template and enter “REVEAL Risk Score Calculator 2.0” as the Display name (to contain the FlowSheet Groups and Rows once created)

3. Create 2 Flowsheet Groups using the following steps:
   a. Enter a record name or ID in the Create Group/Row field
   b. In the General for view, enter the display name “REVEAL Risk Score Calculator 2.0 Questions”
   c. Enter Flowsheet Group in the Row type field
   d. Once completed, repeat steps a-c above to complete the REVEAL Risk Score Calculator 2.0 Score group
   e. Once completed, 2 Flowsheet Groups should be available:
      1. REVEAL Risk Score Calculator 2.0 Questions
      2. REVEAL Risk Score Calculator 2.0 Score

4. Create 13 Flowsheet Rows (add to appropriate Flowsheet Group)
   a. Row 1: WHO Group I Subgroup
      1. Enter a record name or ID in the Create Group/Row field
      2. In the General for view, enter the Display Name “WHO Group I Subgroup”
      3. Enter Custom List in the Row type field
      4. In the Custom List form, enter:
         1. Value: APAH-CTD (abbreviation 1)
         2. Value: APAH-PoPH (abbreviation 3)
3. Value: FPAH (abbreviation 2)
4. Value: Other (abbreviation 0)

b. Row 2: Demographics - Males age >60 years
   1. Enter a record name or ID in the Create Group/Row field
   2. In the General for view, enter the Display Name “Demographics”
   3. Enter Custom List in the Row type field
   4. In the Custom List form, enter:
      1. Value: Yes (abbreviation 2)
      2. Value: No (abbreviation 0)

c. Row 3: Comorbidities - eGFR <60 mL/min/1.73 m² or renal insufficiency
   1. Enter a record name or ID in the Create Group/Row field
   2. In the General for view, enter the Display Name “Comorbidities”
   3. Enter Custom List in the Row type field
   4. In the Custom List form, enter:
      1. Value: Yes (abbreviation 1)
      2. Value: No (abbreviation 0)

d. Row 4: NYHA/WHO Functional Class
   1. Enter a record name or ID in the Create Group/Row field
   2. In the General for view, enter the Display Name “NYHA/WHO Functional Class”
   3. Enter Custom List in the Row type field
   4. In the Custom List form, enter:
      1. Value: I (abbreviation -1)
      2. Value: II (abbreviation 0)
      3. Value: III (abbreviation 1)
      4. Value: IV (abbreviation 2)

e. Row 5: Vital Signs
   1. Enter a record name or ID in the Create Group/Row field
   2. In the General for view, enter the Display Name “Vital Signs”
   3. Enter Custom List in the Row type field
   4. In the Custom List form, enter:
      1. Value: SBP <110 mm Hg (abbreviation 1)
      2. Value SBP ≥110 mm Hg (abbreviation 0)
      3. Value: HR >96 BPM (abbreviation 1)
      4. Value HR ≤96 BPM (abbreviation 0)

f. Row 6: All-Cause Hospitalizations ≤6 mo
   1. Enter a record name or ID in the Create Group/Row field
2. In the General for view, enter the Display Name “All-Cause Hospitalizations ≤6 mo”
3. Enter Custom List in the Row type field
4. In the Custom List form, enter:
   1. Value: Yes (abbreviation 1)
   2. Value: No (abbreviation 0)

g. Row 7: 6-Minute Walk Test
   1. Enter a record name or ID in the Create Group/Row field
   2. In the General for view, enter the Display Name “6-Minute Walk Test”
   3. Enter Custom List in the Row type field
   4. In the Custom List form, enter:
      1. Value: ≥440 m (abbreviation -2)
      2. Value: 320 to <440 m (abbreviation -1)
      3. Value: ≥165 to <320 m (abbreviation 0)
      3. Value: <165 m (abbreviation 1)

h. Row 8: BNP
   1. Enter a record name or ID in the Create Group/Row field
   2. In the General for view, enter the Display Name “BNP”
   3. Enter Custom List in the Row type field
   4. In the Custom List form, enter:
      1. Value: <50 pg/mL or NT-proBNP <300 pg/mL (abbreviation -2)
      2. Value: ≥50 to 199 pg/mL or NT-proBNP ≥300 to 1100 pg/mL (abbreviation 0)
      3. Value: 200 to <800 pg/mL (abbreviation 1)
      4. Value: ≥800 pg/mL or NT-proBNP ≥1100 pg/mL (abbreviation 2)

i. Row 9: Echocardiogram
   1. Enter a record name or ID in the Create Group/Row field
   2. In the General for view, enter the Display Name “Echocardiogram”
   3. Enter Custom List in the Row type field
   4. In the Custom List form, enter:
      1. Value: Pericardial effusion (abbreviation 1)
      2. Value: No pericardial effusion (abbreviation 0)

j. Row 10: Pulmonary Function Test
   1. Enter a record name or ID in the Create Group/Row field
   2. In the General for view, enter the Display Name “Pulmonary Function Test”
   3. Enter Custom List in the Row type field
4. In the Custom List form, enter:
   1. Value: % predicted Dlco ≤40% (abbreviation 1)
   2. Value: % predicted Dlco >40% (abbreviation 0)

k. Row 11: Right Heart Catheterization
   1. Enter a record name or ID in the Create Group/Row field
   2. In the General for view, enter the Display Name “Right Heart Catheterization”
   3. Enter Custom List in the Row type field
   4. In the Custom List form, enter:
      1. Value: mRAP >20 mm Hg within 1 y (abbreviation 1)
      2. Value: mRAP ≤20 mm Hg within 1 y (abbreviation 0)
      3. Value: PVR <5 Wood units (abbreviation -1)
      4. Value: PVR ≥5 Wood units (abbreviation 0)

l. Row 11: Risk Score
   1. Enter a record name or ID in the Create Group/Row field
   2. In the General for view, enter the Display Name “Risk Score”
   3. Enter Custom Formula in the Row type field
   4. In the Formula form, enter: Custom Formula: add all the previously created rows [ID Row 1] + [ID Row 2] + ... + [ID Question Row 10] + 6
   5. In the Row information field, enter: REVEAL 2.0 Risk Score
      1. Low risk: 0-6
      2. Intermediate risk: 7-8
      3. High risk: ≥9

A minimum of 7 criteria are required to generate a risk score. Access the Documentation Rules Editor and select the Rules table. In the Flowsheet Template field, enter the ID of the Flowsheet Template. In the Flowsheet Row, enter the IDs of the Flowsheet Rows for the risk calculator. Set it to a minimum of 7 criteria.

5. Access the previously created Flowsheet Groups in step 3 above; access the Group form and add the Flowsheet Rows created in step 4 above
6. Access the previously created Flowsheet Template in step 2 above; access the Group/Row field and add the previously created Flowsheet Groups in step 3 above
7. Release the new flowsheet in Clinical Administration (Flowsheets > Flowsheet Utilities > Flowsheet Releaser
8. Once satisfactory testing has been completed, release for broader use
A SmartForm can be created for the REVEAL 2.0 Risk Calculator. Administrative rights are required to create the SmartForm.

**Step 1: Create the REVEAL 2.0 Risk Calculator SmartForm**

1. Access the SmartForm Designer tool by clicking Epic Icon > Tools > SmartForms > SmartForm Designer
2. Select Create New Form (using the Advanced Mode), and set the type classification to General
3. Set the SmartForm properties as desired (background, etc.)
4. Create the REVEAL 2.0 Risk Calculator table by selecting 1 column and 13 rows. Set all data-bound components to required by selecting Properties and setting the Requirement property to Required
5. Save the table as a formlet (grouped components), and save as REVEAL 2.0 Calculator (or other desired name)

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**Step 2: Create the REVEAL 2.0 Risk Calculator questions for the SmartForm**

1. Create the title caption in the top of the SmartForm. Consider labeling it REVEAL 2.0 Risk Calculator
2. Add the REVEAL 2.0 Risk Calculator Risk Score questions:
   a. Create a List object for WHO Group I Subgroup
      1. Set the parameters:
         1. Style: Button
         2. Multiple Select: No
         3. Data Provider: Element
      2. Click the binoculars icon to access the SmartData Manager and set the WHO Group I Subgroup Data Element:
         1. Data type: Category
         2. Category List:
a. APAH-CTD (value 1)
b. APAH-PoPH (value 3)
c. FPAH (value 2)
d. Other (value 0)

3. Click Save, select the data element, and then click Accept

b. Create a List object for Demographics - Males age >60 y
   1. Set the parameters:
      1. Style: Button
      2. Multiple Select: No
      3. Data Provider: Element
   2. Click the binoculars icon to access the SmartData Manager, and set the Demographics data Element:
      1. Data type: Category
      2. Category List:
         a. Yes (value 2)
         b. No (value 0)
   3. Click Save, select the data element, and then click Accept

c. Create a List object for Comorbidities - eGFR <60 mL/min/1.73m² or renal insufficiency
   1. Set the parameters:
      1. Style: Button
      2. Multiple Select: No
      3. Data Provider: Element
   2. Click the binoculars icon to access the SmartData Manager, and set the WHO Group I Subgroup data Element:
      1. Data type: Category
      2. Category List:
         a. Yes (value 1)
         b. No (value 0)
   3. Click Save, select the data element, and then click Accept

d. Create a List object for NYHA/WHO Functional Class
   1. Set the parameters:
      1. Style: Button
      2. Multiple Select: No
      3. Data Provider: Element
2. Click the binoculars icon to access the SmartData Manager, and set the WHO Group I Subgroup data Element:
   1. Data type: Category
   2. Category List:
      a. I (value -1)
      b. II (value 0)
      c. III (value 1)
      d. IV (value 2)
   3. Click Save, select the data element, and then click Accept

e. Create a List object for Vital Signs
   1. Set the parameters:
      1. Style: Button
      2. Multiple Select: No
      3. Data Provider: Element
   2. Click the binoculars icon to access the SmartData Manager, and set the Vital Signs data Element:
      1. Data type: Category
      2. Category List:
         a. SBP <110 mm Hg (value 1)
         b. SBP ≥110 mm Hg (value 0)
         c. HR >96 BPM (value 1)
         d. HR ≤96 BPM (value 0)
      3. Click Save, select the data element, and then click Accept

f. Create a List object for All-Cause Hospitalizations ≤6 mo
   1. Set the parameters:
      1. Style: Button
      2. Multiple Select: No
      3. Data Provider: Element
   2. Click the binoculars icon to access the SmartData Manager, and set the All-Cause Hospitalizations ≤6 mo data Element:
      1. Data type: Category
      2. Category List:
         a. Yes (value 1)
         b. No (value 0)
      3. Click Save, select the data element, and then click Accept
g. Create a List object for 6-Minute Walk Test
   1. Set the parameters:
      1. Style: Button
      2. Multiple Select: No
      3. Data Provider: Element
   2. Click the binoculars icon to access the SmartData Manager, and set the 6-Minute Walk Test data Element:
      1. Data type: Category
      2. Category List:
         a. ≥440 m (value -2)
         b. 320 to < 440 m (value -1)
         c. ≥165 to <320 m (value 0)
         d. <165 m (value 1)
   3. Click Save, select the data element, and then click Accept

h. Create a List object for BNP
   1. Set the parameters:
      1. Style: Button
      2. Multiple Select: No
      3. Data Provider: Element
   2. Click the binoculars icon to access the SmartData Manager, and set the BNP data Element:
      1. Data type: Category
      2. Category List:
         a. <50 pg/mL or NT-proBNP <300 pg/mL (value -2)
         b. ≥50 to 199 pg/mL or NT-proBNP ≥300 to 1100 pg/mL (value 0)
         c. 200 to <800 pg/mL (value 1)
         d. ≥800 pg/mL or NT-proBNP ≥1100 pg/mL (value 2)
   3. Click Save, select the data element, and then click Accept

i. Create a List object for Echocardiogram
   1. Set the parameters:
      1. Style: Button
      2. Multiple Select: No
      3. Data Provider: Element
   2. Click the binoculars icon to access the SmartData Manager, and set the Echocardiogram data Element:
1. Data type: Category
2. Category List:
   a. Pericardial effusion (value 1)
   b. No pericardial effusion (value 0)
3. Click Save, select the data element, and then click Accept

j. Create a List object for Pulmonary Function Test
1. Set the parameters:
   1. Style: Button
   2. Multiple Select: No
   3. Data Provider: Element
2. Click the binoculars icon to access the SmartData Manager, and set the Pulmonary Function Test data Element:
   1. Data type: Category
   2. Category List:
      a. % predicted Dlco ≤40% (value 1)
      b. % predicted Dlco >40% (value 0)
3. Click Save, select the data element, and then click Accept

k. Create a List object for Right Heart Catheterization
1. Set the parameters:
   1. Style: Button
   2. Multiple Select: No
   3. Data Provider: Element
2. Click the binoculars icon to access the SmartData Manager, and set the Right Heart Catheterization data Element:
   1. Data type: Category
   2. Category List:
      a. mRAP >20 mm Hg within 1 y (value 1)
      b. mRAP ≤20 mm Hg within 1 y (value 0)
      c. PVR <5 Wood units (value -1)
      d. PVR≥5 Wood units (value 0)
3. Click Save, select the data element, and then click Accept

l. Create a List object for Risk Score (Split into 2 objects; one object for the score, the second object to clear the values)
1. Set the parameters:
   1. Style: Button
   2. Multiple Select: No
   3. Data Provider: Element
2. Click the binoculars icon to access the SmartData Manager, and set the Risk Score data Element:
   1. Data type: Number
3. Click Save, select the data element, and then click Accept
4. Set the second object as a Command button and label Clear Values

Step 3: Set the Rules and Scripting for the SmartForm
1. Scripts can optionally be created to automatically populate the values of different objects. Access the Scripting tab and the condition, and set the rule (for example, Males age>60 y).
2. To set the REVEAL 2.0 Risk Score field, select the object, select Calculate, and enter the calculation: [ID Row 1] + [ID Row 2] + ... + [ID Question Row 10] + 6. Click Require All Component Values Exist radio button is checked.
3. To set the interpretation of the REVEAL 2.0 Risk Calculator score, select the REVEAL Risk 2.0 Risk Score field and select Value Changed section. Add the 3 result ranges:
   - Risk score results:
     a. Low risk: 0-6
     b. Intermediate risk: 7-8
     c. High risk: ≥9
   A minimum of 7 criteria are required to generate a risk score. Access the Documentation Rules Editor and select the Rules table. In the Flowsheet Template field, enter the ID of the Flowsheet Template. In the Flowsheet Row, enter the IDs of the Flowsheet Rows for the risk calculator. Set it to a minimum of 7 criteria.
4. Complete a scripting rule to clear the values of the REVEAL 2.0 Risk Calculator.

Step 4: Set the Navigator placement in the Navigator
A navigator section can be created containing the REVEAL 2.0 Risk Calculator SmartForm.
• The Customers (i.e., physician, medical group, IDN) shall be solely responsible for implementation, testing, and monitoring of the instructions to ensure proper orientation in each Customer’s EHR system.

• Capabilities, functionality, and set-up (customization) for each individual EHR system vary. Changes in software or configuration of the EHR system may affect the use of these instructions. United Therapeutics has no responsibility to update these instructions for any Customer.

• While United Therapeutics tests its implementation instructions on multiple EHR systems, the instructions are not guaranteed to work for all available EHR systems.

• While EHRs may assist providers in identifying appropriate patients for consideration of assessment and treatment, the decision and action should ultimately be decided by a provider in consultation with the patient, after a review of the patient’s records to determine eligibility.

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APAH-CTD: PAH associated with connective tissue disease; BNP: brain natriuretic peptide; BPM: beats per min; Dlco: diffusing capacity of the lungs for carbon monoxide; eGFR: estimated glomerular filtration rate; FC: functional class; HR: heart rate; mRAP: mean right atrial pressure; NT-proBNP: N-terminal fragment of pro-brain natriuretic peptide; NYHA: New York Heart Association; PAH: pulmonary arterial hypertension; PoPH: pulmonary arterial hypertension associated with portopulmonary hypertension; PVR: pulmonary vascular resistance; REVEAL: Registry to Evaluate Early and Long-Term Pulmonary Arterial Hypertension Disease Management; SBP: systolic blood pressure; WHO: World Health Organization