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### Background Information:

This tool is to be utilized as a web-based financial simulation widget that determines savings and waste reduction metrics of implementing CWC recommendations. The widget provides medical professionals with evidence to support the adoption of recommendations and better equip them to influence change within their workplaces. The information and calculations are based on our comprehensive literature review ([Appendix A](#)) and focuses on problematic testing as defined therein.

It addresses two specific CWC recommendations related to Medical Laboratory Science:

1. Don't collect extra blood tubes in anticipation of test orders.
2. Don't support ordering system mechanisms that contribute to over-testing. Encourage the development of an evidence-based utilization management program that may include interventions such as unbundling order sets, reflex testing algorithms, and decision-support technology.

### Tags:

- Throughout the document there are images of each step used for the calculation. Key features of the step are labeled, directly on the image, with red circles containing a number.
- Below the image is a numbered list containing instructions relevant to the step depicted in the image.
- The numbering system used in the list employs the following formula:

'Step number'-'Image number (i.e. the number in the red circle)'

- For example, **1-1**, corresponds to step 1 and the red circle that contains the number 1 within the step 1 image.

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**Step 1**

**Step 1: Input the Total Number of tests you are currently performing in the time period of interest**

1  Select All      2  Advanced

|              | Diagnostic Test | Selection                             |
|--------------|-----------------|---------------------------------------|
| Immunoassay  | 3 Vitamin D     | <input type="checkbox"/>              |
|              | Vitamin B12     | <input type="checkbox"/>              |
|              | TSH             | <input type="checkbox"/>              |
|              | FT3             | <input type="checkbox"/>              |
|              | FT4             | <input checked="" type="checkbox"/>   |
|              | PSA             | <input type="checkbox"/>              |
|              | CRP             | 4 <input checked="" type="checkbox"/> |
| Microbiology | Folate* 5       | <input checked="" type="checkbox"/>   |
|              | UA              | <input type="checkbox"/>              |
|              | UA culture      | <input type="checkbox"/>              |

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- 1-1.** Select all – Allows users to quickly select all tests listed. Individual tests can be deselected afterwards.
- 1-2.** Advanced – Selecting this option allows access to additional steps, that allow for greater customization of the calculations. If left unselected, the calculations will use default values determined through a literature review.
- 1-3.** This is the list of diagnostic tests available. Tests were included by considering the frequency at which they are ordered unnecessarily. The most problematic tests were prioritized.
- 1-4.** This is where the test selection is made
- 1-5.** Folate is unique among the available tests because it is only available after selecting the advanced feature. Though folate was identified as frequently ordered unnecessarily, users must provide their own testing cost information since its estimate could not be determined from the literature.
- 1-6.** Clicking “Confirm Selection” allows the user to advance to the next step.

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## Step 2



## Step 2

### Step 2: Input the Target Percentage Reduction

e.g. if you are performing 1000 tests and would like to reduce that number to 800, input 20%.

| Diagnostic Test | Total Number | Percent Reduction |
|-----------------|--------------|-------------------|
| ① CBC           | ② 500        | ③ 15 %            |
| ESR             | 800000       | 30 %              |
| HBA1C           | 1            | 25 %              |

④ Back      Continue ⑤

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- 2-1.** All tests selected during “Step 1” will appear in this column.
- 2-2.** This column requires the user to input the total number of tests performed. Its up to the user to determine the interval in question, per month or per year for example.
- 2-3.** This column requires the user to input a percentage corresponding to their reduction goals. This should be based on the user’s knowledge of how many tests are unnecessary. The default is 15%, derived from a conservative estimate from the literature review.
- 2-4.** Select the “Back” button if a change in step 1, tests selected or toggling the advanced features, is required.
- 2-5.** The “Continue” button will do one of two things. If the “Advanced” checkbox was selected in step 1, “Continue” will send the user to Step 3. If the “Advanced” checkbox remained unchecked during step 1, “Continue” will take you to the final output page called “Savings Summary”.

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**Step 3**



## Step 3

### Step 3: Panel Testing (Labor, Needle and Supply Adjustments)

1 Examples of Common/Problematic Ordering Clusters

| Are the tests part of an order profile/set? |                                     |                 |        |
|---|-------------------------------------|-----------------|--------|
| (Select all that apply) 2                   | 3                                   | Test per needle | 4      |
| BMP   | <input type="checkbox"/>            |                 | 11     |
| Liver Profile                               | <input checked="" type="checkbox"/> |                 | 5      |
| Kidney Profile                              | <input type="checkbox"/>            |                 | 4      |
| Lipid Profile                               | <input type="checkbox"/>            |                 | 3      |
| Labour-Supply ratio individual tests        | <input type="radio"/> 5             | 57.4 %          | 13.7 % |
| Labour-Supply ratio for sets                | <input checked="" type="radio"/>    | 35.6 %          | 35.6 % |

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**3-1.** “Examples of Common/Problematic Ordering Clusters” is a button that allows users to see the ordering clusters that have been included as the default values in the widget. Clicking this button will launch a popup window that displays the groupings. **Figure 1** in the blue box on page 5 displays the pop-up window the user will see.

Ordering clusters are groups of tests that are ordered and performed at the same time, so some of the resources’ costs can be spread out over multiple tests. For example, the “Calcium” is commonly included in a panel/cluster order of tests called BMP. The default size of this cluster is 11 tests. Thus, the cost associate with supplies like a needle would be divided by 11, since one needle would be used to collect samples for the calcium test and the 10 additional tests indicated.

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We note that although the cost of the test is reduced by the ordering cluster, it still adds to the overall cost of unnecessary testing and it is better to remove the unnecessary test altogether rather than include an order cluster.

**Step 3 - Clusters**

**Examples of Common/Problematic Ordering Clusters**

| CBC/ESR | BMP          | Liver Profile | Kidney Profile | Lipid Profile | Thyroid | Coag. Panel |
|---------|--------------|---------------|----------------|---------------|---------|-------------|
| CBC     | AST          | AST           | Creatinine     | Cholesterol   | TSH     | PT (INR)    |
| ESR     | ALT          | ALT           | Urea           | HDL           | FT3     | PTT         |
|         | ALP          | ALP           | Glucose        | TRIG          | FT4     | Fibrinogen  |
|         | Creatinine   | Albumin       | EP (Na/K/Cl)   |               |         |             |
|         | Bill (T)     | Bill (T)      |                |               |         |             |
|         | Protein      |               |                |               |         |             |
|         | Albumin      |               |                |               |         |             |
|         | Urea         |               |                |               |         |             |
|         | Glucose      |               |                |               |         |             |
|         | EP (Na/K/Cl) |               |                |               |         |             |
|         | Calcium      |               |                |               |         |             |

Close

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**Figure 1.** The ‘Examples of problematic ordering clusters pop-up window’.  
 Note the “close” button will close this pop-up.

- 3-2.** If any tests selected in step 1 are found in the list as depicted above, the corresponding header of the column will appear here in this list.
- 3-3.** The user has the option to select any applicable ordering clusters in this column. Note that many tests included in the either the BMP or Liver profile clusters overlap. In this instance only one of either BMP or Liver profile can be selected at a time.
- 3-4.** Here the user can input the number of tests performed per needle in an ordering cluster.
  - For “BMP” the widget’s default is 11 tests. However, if the users typical BMP ordering panel includes less tests they have the option to reduce this number, or if it includes additional tests they could increase this number.
  - Setting the number only effects the tests listed in the respective column of the “Examples of Common/Problematic Ordering Clusters” table. For example, changing the default “BMP” value only effects the tests listed in the “BMP” column.

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- 3-5.** Here a user can input expense information, if known. Specifically, the labour-to supply ratio.
- e.g. labour =cost of labour/[cost of labour + cost of supplies] x71.2%, and supply =cost of supplies/[cost of labour + cost of supplies] x71.2%.
  - The values input in this area will be used to populate columns in the next step, Step 4. This was provided as a quick way to populate all the cells required in Step 4.
  - Note, in the event different ratios occur for different tests, each test can be fine tuned on an individual basis during Step 4.
  - For convenience, its recommended you pick values during this step that can cover the largest number of tests and modify the outliers during Step 4.

The expense breakdown, specifically the ratio between the cost of labor versus the cost of supplies, was found to be dependent on whether or not the tests were being done as part of an order panel or on an individual test basis. For individual tests, less supplies are used in comparison to the amount of labour so the ratio shifts to a higher labour proportion. To account for this, we've provided two sets of default values. If no order cluster is selected the default selection here is "Labour-Supply ratio individual tests" and if any order cluster is selected the selection switches to the "Labour-Supply ratio for sets".

**3-6.** The "Back" button sends the user back to Step 2.

**3-7.** The "Continue" button will send the user forward to Step 4.

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**Step 4**



# Step 4

## Step 4: Specific Expense Inputs

Note: the default values are intentional and represent averages generated from a scoping review (manuscript in preparation).

| Test    | Estimated Cost per Test           | Adjusted Cost per Test             | Labour                            | Supplies                          | Physical Space                    | Equipment Costs                  |
|---------|-----------------------------------|------------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|----------------------------------|
| FT4     | 6.85                              | <input type="text" value="6.85"/>  | <input type="text" value="35.6"/> | <input type="text" value="35.6"/> | <input type="text" value="22.7"/> | <input type="text" value="4.6"/> |
| PSA     | 12.72                             | <input type="text" value="12.72"/> | <input type="text" value="27.4"/> | <input type="text" value="13.7"/> | <input type="text" value="22.7"/> | <input type="text" value="4.6"/> |
| CRP     | 10.27                             | <input type="text" value="10.27"/> | <input type="text" value="27.4"/> | <input type="text" value="13.7"/> | <input type="text" value="22.7"/> | <input type="text" value="4.6"/> |
| Folate* | <input type="text" value="0.00"/> | <input type="text" value="0.00"/>  | <input type="text" value="27.4"/> | <input type="text" value="13.7"/> | <input type="text" value="22.7"/> | <input type="text" value="4.6"/> |
| UA      | 12.41                             | <input type="text" value="12.41"/> | <input type="text" value="27.4"/> | <input type="text" value="13.7"/> | <input type="text" value="22.7"/> | <input type="text" value="4.6"/> |

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- 4-1. All tests selected during “Step 1” will appear in this column.
- 4-2. This column displays the estimated cost per test as determined by a literature review that is used in the default calculation. The values were determined by averaging all available cost information for the corresponding test. The **supporting information** on the test expenses used can be found in [Appendix A - Laboratory Costs Scoping Review \(CSMLS FINAL REPORT\)](#) and [Appendix B - Laboratory Costs Spreadsheet](#).
- 4-3. This column can be used to input a user’s true cost of a test, if known and if it deviates from the average cost we determined. The value used should reflect the cost of one test. Note that users must input a value for folate. They must input their cost because the literature did not provide suitable cost information for this test.

Steps 4-4 to 4-7; Labour, Supplies, Physical Space and Equipment Costs are all based on percentages that total to 100%. The widget will verify the sum of these numbers is 100% for every row prior to allowing the user to press the continue button. Default values were derived from the **supporting information** documents.

- 4-4. The user can input the labour cost as a percentage of their total cost.

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- 4-5.** The user can input the supplies cost as a percentage of their total cost.
- 4-6.** The user can input any physical space (building cost, lab up-keep etc.) cost as a percentage of their total cost.
- 4-7.** The user can input the equipment maintenance cost as a percentage of their total cost.
- 4-8.** The “Back” button sends the user back to Step 2.
- 4-9.** The “Continue” button will send the user forward to Step 5.



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**Step 5a – Overview**

**Step 5: Specific Waste Inputs**  
 Note: the default values are intentional and represent averages generated from a scoping review (manuscript in preparation).


| Test     | Type of Tube Used in Estimate | Money spent explicitly to generate waste (CAD) |               |                          |  |                           |   |                    |
|----------|-------------------------------|--|---------------|--------------------------|--|---------------------------|---|--------------------|
|          |                               | Blood waste                                    | cost per tube | Tourniquet (Cost of One) | Tourniquet (Cost Adjusted by Panel Test) | Needle cost (cost of One) | Needle cost (Cost Adjusted by Panel Test) | Miscellaneous cost |
| CBC      | EDTA (lavender)               | 4  | 0.15          | 0.18                     | 0.18                                     | 1.13                      | 1.13                                      | 0.00               |
| ESR      | EDTA (lavender)               | 4  | 0.20          | 0.18                     | 0.18                                     | 1.13                      | 1.13                                      | 0.00               |
| H        | (lavender)                    | 4  | 0.15          | 0.18                     | 0.18                                     | 0.97                      | 0.97                                      | 0.00               |
| PT (INR) | Citrate (light blue)          | 2.7  | 0.34          | 0.18                     | 0.18                                     | 1.13                      | 1.13                                      | 0.00               |

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- 5a-1.** This is a note to the user that “the default values are intentional and represent averages generated from a scoping review”. See **supporting information** documents for more information.
- 5a-2.** All tests selected during “Step 1” will appear in this column.
- 5a-3.** Several default values are dependent on the type of tube used for collection. Costs, weight and volume can all vary. This column indicates which type of tube was used for a specific row.
- 5a-4.** This is a horizontal scroll bar that allows the user to scroll between volume, cost and weight variables.
- 5a-5.** The “Back” button sends the user back to Step 2.
- 5a-6.** The “Continue” button will send the user forward to the “Savings Summary” page.

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**Step 5b – Blood Volume**



## Step 5b – Blood Volume

### Step 5: Specific Waste Inputs

Note: the default values are intentional and represent averages generated from a scoping review (manuscript in preparation).

|          |                               | Blood wasted (ml)                |                                   | Money spent explicitly to generate waste (CAD) |  |                                   |   |                                   |
|----------|-------------------------------|----------------------------------|-----------------------------------|--|--|-----------------------------------|---|-----------------------------------|
| Test     | Type of Tube Used in Estimate | Blood waste                      | cost per tube                     | Tourniquet (Cost of One)                       | Tourniquet (Cost Adjusted by Panel Test) | Needle cost (cost of One)         | Needle cost (Cost Adjusted by Panel Test) | Miscellaneous cost                |
| CBC      | EDTA (lavender)               | <input type="text" value="4"/>   | <input type="text" value="0.15"/> | <input type="text" value="0.18"/>              | <input type="text" value="0.18"/>        | <input type="text" value="1.13"/> | <input type="text" value="1.13"/>         | <input type="text" value="0.00"/> |
| ESR      | EDTA (lavender)               | <input type="text" value="4"/>   | <input type="text" value="0.20"/> | <input type="text" value="0.18"/>              | <input type="text" value="0.18"/>        | <input type="text" value="1.13"/> | <input type="text" value="1.13"/>         | <input type="text" value="0.00"/> |
| HBA1C    | EDTA (lavender)               | <input type="text" value="4"/>   | <input type="text" value="0.15"/> | <input type="text" value="0.18"/>              | <input type="text" value="0.18"/>        | <input type="text" value="0.97"/> | <input type="text" value="0.97"/>         | <input type="text" value="0.00"/> |
| PT (INR) | Citrate (light blue)          | <input type="text" value="2.7"/> | <input type="text" value="0.34"/> | <input type="text" value="0.18"/>              | <input type="text" value="0.18"/>        | <input type="text" value="1.13"/> | <input type="text" value="1.13"/>         | <input type="text" value="0.00"/> |

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**5b-1.** The user can input the amount of blood drawn for a specific test in this column. The value reflects the volume of one test.

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**Step 5c – Costs**

**Step 5c – Costs**

**Step 5: Specific Waste Inputs**

Note: the default values are intentional and represent averages generated from a scoping review (manuscript in preparation).

Money spent explicitly to generate waste (CAD)

| cost per tube | Tourniquet (Cost of One) | Tourniquet (Cost Adjusted by Panel Test) | Needle cost (cost of One) | Needle cost (Cost Adjusted by Panel Test) | Miscellaneous cost | Carbon footprint (\$) | Cost of waste per test estimate |
|---------------|--------------------------|--|---------------------------|---|--------------------|-----------------------|---------------------------------|
| 0.15          | 0.18                     | 0.18                                     | 1.13                      | 1.13                                      | 0.00               | 3.90                  | 4.96                            |
| 0.30          | 0.18                     | 0.18                                     | 1.13                      | 1.13                                      | 0.00               | 0.00                  | 1.51                            |
| 0.15          | 0.18                     | 0.18                                     | 0.57                      | 0.57                                      | 0.00               | 0.00                  | 0.90                            |
| 0.34          | 0.18                     | 0.18                                     | 1.13                      | 1.13                                      | 0.00               | 0.00                  | 1.65                            |

Back Continue

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The costs in Step 5 are on a per test basis. There are seven components of the total cost that a user can input and these are labeled as 1 to 7 in the figure above. Each cell value reflects the component cost of a single test. The respective column headers identify what aspect of the total cost the component cost relates to. Order sets/Clusters indicated in Step 3 will affect the default costs found in 5c-3 and 5c-5. Prices for various types of tubes, needles and tourniquets can be found in the Supporting Information.

- 5c-1.** The user can input the cost of the tube used for the test.
- 5c-2.** The user can input the cost of a single tourniquet.
- 5c-3.** If an order set was selected in Step 3 that affects the test, the cost of the tourniquet in 5c-2 will be divided by the “tests per needle” value from Step 3 (See 3-4). Using the “Step 3” BMP order cluster and the AST test as an example, with the number of tests included in that cluster as 11 and a tourniquet cost of \$0.18 as indicated in the 5c-2 column, the adjusted tourniquet cost becomes \$0.02 (= \$0.18/11 rounded to the nearest cent).
- 5c-4.** The user can input the cost of a single needle for this test.
- 5c-5.** If an order set was selected in Step 3 that affects the test, the cost of the needle in 5c-4 will be divided by the “tests per needle” value from Step 3 (See 3-4). Using the “Step 3” BMP order cluster and the AST test as an example, with the number of tests included in that cluster as 11 and a needle

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cost of \$1.13 as indicated in the 5c-4 column, the adjusted needle cost becomes \$0.10 (= \$1.13/11 rounded to the nearest cent).

- 5c-6.** This is a miscellaneous cost per test that the user can input. The user can account for any other costs not already included in the widget’s default settings. The default value for the miscellaneous cost is \$0.00. Users that want to add an additional expense to the test would do so here on a cost per test basis.
- 5c-7.** When the cost of the carbon footprint per test could be determined from the literature it was included here. In many instances this information was not available and the default value of \$0.00 was used instead, however we anticipate this would be a value greater than zero if it could be estimated.  
 The carbon footprint is an indirect cost that arises from the amount of greenhouse gases (including carbon dioxide and methane) that are generated by our actions.
- 5c-8.** This column displays the overall cost per test. It is a sum of 5c-3, 5c-5, 5c-6 and 5c-7 as described above.

### Step 5d – Weight

**Step 5: Specific Waste Inputs**  
 Note: the default values are intentional and represent averages generated from a scoping review (manuscript in preparation).

| Weight of Garbage (All Masses Here are in Grams) |             |                                   |  |                               |  |                      |                  |                    |
|--|-------------|-----------------------------------|--|-------------------------------|--|----------------------|------------------|--------------------|
| Cost of waste per test estimate                  | Tube weight | Tourniquet weight (Weight of One) | Tourniquet weight (Weight Adjusted for Panel Test) | Needle weight (Weight of One) | Needle weight (Weight Adjusted for Panel Test) | Miscellaneous weight | Carbon footprint | Waste per test (g) |
| 4.96   | 6.00        | 6.85                              | 6.85   | 5.40                          | 5.40   | 0.00                 | 150.00           | 172.49             |
| 1.51   | 6.00        | 6.85                              | 6.85   | 5.40                          | 5.40   | 0.00                 | 150.00           | 172.49             |
| 0.90   | 6.00        | 6.85                              | 6.85   | 5.40                          | 5.40   | 0.00                 | 150.00           | 172.49             |
| 1.65   | 2.70        | 6.85                              | 6.85   | 5.40                          | 5.40   | 0.00                 | 150.00           | 172.61             |

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The weights in Step 5 are on a per test basis. There are seven components of the total weight that a user can input and these are labeled as 1 to 7 in the figure above. Each cell value reflects the component weight of a single test. The respective column headers identify what aspect of the total weight the component weight relates to. Order sets/Clusters indicated in Step 3 will affect the default weights found in 5d-3 and 5d-5. Weights for various types of tubes, needles and tourniquets can be found in the **Supporting Information**.

- 5d-1.** The user can input the weight of the tube used for the test.
- 5d-2.** The user can input the weight of a single tourniquet.
- 5d-3.** If an order set was selected in Step 3 that affects the test, the weight of the tourniquet in 5d-2 will be divided by the “tests per needle” value from Step 3 (See 3-4). Using the “Step 3” BMP order cluster and the AST test as an example, with the number of tests included in that cluster as 11 and a tourniquet weight of 6.85 g as indicated in the 5d-2 column, the adjusted tourniquet weight becomes 0.62 g ( $= 6.85 \text{ g}/11$ ).
- 5d-4.** The user can input the weight of a single needle for this test.
- 5d-5.** If an order set was selected in Step 3 that affects the test, the weight of the needle in 5d-4 will be divided by the “tests per needle” value from Step 3 (See 3-4). Using the “Step 3” BMP order cluster and the AST test as an example, with the number of tests included in that cluster as 11 and a needle weight of 5.40 g as indicated in the 5d-4 column, the adjusted needle weight becomes 0.49 g ( $= 5.40 \text{ g}/11$ ).
- 5d-6.** This is a miscellaneous weight per test that the user can input. The user can account for any other weights not already included in the widget’s default settings. The default value for the miscellaneous weight is 0.00 g. Users that want to add an additional weight to the test would do so here on a weight per test basis. Liquid or reagent waste could be included here as a weight in grams.
- 5d-7.** The carbon footprint is an indirect weight metric that arises from the amount of greenhouse gases (including carbon dioxide and methane) that are generated by our actions. We set the default value at 150 g for each test based on values determined by, and included in, the **Supporting Information**.
- 5d-8.** This column displays the overall weight per test. It is a sum of 5d-3, 5d-5, 5d-6 and 5d-7 as described above.

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**Step 6a – Savings Summary**



## 6a - Savings Summary

**Savings Summary**

| Total Savings  | Cost Savings |              |                |                 | Blood Savings   |                           | Waste Savings |                        |  |
|----------------|--------------|--------------|----------------|-----------------|-----------------|---------------------------|---------------|------------------------|--|
|                | Labor        | Supplies     | Physical Space | Equipment Costs | Blood Saved (L) | Blood Donation Equivalent | Cost          | Mass (kg) <sup>1</sup> | CO <sub>2</sub> Distance (km) <sup>2</sup> |
| 1 \$824,373.20 | \$473,160.25 | \$112,939.12 | \$187,132.72   | \$37,921.16     | 481.03          | 1,068.96                  | \$182,448.40  | 20,743.38              | 116,085.90                                 |

2 View Breakdown

3 Does not include liquid/reagent waste

4 the equivalent number of kilometers driven per carbon footprint. We used a 1998 Toyota Corolla, as an average sized car, in our estimate. We used <https://calculator.carbonfootprint.com/calcator.aspx> in this estimate

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- 6a-1.** This row displays the savings metrics calculated by the widget. It is a cumulative sum of savings from all the individual test savings selected. Information to show how each value is calculated can be found in section 6c below.
- 6a-2.** Press this button to show the savings from individual tests. The individual test information will appear below the “View Breakdown” button. Rows correspond to the test and columns correspond to the specific saving metric. See section 6b for more information.
- 6a-3.** This is a note to the user that waste savings do not account for liquid or reagent waste that may be generated during testing. If desired, the user can include liquid or reagent waste as instructed in step 5d-6 above.
- 6a-4.** This is a note to the user explaining what CO<sub>2</sub> distance is and how it was determined.
- 6a-5.** The “Back” button sends the user back to Step 2 if the advanced option is left unselected. If the advanced option is selected the “Back” button sends the user to Step 5. See section 1-2 for more information regarding the advanced option.

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**Step 6b – Savings Breakdown**



**6b - Savings Breakdown**

① Print CSV Excel

② Hide Breakdown

| Diagnostic Test US or Equivalent | Test Numbers  |                  | Testing Costs  |                |              |              |              |                |                 | Patient Blood Loss Prevention |                 | Waste Reduction |           |                               |
|----------------------------------|---------------|------------------|----------------|----------------|--------------|--------------|--------------|----------------|-----------------|-------------------------------|-----------------|-----------------|-----------|-------------------------------|
|                                  | Current Total | Tests Eliminated | Current Total  | Reduced Total  | Savings      | Labor        | Supplies     | Physical Space | Equipment Costs | Blood Saved (L)               | Blood Donations | Cost (CAD)      | Mass (kg) | CO <sub>2</sub> Distance (km) |
| CBC                              | 1,000         | 250              | \$9,210.00     | \$6,907.50     | \$2,302.50   | \$1,321.63   | \$315.44     | \$522.67       | \$105.91        | 1.00                          | 2.22            | \$1,240.00      | 43.12     | 241.33                        |
| ESR                              | 800,000       | 120,000          | \$5,480,000.00 | \$4,658,000.00 | \$822,000.00 | \$471,828.00 | \$112,614.00 | \$186,594.00   | \$37,812.00     | 480.00                        | 1,065.67        | \$181,200.00    | 20,656.80 | 115,836.36                    |
| HbA1c                            | ⑤             | 7.5              | \$409.00       | \$347.65       | \$61.35      | \$35.21      | \$9.40       | \$13.93        | \$2.62          | 0.03                          | 0.07            | \$6.75          | 1.29      | 7.24                          |
| PT (INR)                         | 2             | 1                | \$18.70        | \$9.35         | \$9.35       | \$5.37       | \$1.28       | \$2.12         | \$0.43          | 0.00                          | 0.00            | \$1.65          | 0.17      | 0.97                          |
|                                  |               |                  | ⑥ Total :      | \$624,373.20   | \$473,196.21 | \$151,176.99 | \$187,132.72 | \$37921.16     | 481.03          | 1068.96                       | \$182448.40     | 29743.38        | 15605.90  |                               |


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- 6b-1.** These 3 buttons allow the user to print or export their data in .CSV or Excel format.
- 6b-2.** Pressing this button will hide the breakdown of individual tests section.
- 6b-3.** Rows can be sorted with the arrow icons, either alphabetically or highest/lowest numbers.
- 6b-4.** This column displays the test name for the corresponding row.
- 6b-5.** This column displays the total number of tests currently being performed. It is based on the user input (2-2).
- 6b-6.** This row displays column totals that appear in the Savings Summary (6a)
- 6b-7.** These buttons allow a user to navigate between individual tests. The spreadsheet can display up to 10 tests/rows at a time. If there are less than 10 tests selected in Step 1 this feature will be disabled. If there are more that 10 tests, pressing the 'Next' button will reveal the next series of rows in the breakdown.

Click this link to access the calculator:  
<https://labwisely.ca/calculator.html>

**Step 6c – Savings Calculations**



## 6c - Savings Calculations

Hide Breakdown

Print CSV Excel

| Diagnostic Test US or Equivalent | Test Numbers  |                  | Testing Costs  |                |              |              |              |                |                 | Patient Blood Loss Prevention |                 | Waste Reduction |           |                               |
|----------------------------------|---------------|------------------|----------------|----------------|--------------|--------------|--------------|----------------|-----------------|-------------------------------|-----------------|-----------------|-----------|-------------------------------|
|                                  | Current Total | Tests Eliminated | Current Total  | Reduced Total  | Savings      | Labor        | Supplies     | Physical Space | Equipment Costs | Blood Saved (L)               | Blood Donations | Cost (CAD)      | Mass (kg) | CO <sub>2</sub> Distance (km) |
| CBC                              | 1,000         | 250              | \$9,210.00     | \$6,907.50     | \$2,302.50   | \$1,321.63   | \$315.44     | \$522.67       | \$105.91        | 1.00                          | 2.22            | \$1,240.00      | 43.12     | 241.33                        |
| ESR                              | 800,000       | 120,000          | \$5,480,000.00 | \$4,658,000.00 | \$822,000.00 | \$471,828.00 | \$112,614.00 | \$186,594.00   | \$37,812.00     | 480.00                        | 1,066.67        | \$181,200.00    | 20,656.80 | 115,836.36                    |
| HBA1C                            | 50            | 1                | \$2,000        | \$1,705        | \$295        | \$21         | \$8          | \$30           | \$2             | 0.13                          | 0.10            | \$15            | 0.10      | 0.13                          |
| PT (INR)                         | 2             | 1                | \$18.70        | \$9.35         | \$9.35       | \$0.37       | \$1.28       | \$2.12         | \$0.43          | 0.00                          | 0.00            | \$1.65          | 0.17      | 0.97                          |
|                                  |               |                  | Total :        | \$624,373.20   | \$473,196.21 | \$151,176.99 | \$187,132.72 | \$37921.16     |                 | 481.03                        | 1068.96         | \$182448.40     | 20743.38  | 116665.90                     |

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**Testing Numbers**

**6c-1.** This column displays the number of tests eliminated from the current total based on the percent reduction target.

$$\text{Tests eliminated} = \text{total number of tests performed (2-2)} \times \text{percent reduction (2-3)}$$

**Testing Costs**

**6c-2.** This column displays the total cost of testing for one type of test.

$$\text{Current total} = \text{total number of tests performed (2-2)} \times \text{adjusted cost per test (4-3)}$$

**6c-3.** This column displays what the cost would be if the reduction targets are met.



Click this link to access the calculator:

<https://labwisely.ca/calculator.html>

Reduced total = Current total (6c-2) x (100- percent reduction (2-3))/100%

**6c-4.** This column displays total savings if the reduction targets are met.

Savings = Current total (6c-2) – Reduced total (6c-3)

**6c-5.** This column displays the portion of the Savings that corresponds to labour costs. It considers the percentage of the costs used for labour divided by the total costs.

Labour = Savings (6c-4) x Labour (4-4) / 100%

**6c-6.** This column displays the portion of the Savings that corresponds to Supplies. It considers the percentage of the costs used for Supplies divided by the total costs.

Supplies = Savings (6c-4) x Supplies (4-5) / 100%

**6c-7.** This column displays the portion of the Savings that corresponds to Physical Space. It considers the percentage of the costs used for Physical Space divided by the total costs.

Physical Space = Savings (6c-4) x Physical Space (4-6) / 100%

**6c-8.** This column displays the portion of the Savings that corresponds to Equipment Costs. It considers the percentage of the costs used for Equipment Costs divided by the total costs.

Equipment Costs = Savings (6c-4) x Equipment Costs (4-7) / 100%

#### Patient Blood Loss Prevention

**6c-9.** This column indicates the volume of blood saved if the percent reduction target is achieved.

Blood Saved = Tests eliminated (6c-1) x Blood wasted (5b-1) /1000 mL per L

**6c-10.** Blood donations considers the amount of blood saved and converts that into a real-world example of how many blood donation bags could be filled with that volume of saved blood.

Blood donations = Blood Saved (6c-9) / 0.450 litres per donation

Click this link to access the calculator:

<https://labwisely.ca/calculator.html>

## Waste Reduction

The waste reduction section is intended to provide the user the ability to further explore the benefits of unnecessary test reduction.

**6c-11.** This column displays a cost, attributed to generating waste, that can be avoided by achieving the reduction target. It is a combination of the cost of various supplies (e.g. tubes, tourniquets, needles), but also the carbon footprint and any other miscellaneous costs the user may want to investigate.

Cost (\$) = Tests eliminated (6c-1) x Cost of waste per test estimate (5c-8)

**6c-12.** This column displays the mass of waste that can be avoided by achieving the testing reduction target.

Mass (kg) = Tests eliminated (6c-1) x Mass of waste per test estimate (5d-8) / 1000 g per kg

**6c-13.** The information in this column is intended to provide a real-world, quantifiable, example of how much waste is being produced. It takes the weight of the unnecessary tests and converts it into a distance (km) as if the entire mass of waste was CO<sub>2</sub> being emitted from a car while driving.

Due to some uncertainty regarding the chemical breakdown of the waste produced, this treats the entire mass as if it was already CO<sub>2</sub>. However, since the plastic components are not yet CO<sub>2</sub>, the weight could be about 3.5x higher if it was converted from carbon (plastic) to CO<sub>2</sub> first (i.e. through incineration). In this regard the "CO<sub>2</sub> distance" is an underestimation.

CO<sub>2</sub> distance (km) = Tests eliminated (6c-1) x Mass of waste per test estimate (5d-8) / 178.69 g of CO<sub>2</sub> per km driven<sup>1</sup>

1. We used a 1999 Toyota Corolla, as an average sized car, in our estimate. We used <https://calculator.carbonfootprint.com/calculator.aspx> in this estimate"