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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 – Default View

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

Advanced

Category Filter (Optional):

Test:

- 1-1.** Allows users to switch to the table view for test selection.
- 1-2.** Clicking on the options button allows for the selection or deselection of various savings metrics. By default, all savings metrics are selected.
- 1-3.** 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.
- 1-4.** Clicking on the add custom tests button creates a popup that will prompt users to input data for additional tests not included in the default list.
- 1-5.** This is an optional Test Category filter that will reduce the total number of tests displayed in the test selection list.
- 1-6.** This is the list of diagnostic tests available. Click on a test of interest to proceed with calculations for that test. Tests were included by considering the frequency at which they are ordered unnecessarily. The most problematic tests were prioritized.
- 1-7.** Clicking “Confirm Selection” allows the user to advance to the next step.

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Step 1 -Table View

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

The screenshot shows the test selection interface. At the top right, there are two buttons: "Switch to Dropdown View" (with a circled 8) and "Options" (with a dropdown arrow). Below these are checkboxes for "Comparison Mode" (with a circled 9) and "Advanced". A green button labeled "+ Add Custom Test" is also present. The main part of the interface is a table with three columns: "Diagnostic Test", "Selection", and an unlabeled column. The table lists various tests with checkboxes in the "Selection" column. A circled 10 points to the checkbox for "CBC". At the bottom right, there is a blue button labeled "Confirm Selection".

	Diagnostic Test	Selection
Custom	Custom Test 1 Edit	<input checked="" type="checkbox"/>
Hematology	CBC	<input checked="" type="checkbox"/>
Hematology	ESR	<input type="checkbox"/>
Hematology	HBA1C	<input type="checkbox"/>
Coagulation	PT (INR)	<input type="checkbox"/>
Coagulation	PTT	<input type="checkbox"/>
General Chemistry	Chemistry Profile	<input type="checkbox"/>
General Chemistry	AST	<input type="checkbox"/>
General Chemistry	ALT	<input type="checkbox"/>
General Chemistry	GGT	<input type="checkbox"/>

Select all Allows users to switch to the table view for test selection.

- 1-8.** Allows users to switch back to the default view, a dropdown menu for test selection.
- 1-9.** Compare mode allows the user to compare the difference between two tests. At least one of the tests must be a custom test added by the user. Only two tests can be compared at a time.
- 1-10.** Toggling the checkboxes selects a test to be added to the savings or comparison calculation.

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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%.

Options

Diagnostic Test	Total Number	Percent Reduction
① Custom Test 1	② <input style="width: 80%;" type="text" value="500.00"/>	③ <input style="width: 80%;" type="text" value="15.00"/> %
		④ Back Continue ⑤

- 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.

Note: This value should be set to 100% if “Compare Mode” was selected.

- 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”.

Step 3

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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)		Test per needle	
CBC/ESR	<input type="checkbox"/>	<input type="text" value="2"/>	
Labour-Supply ratio individual tests	<input checked="" type="radio"/>	<input type="text" value="57.40"/> %	<input type="text" value="15.30"/> %
Labour-Supply ratio for sets	<input type="radio"/>	<input type="text" value="36.35"/> %	<input type="text" value="36.35"/> %

⑥ Back ⑦ Continue

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.

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.

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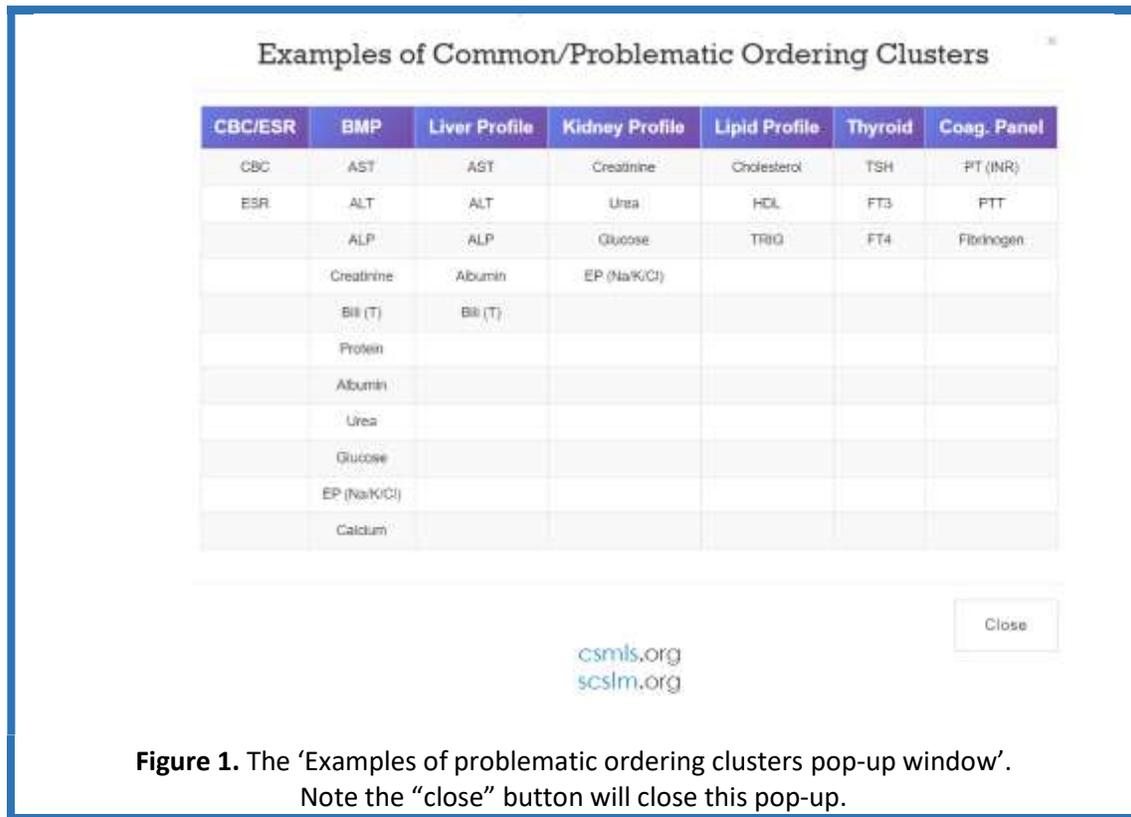


Figure 1. The ‘Examples of problematic ordering clusters pop-up window’. Note the “close” button will close this pop-up.

- 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.
- 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.

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- 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: Specific Expense Inputs Options

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

	Cost Category	Custom Test 1	CBC
1	2 Estimated Cost per Test	0.00	9.21
	3 Adjusted Cost per Test	0.00	9.21
	4 Labour (%)	57.40	57.40
	5 Supplies (%)	15.30	15.30
	6 Physical Space (%)	22.70	22.70
	7 Equipment Costs (%)	4.60	4.60
	8 Total Percentage	100.00%	100.00%

Back
Continue

9
10

- 4-1. All tests selected during “Step 1” will appear in this row as column headers
- 4-2. This row 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 row 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 column 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.
- 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. This row displays the sum of percentages for the Labour, Supplies, Physical Space and Equipment Costs fields in the corresponding column.
- 4-9. The “Back” button sends the user back to Step 2.
- 4-10. The “Continue” button will send the user forward to Step 5.

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Step 5a – Overview

Options

Step 5: Specific Waste Inputs

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

2 Category	Environmental Metric	Custom Test 1	CBC
3 Test Information	Type of Tube Used in Estimate	SST (gold)	EDTA (lavender)
Blood Waste	Blood waste (ml)	<input type="text" value="0.00"/>	<input type="text" value="4.00"/>
Cost of supplies (CAD)	Cost per tube (CAD)	<input type="text" value="0.00"/>	<input type="text" value="0.15"/>
	Tourniquet (Unit cost) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="0.18"/>
	Tourniquet (Adjusted cost) (CAD)	0.00	0.18
	Needle (Unit cost) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="1.13"/>
	Needle cost (Adjusted cost) (CAD)	0.00	1.13
	Miscellaneous cost (CAD)	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
	Carbon footprint (\$) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="3.50"/>
	Cost of waste per test estimate (CAD)	0.00	4.96
Weight of supplies (all masses in grams)	Tube weight (g)	<input type="text" value="0.00"/>	<input type="text" value="6.00"/>
	Tourniquet weight (Unit weight) (g)	<input type="text" value="0.00"/>	<input type="text" value="6.85"/>
	Tourniquet weight (Adjusted weight) (g)	0.00	6.85
	Needle weight (Unit weight) (g)	<input type="text" value="0.00"/>	<input type="text" value="5.40"/>
	Needle weight (Adjusted weight) (g)	0.00	5.40
	Miscellaneous weight (g)	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
	Carbon footprint (g)	<input type="text" value="0.00"/>	<input type="text" value="156.37"/>
	Waste per test (g)	0.00	178.86

4 Back

5 Continue

- 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 row.
- 5a-3.** Several default values are dependent on the type of tube used for collection. Costs, weight and volume can all vary. This row indicates which type of tube was used for a specific row.
- 5a-4.** The “Back” button sends the user back to Step 2.
- 5a-5.** The “Continue” button will send the user forward to the “Savings Summary” page.

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Step 5b – Blood Volume

Step 5: Specific Waste Inputs

Options

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

Category	Environmental Metric	Custom Test 1	CBC
Test Information	Type of Tube Used in Estimate	SST (gold)	EDTA (lavender)
① Blood Waste	Blood waste (ml)	<input type="text" value="0.00"/>	<input type="text" value="4.00"/>
Cost of supplies (CAD)	Cost per tube (CAD)	<input type="text" value="0.00"/>	<input type="text" value="0.15"/>
	Tourniquet (Unit cost) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="0.18"/>
	Tourniquet (Adjusted cost) (CAD) ⓘ	0.00	0.18
	Needle (Unit cost) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="1.13"/>
	Needle cost (Adjusted cost) (CAD) ⓘ	0.00	1.13
	Miscellaneous cost (CAD) ⓘ	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
	Carbon footprint (\$) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="3.50"/>
	Cost of waste per test estimate (CAD)	0.00	4.96
Weight of supplies (all masses in grams)	Tube weight (g)	<input type="text" value="0.00"/>	<input type="text" value="6.00"/>
	Tourniquet weight (Unit weight) (g)	<input type="text" value="0.00"/>	<input type="text" value="6.85"/>
	Tourniquet weight (Adjusted weight) (g) ⓘ	0.00	6.85
	Needle weight (Unit weight) (g)	<input type="text" value="0.00"/>	<input type="text" value="5.40"/>
	Needle weight (Adjusted weight) (g) ⓘ	0.00	5.40
	Miscellaneous weight (g)	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
	Carbon footprint (g) ⓘ	<input type="text" value="0.00"/>	<input type="text" value="156.37"/>
	Waste per test (g)	0.00	178.86

Back
Continue

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

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Step 5c – Costs

Step 5: Specific Waste Inputs Options

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

Category	Environmental Metric	Custom Test 1	CBC
Test Information	Type of Tube Used in Estimate	SST (gold)	EDTA (lavender)
Blood Waste	Blood waste (ml)	<input type="text" value="0.00"/>	<input type="text" value="4.00"/>
Cost of supplies (CAD)	1 Cost per tube (CAD)	<input type="text" value="0.00"/>	<input type="text" value="0.15"/>
	2 Tourniquet (Unit cost) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="0.18"/>
	3 Tourniquet (Adjsted cost) (CAD) <small>?</small>	0.00	0.18
	4 Needle (Unit cost) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="1.13"/>
	5 Needle cost (Adjsted cost) (CAD) <small>?</small>	0.00	1.13
	6 Miscellaneous cost (CAD) <small>?</small>	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
	7 Carbon footprint (\$) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="3.50"/>
	8 Cost of waste per test estimate (CAD)	0.00	4.96
Weight of supplies (all masses in grams)	Tube weight (g)	<input type="text" value="0.00"/>	<input type="text" value="6.00"/>
	Tourniquet weight (Unit weight) (g)	<input type="text" value="0.00"/>	<input type="text" value="6.85"/>
	Tourniquet weight (Adjusted weight) (g) <small>?</small>	0.00	6.85
	Needle weight (Unit weight) (g)	<input type="text" value="0.00"/>	<input type="text" value="5.40"/>
	Needle weight (Adjusted weight) (g) <small>?</small>	0.00	5.40
	Miscellaneous weight (g)	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
	Carbon footprint (g) <small>?</small>	<input type="text" value="0.00"/>	<input type="text" value="156.37"/>
	Waste per test (g)	0.00	178.86

Back
Continue

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 row 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

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tourniquet cost of \$0.18 as indicated in the 5c-2 row, 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 cost of \$1.13 as indicated in the 5c-4 row, 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 row displays the overall cost per test. It is a sum of 5c-3, 5c-5, 5c-6 and 5c-7 as described above.

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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).

Options

Category	Environmental Metric	Custom Test 1	CBC
Test Information	Type of Tube Used in Estimate	SST (gold)	EDTA (lavender)
Blood Waste	Blood waste (ml)	<input type="text" value="0.00"/>	<input type="text" value="4.00"/>
Cost of supplies (CAD)	Cost per tube (CAD)	<input type="text" value="0.00"/>	<input type="text" value="0.15"/>
	Tourniquet (Unit cost) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="0.18"/>
	Tourniquet (Adjusted cost) (CAD) ⓘ	0.00	0.18
	Needle (Unit cost) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="1.13"/>
	Needle cost (Adjusted cost) (CAD) ⓘ	0.00	1.13
	Miscellaneous cost (CAD) ⓘ	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
	Carbon footprint (\$) (CAD)	<input type="text" value="0.00"/>	<input type="text" value="3.50"/>
	Cost of waste per test estimate (CAD)	0.00	4.96
Weight of supplies (all masses in grams)	① Tube weight (g)	<input type="text" value="0.00"/>	<input type="text" value="6.00"/>
	② Tourniquet weight (Unit weight) (g)	<input type="text" value="0.00"/>	<input type="text" value="6.85"/>
	③ Tourniquet weight (Adjusted weight) (g) ⓘ	0.00	6.85
	④ Needle weight (Unit weight) (g)	<input type="text" value="0.00"/>	<input type="text" value="5.40"/>
	⑤ Needle weight (Adjusted weight) (g) ⓘ	0.00	5.40
	⑥ Miscellaneous weight (g)	<input type="text" value="0.00"/>	<input type="text" value="0.00"/>
	⑦ Carbon footprint (g) ⓘ	<input type="text" value="0.00"/>	<input type="text" value="156.37"/>
	⑧ Waste per test (g)	0.00	178.86

Back
Continue

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 row 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 row, the adjusted tourniquet weight becomes 0.62 g (= 6.85 g/11).
- 5d-4.** The user can input the weight of a single needle for this test.

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- 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 row, the adjusted needle weight becomes 0.49 g (= 5.40 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 row displays the overall weight per test. It is a sum of 5d-3, 5d-5, 5d-6 and 5d-7 as described above.

Step 6a – Savings Summary

Savings Summary

Cost Savings					Blood Savings		Waste Savings		
Total Savings	Labor	Supplies	Physical Space	Equipment Costs	Blood Saved (L)	Blood Donation Equivalent	Cost	Mass (kg) ¹	CO ₂ Distance (km) ²
1 24,373.20	\$473,190.21	\$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

5 Back

3 Does not include liquid/reagent waste

4 ¹ the equivalent number of kilometers driven per carbon footprint. 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

- 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 CO₂ 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

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 ₂ Distance (km)
CBC	1,000	250	\$3,210.00	\$6,907.50	\$2,302.50	\$1,321.63	\$315.44	\$922.67	\$105.91	1.00	2.22	\$1,240.00	43.12	241.33
ESR	800,000	120,000	\$5,480,000.00	\$4,666,000.00	\$822,000.00	\$471,826.00	\$112,614.00	\$106,594.00	\$37,812.00	480.00	1,085.67	\$181,200.00	20,898.80	119,506.36
HbA1c	7.5	7.5	\$409.00	\$347.85	\$61.35	\$35.21	\$8.40	\$13.93	\$2.62	0.03	0.07	\$6.75	1.28	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
			Total :		\$624,573.20	\$473,190.21	\$112,609.12	\$187,132.72	\$37,921.16	481.03	1,088.96	\$182,448.40	20,743.36	119,885.90

- 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 than 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/apps/calculator/>

Step 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 ₂ Distance (km)	
CBC	1,000	200	\$4,210.00	\$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	\$4,608,000.00	\$822,000.00	\$471,836.00	\$112,514.00	\$186,594.00	\$37,612.00	450.00	1,066.67	\$181,200.00	20,606.80	115,830.36	
HBA1C	50	1	\$2,000.00	\$2,000.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	0.00	0.00	\$0.00	0.00	0.00	
PT (NR)	2	1	\$18.70	\$9.35	\$9.35	\$0.37	\$1.38	\$2.12	\$0.43	0.00	0.00	\$1.65	0.17	0.97	
			Total :												
					\$624,573.20	\$473,190.21	\$112,609.12	\$187,132.72	\$37,921.16		481.00	1,069.96	\$182,448.40	29,743.56	156,665.90

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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.

$$\text{Reduced total} = \text{Current total (6c-2)} \times (100 - \text{percent reduction (2-3)}) / 100\%$$

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

$$\text{Savings} = \text{Current total (6c-2)} - \text{Reduced total (6c-3)}$$

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.

$$\text{Labour} = \text{Savings (6c-4)} \times \text{Labour (4-4)} / 100\%$$

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

- 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.

$$\text{Supplies} = \text{Savings (6c-4)} \times \text{Supplies (4-5)} / 100\%$$

- 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.

$$\text{Physical Space} = \text{Savings (6c-4)} \times \text{Physical Space (4-6)} / 100\%$$

- 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.

$$\text{Equipment Costs} = \text{Savings (6c-4)} \times \text{Equipment Costs (4-7)} / 100\%$$

Patient Blood Loss Prevention

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

$$\text{Blood Saved} = \text{Tests eliminated (6c-1)} \times \text{Blood wasted (5b-1)} / 1000 \text{ mL per L}$$

- 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.

$$\text{Blood donations} = \text{Blood Saved (6c-9)} / 0.450 \text{ litres per donation}$$

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.

$$\text{Cost (\$)} = \text{Tests eliminated (6c-1)} \times \text{Cost of waste per test estimate (5c-8)}$$

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

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

$$\text{Mass (kg)} = \text{Tests eliminated (6c-1)} \times \text{Mass of waste per test estimate (5d-8)} / 1000 \text{ g per kg}$$

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 CO₂ 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 CO₂. However, since the plastic components are not yet CO₂, the weight could be about 3.5x higher if it was converted from carbon (plastic) to CO₂ first (i.e. through incineration). In this regard the “CO₂ distance” is an underestimation.

$$\text{CO}_2 \text{ distance (km)} = \text{Tests eliminated (6c-1)} \times \text{Mass of waste per test estimate (5d-8)} / 178.69 \text{ g of CO}_2 \text{ per km driven}^1$$

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"

Step 6d – Comparison Mode Summary

Options

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 ₂ Distance (km)
Custom Test 1	1	1.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	0.00	0.00	\$0.00	0.00	0.00
CBC	1	1.00	\$9.21	\$0.00	\$9.21	\$5.29	\$1.41	\$2.09	\$0.42	0.00	0.00	\$4.96	0.18	1.00
			Difference:		-\$9.21	-\$5.29	-\$1.41	-\$2.09	-\$0.42	0.00	0.00	-\$4.96	-0.18	-1.00

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- 6d-1.** These 3 buttons allow the user to print or export their data in .CSV or Excel format.
- 6d-2.** These two rows display all the information that is used for the comparison calculation. The difference is determined by subtracting the second rows value from that of the first.
- 6d-3.** This row shows the differences between the two test values. The column headers indicate which aspect of the test each difference relates to.

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

- 6d-4.** 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.