REDCap Advanced Topics

University of Iowa

Institute for Clinical and Translational Science (ICTS)

https://www.icts.uiowa.edu/confluence/display/ICTSit/REDCap#REDCap-REDCapAdvancedTopicsTraining

Calculated Fields

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https://www.icts.uiowa.edu/confluence/download/attachments/53149797/REDCap_Calculated_Fields.pdf

Calculated Field Defined

- **A calculated field offers the capability to perform a mathematical operation for one or more REDCap fields.**

- **The results are displayed in a read-only text box.**

Calculated Field Requirement

- **A calculated field can perform calculations of the following REDCap fields:**

  - ❑ **Integer**
  - ❑ **Number**
  - ❑ **Date/Time**

Specifying Variables

- **The value of a field can be specified as a variable inside of an equation.**

- **To do this, the field variable name should be surrounded with a pair of square brackets when defining an equation for a calculated field.**

Calculated Field Operations

- **The following math operations are available to use inside calculated fields:**

Operator	Description
+	Addition
–	Subtraction
*	Multiplication
/	Division

Calculated Field Functions

Function	Description
`min(n1,n2,...)`	Minimum value in set
`max(n1,n2,...)`	Maximum value in set
`mean(n1,n2,...)`	Mean (or average) value in set
`median(n1,n2,...)`	Median value of a set
`sum(n1,n2,...)`	Sums set of values
`stdev(n1,n2,...)`	Standard deviation of set of values

Calculated Field Functions

Function	Description
`round(value, places)`	Rounds to the nearest value (13.4 to 13)
`roundup(value, places)`	Rounds up to decimal (13.4 becomes 14)
`rounddown(value, places)`	Truncate to decimal (13.7 becomes 13)
`sqrt(value)`	Square Root
`(base)^(exponent)`	Exponents (power)
`abs(value)`	Absolute Value

Calculated Field Date Functions

```
datediff([date1], [date2],
         "units", "dateFmt",
         true|false)
```

Units	Description
"y"	Years
"M"	Months
"d"	Days
"h"	Hours
"m"	Minutes
"s"	Seconds

Date Fmt	Description
"ymd"	Y-M-D (default)
"mdy"	M-D-Y
"dmy"	D-M-Y

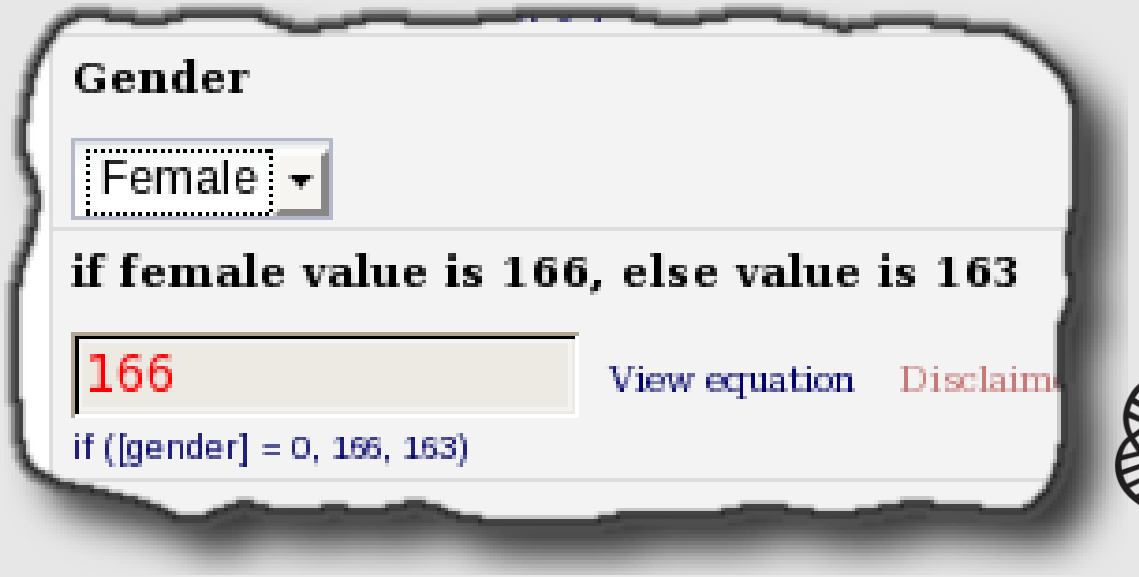
Conditional Logic in Calculation

- **Syntax:**

  if (condition, trueValue, falseValue)

- **If female, value is 166 else, 163:**

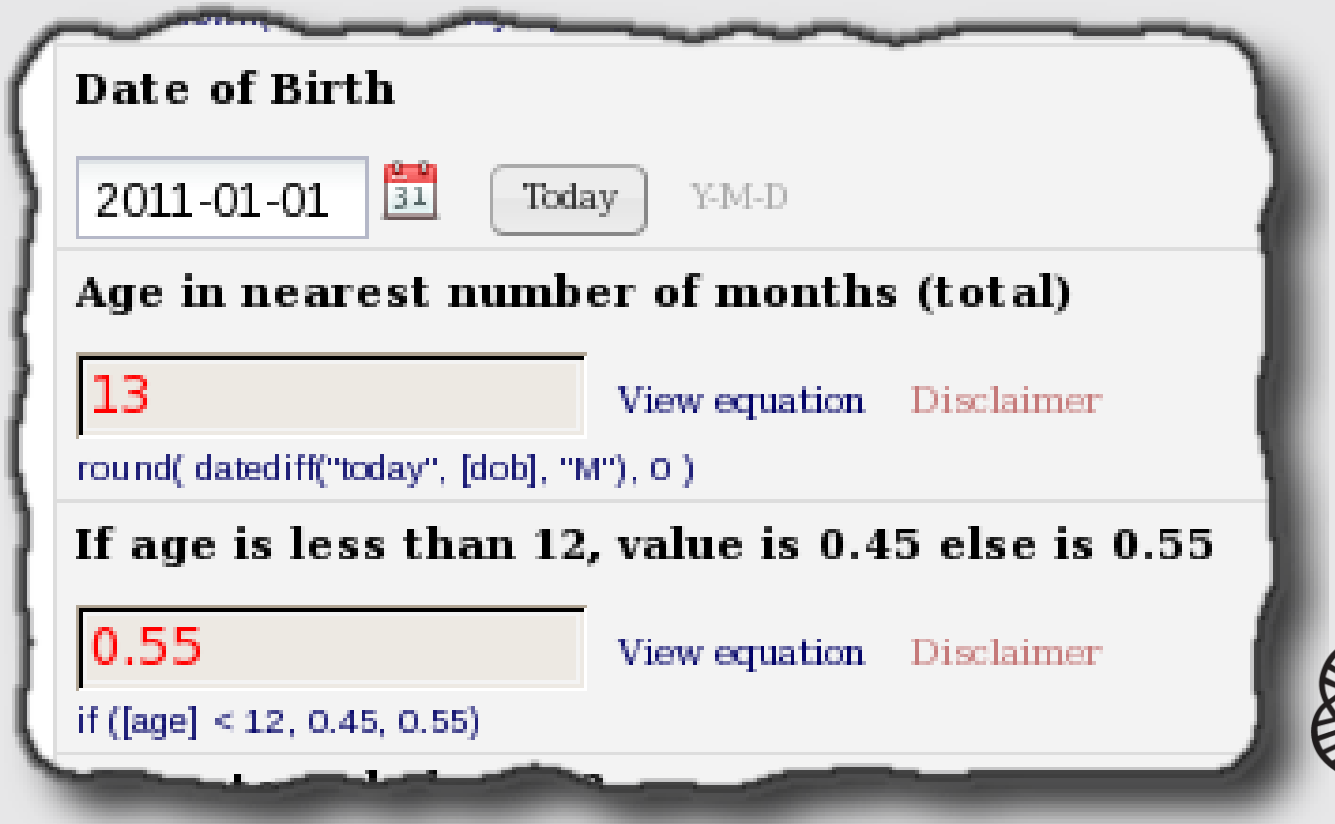
```
if ([gender] = 0, 166, 163)
```



Conditional Logic in Calculation

If age less than 12 value is 0.45 else 0.55:

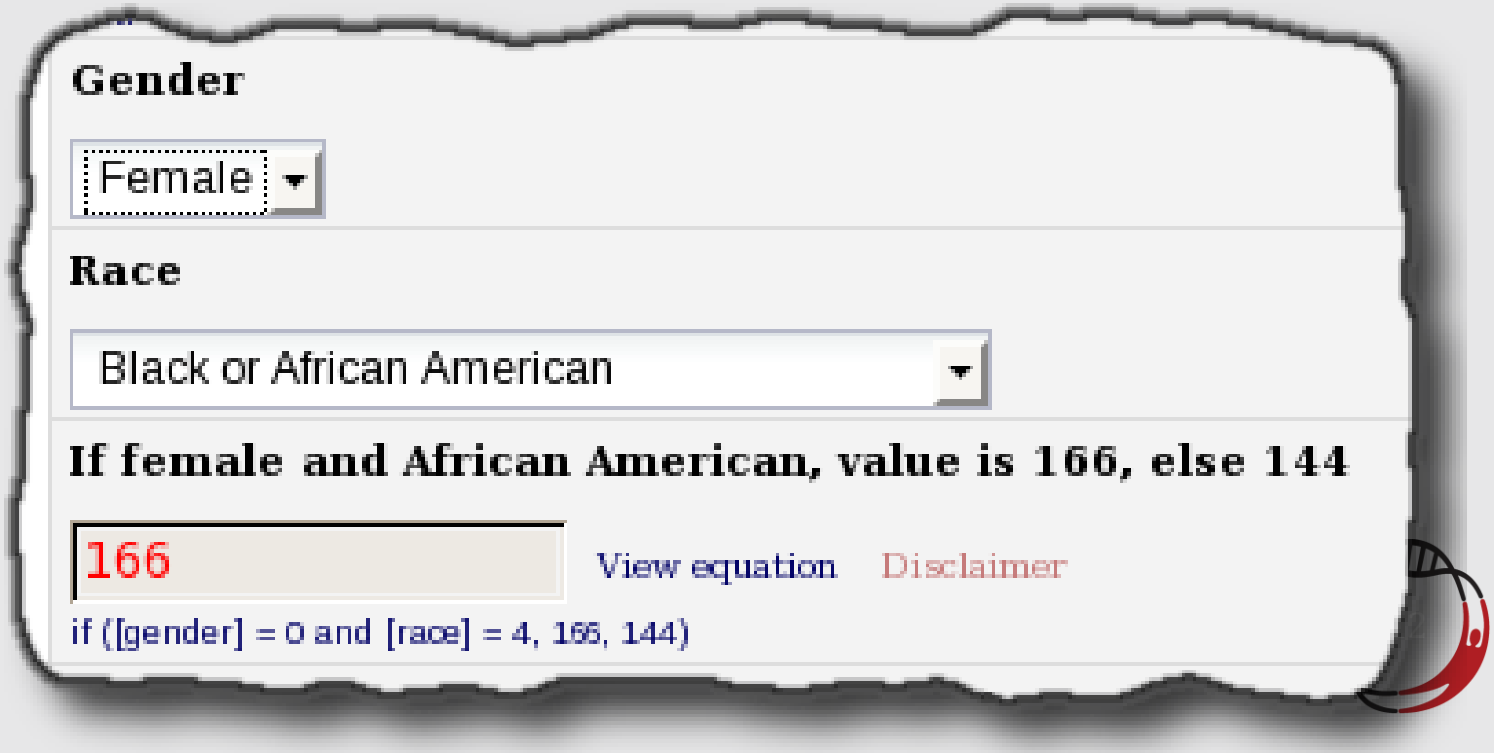
```
if ([age] < 12, 0.45, 0.55)
```



Conditional Logic and Boolean

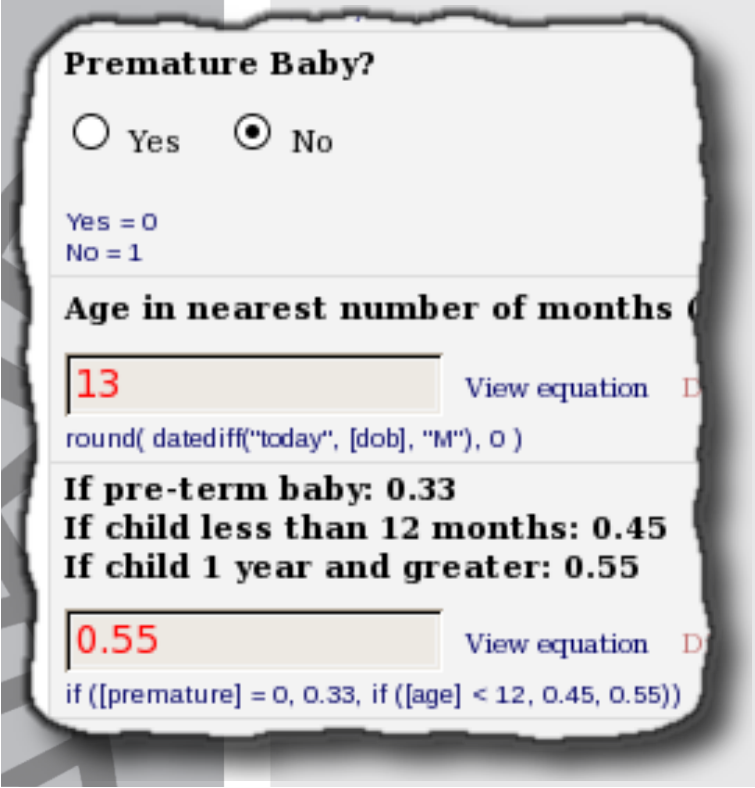
If female and African American:

```
if ([gender] = 0 and
    [race] = 4, 166, 144)
```



Nesting Conditional Logic

- If pre-term baby: 0.33
- If child less than 12 months: 0.45
- If child 1 year and greater: 0.55




```
if ([premature] = 0, 0.33,
  if ( [age] < 12, 0.45,
      0.55 ) )
```

Calculation Equation Examples

- **Conversion from kilograms to pounds:**

```
round( [weight_kg] *
   2.20462262, 1 )
```

- **Conversion from centimeters to feet:**

```
round( [height_cm] *
   0.032808399, 1 )
```

Calculation Equation Examples

Body Mass Index (BMI)

- **Metric BMI (Meters):**

```
[weight_kg] / ([height_meter]) ^ (2)
```

- **Metric BMI (Centimeters):**

```
([weight_kg] * 10000) /
  ([height_cm]) ^ (2)
```

- **English BMI (Inches):**

```
([weight_lb] * 703) /
  ([height_in]) ^ (2)
```

- **English BMI (Feet):**

```
([weight_lb] * 4.88) /
  ([height_ft]) ^ (2)
```

Calculation Equation Examples

Basal Metabolic Rate (BMR)

- **English BMR Formula:**
  - **Women**

    ```
    655 + ( 4.35 * [weight_lbs] ) + ( 4.7 *
    [height_inch] ) - ( 4.7 * [age] )
    ```

  - **Men**

    ```
    66 + ( 6.23 * [weight_lbs] ) + ( 12.7 *
    [height_inch] ) - ( 6.8 * [age] )
    ```

- **Metric BMR Formula:**
  - **Woman**

    ```
    655 + ( 9.6 * [weight_kgs] ) + ( 1.8 *
    [height_cm] ) - ( 4.7 * [age] )
    ```

  - **Men**

    ```
    66 + ( 13.7 * [weight_kgs ) + ( 5 *
    [height_cm] ) - ( 6.8 x [age] )
    ```

Calculation Equation Examples

- **Age in years (rounded to previous integer):**

```
rounddown(
   datediff("today",
      [dateofbirth], "y"), 0 )
```

- **Age in months (over a year):**

```
round( ( ( datediff("today",
   [dateofbirth], "y") - (
   rounddown( datediff("today",
   [dateofbirth], "y"), 0 ) ) )
   * 12 ), 0 )
```

REDCap Newsletter

- **Monthly REDCap Newsletter**
  - ❑ Upcoming Training
  - ❑ Walk-in Hours Schedule
  - ❑ Helpful Tips
  - ❑ New REDCap Functionality
  - ❑ Frequently Asked Questions (and answers)
  - ❑ REDCap Best Practices

- **REDCap LISTSERV Subscription:**
  - ❖ https://list.uiowa.edu/scripts/wa.exe?SUBED1=REDCAP&A=1

REDCap Documentation

- **Training within REDCap:**
  - **FAQs (Help & FAQ Tab):**

    https://redcap.icts.uiowa.edu/redcap/index.php?action=help

  - **Video (Training Resources Tab):**

    https://redcap.icts.uiowa.edu/redcap/index.php?action=training

- **Local REDCap documentation:**

  https://icts.uiowa.edu/confluence/display/ICTSit/REDCap