

# STREET MOBILITY PROJECT

## User Guide for Analysing the Health and Neighbourhood Mobility Survey

March 2017

STREET MOBILITY PROJECT TOOLKIT: MEASURING THE EFFECTS OF BUSY ROADS ON LOCAL PEOPLE

### INTRODUCTION

The following User Guide shows how you can analyse data collected from the Health and Neighbourhood Mobility Survey. You can find the Health and Neighbourhood Mobility Survey questionnaire at [www.ucl.ac.uk/street-mobility/toolkit](http://www.ucl.ac.uk/street-mobility/toolkit). We have created a Microsoft Excel file as one way to handle the survey data. You can download this from the project website at [www.ucl.ac.uk/street-mobility/toolkit](http://www.ucl.ac.uk/street-mobility/toolkit).

The following User Guide shows examples of how you can analyse the data from the Health and Neighbourhood Mobility Survey using pivot tables and charts in Microsoft Excel. This is not the only way to analyse the data, but it is simple and quick, so learning how to use pivot tables will probably save you time.<sup>1</sup>

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<sup>1</sup> This User Guide assumes some familiarity with Excel. A useful summary of basic tips to using Excel 2013 can be found here: [www.siumed.edu/lib/classes/excel/Excel2013-Basics.pdf](http://www.siumed.edu/lib/classes/excel/Excel2013-Basics.pdf). This User Guide is designed for people using PCs. Some instructions would be different on a Mac.

## THE HEALTH AND NEIGHBOURHOOD MOBILITY SURVEY DATABASE

The Microsoft Excel file is a randomly generated database that contains responses from 100 participants to the Health and Neighbourhood Mobility Survey, as an example. The Survey itself contains 14 questions covering topics such as:

- demographics (gender, age, length of time lived at the address);
- perceived health; and
- travel and mobility (e.g. whether factors such as the speed of traffic, amount of traffic, or lack of crossing points affect walking around the local area).

Some of the questions require only one answer. Other questions ask the survey respondent to tick all the response options that apply to them.

In practice, we expect that you would manually enter the residents' answers on the paper version of the questionnaire into a computer database such as Excel, giving each answer a numerical code, such as 0 for 'No' and 1 for 'Yes' for easier analysis.

Below is a screen shot of the Excel file (worksheet titled "Raw-data") that you can download from the Street Mobility Project website:

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Q3 in the Survey asked **“How long have you lived at this address?”** with separate boxes for years and months (if a participant lived at the address for less than one year). This has been arranged in the Excel database as two columns: Q3Y contains the number of years, and Q3M contains the number of months. Similarly, Q8 asks participants whether nine factors (e.g. speed of traffic, amount of traffic) **“affect your ability to walk to places in your local area?”** The answers for each factor (numerical codes: ranging from 1 for “Never” to 4 for “Always”) are arranged as nine columns (e.g. Q8A for the speed of traffic, and Q8B for the amount of traffic). We will be analysing this data later.

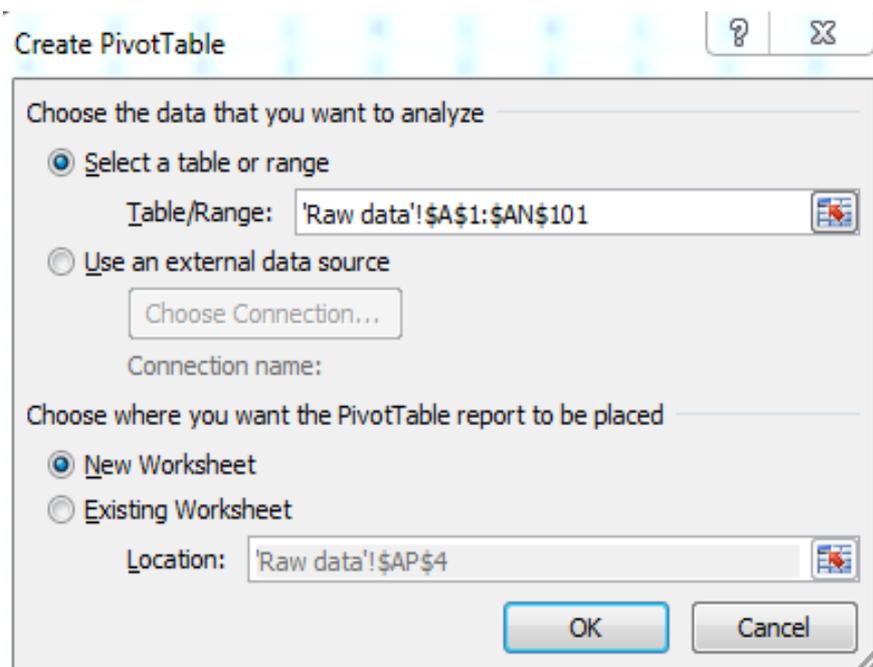
In the remaining sections of this User Guide, we show examples of how to tabulate the data from the Health and Neighbourhood Mobility Survey using Pivot Tables<sup>2</sup> and how you could show the results graphically.

## EXAMPLE 1: SIMPLE DESCRIPTIVE ANALYSIS

Our first example shows how you can run a simple descriptive analysis. For example, you may want to know the age distribution of the participants in your survey (e.g. the percentage of participants who were aged 85 years and over). This can be shown in a frequency table<sup>3</sup> and as a column chart.

### Frequency table

To create a frequency table using pivot tables in Excel, in the worksheet containing the raw data, click on the *Insert* tab, and select *PivotTable*.



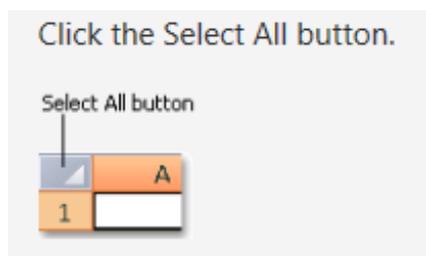
In the Create PivotTable box, use the ‘Select a table or range’ option, and using the mouse on your computer highlight the whole survey data.

---

<sup>2</sup> PivotTables are one way to summarise, analyse, explore, and present your data. They are highly flexible and can be adjusted quickly depending on how you need to display your results (<https://support.office.com/en-gb/article/Create-a-PivotTable-to-analyze-worksheet-data-a9a84538-bfe9-40a9-a8e9-f99134456576>).

<sup>3</sup> A frequency table is a table that lists items and shows the number of times they occur.

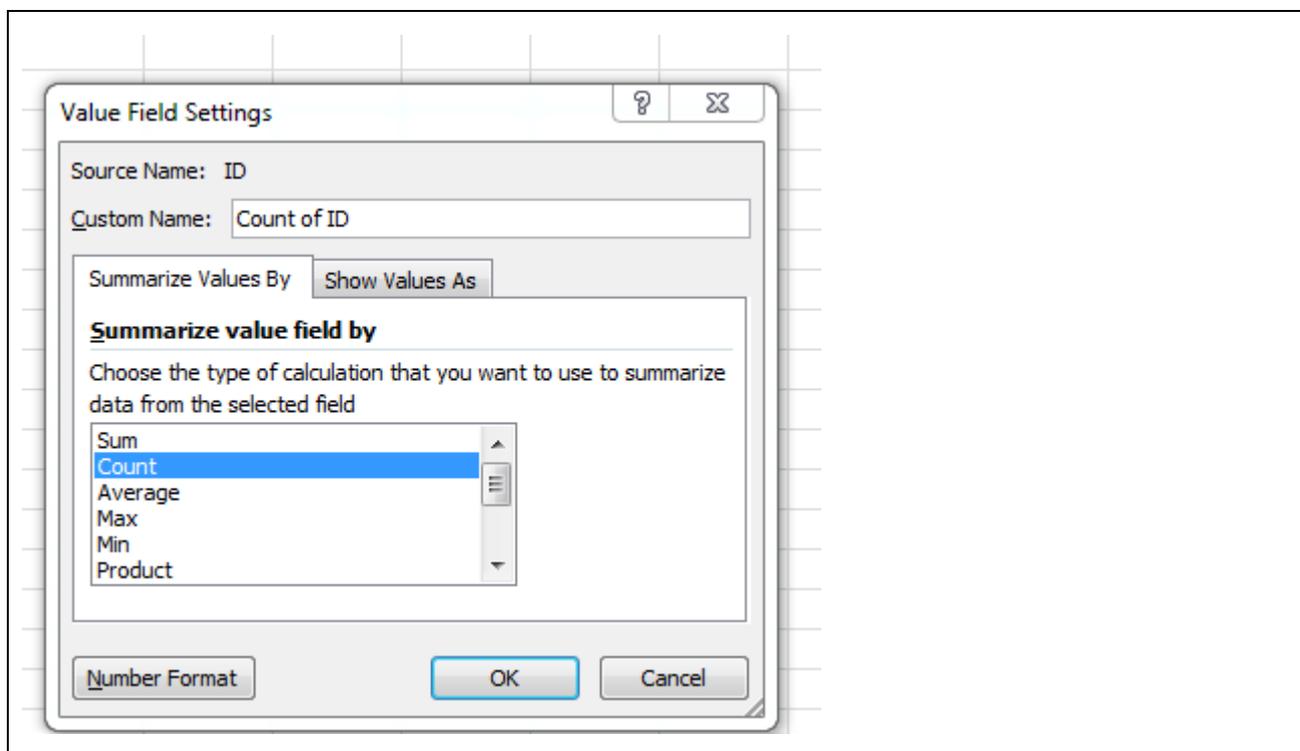
Alternatively, you could select all the cells in the worksheet containing the survey data by clicking the Select All button in the top left corner of the worksheet (as below) and then click on the *Insert* tab, and select *PivotTable* :



We also found that minor changes to road design could make walking trips much shorter and quicker, reduce the amount pedestrians are exposed to traffic, and could improve the quality of the street environment.<sup>4</sup>

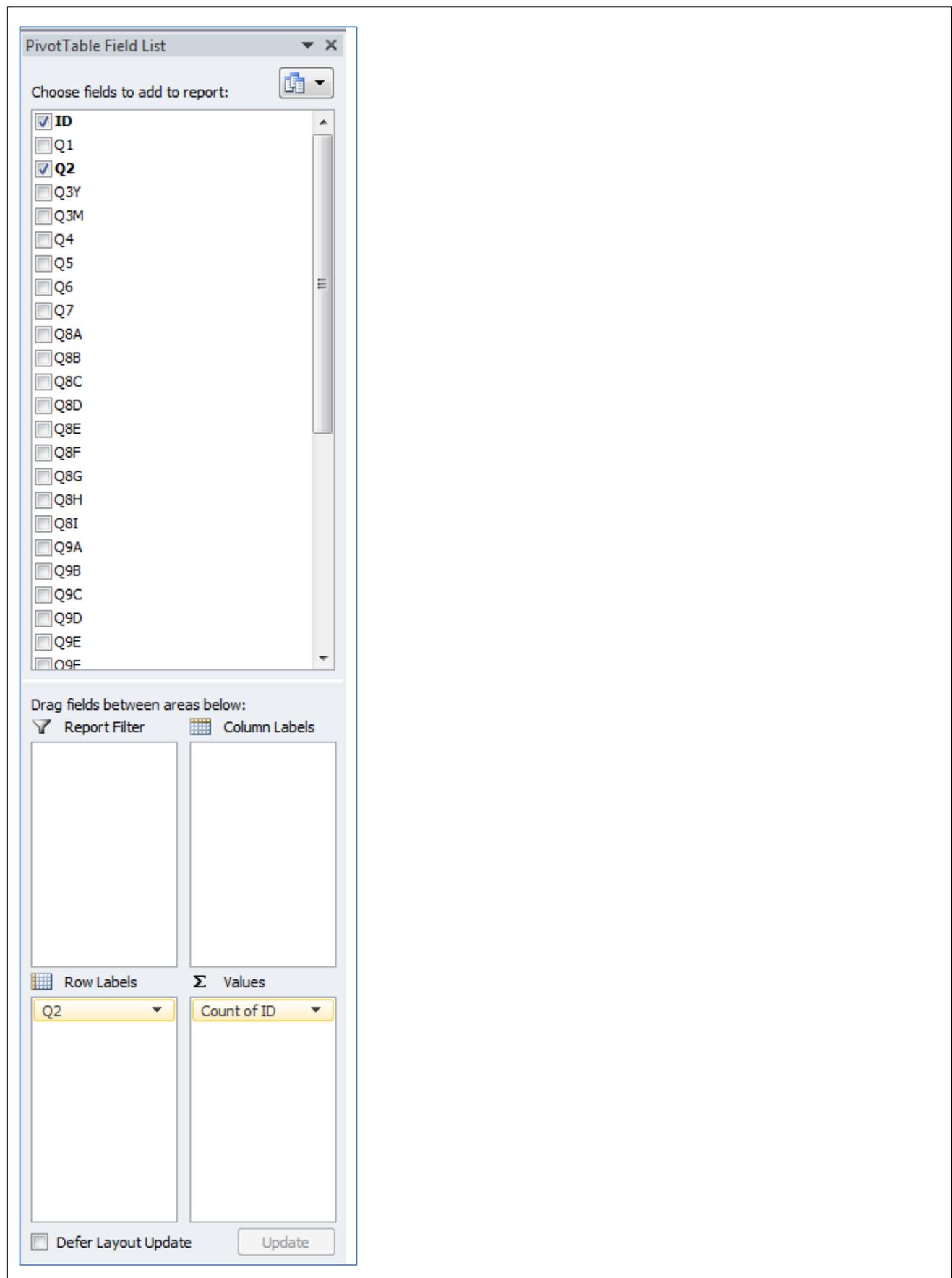
It is probably easier to choose to create your PivotTable report in a New Worksheet rather than in the Existing one. In the new worksheet, an option menu will appear on the right-hand side of the screen: the column names attached to the Survey questions will appear as tick boxes, and below there will be four boxes: Report Filter, Column Labels, Row Labels and  $\Sigma$  Values.

You need to drag the chosen column headings into the boxes to create the PivotTable. In this example, we drag the column heading Q2 into the Row Labels box. In the  $\Sigma$  Values box, drag the column heading ID. We do not want the 'Sum of ID number' (which is the default setting). Choose the down arrow in the  $\Sigma$  Values box: select Value Field Settings: change Sum of ID to **Count** of ID in the option list (as shown below).



<sup>4</sup> Ancaies PR, Jones P. The effectiveness of changes in street layout and design for reducing barriers to walking. *Transportation Research Record* 2016; 2586: 39-47.

The PivotTable Field List will then look like this:

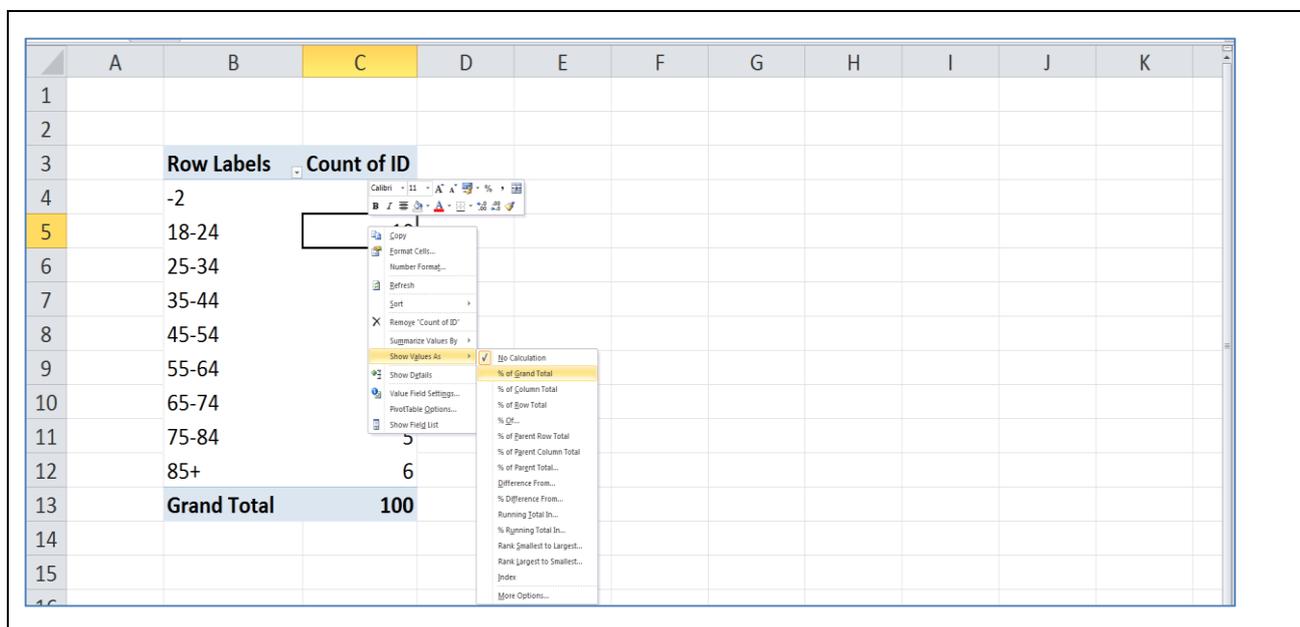


The PivotTable created will then show the number of survey participants within each age-group category.<sup>5</sup> To assign value labels within the PivotTable you can click on the cells of the Row Labels column in the PivotTable: e.g. replace 1 with '18-24', 2 with '25-34', and so on. You should then have a PivotTable that looks something like this (showing, for example, that 21 of the 100 participants were in the 45-54 age-group):

Row Labels	Count of ID
-2	5
18-24	10
25-34	6
35-44	16
45-54	21
55-64	15
65-74	16
75-84	5
85+	6
<b>Grand Total</b>	<b>100</b>

### Showing percentages rather than frequency

If you want to show the percentage of survey participants who belonged to each age-group then you could click in the “Count of ID” column, use right-click, and select “Show Values As -> % of Grand Total” (as shown below). Other summary statistics are available.<sup>6</sup>



You can remove the missing values (coded in this example as -2) by clicking on the Row Labels down arrow in the PivotTable, and unchecking the -2 label (the percentages will then be recalculated

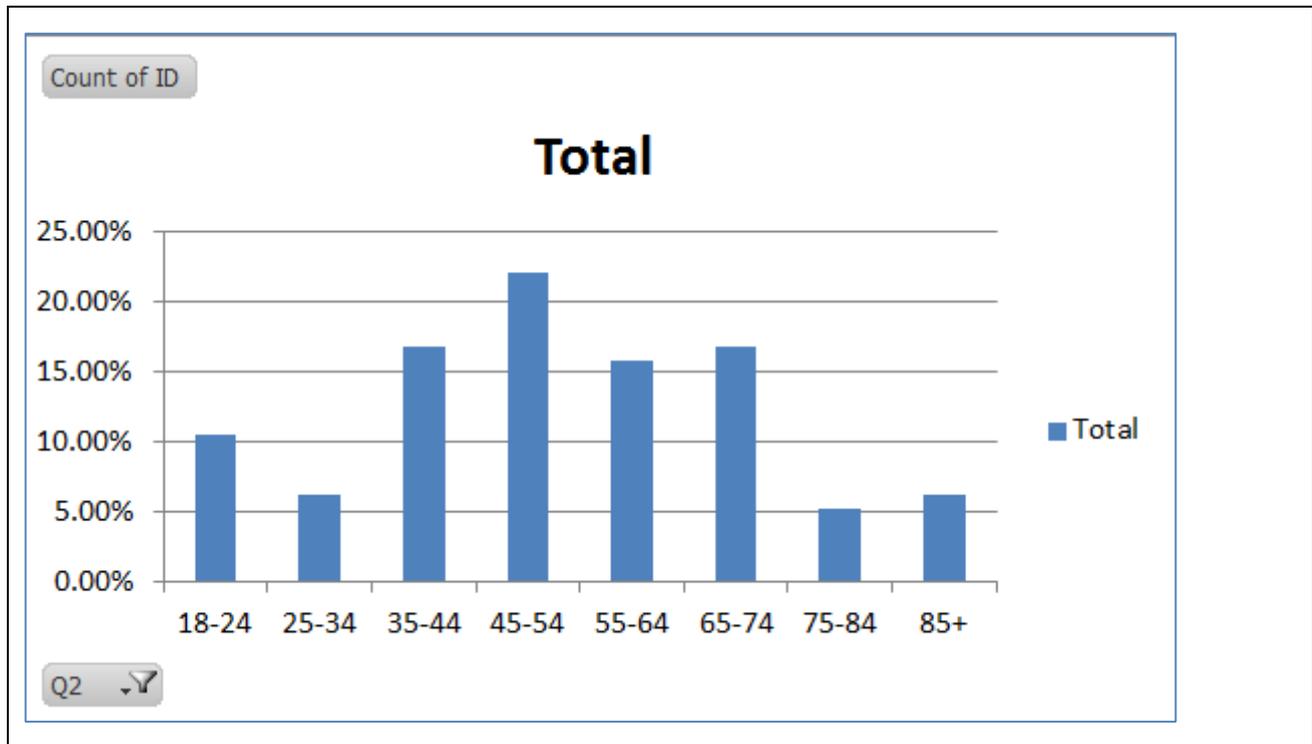
<sup>5</sup> If you make a mistake creating a PivotTable report then click inside the PivotTable, click on the Options tab, choose “Select -> EntirePivotTable”, and then press delete.

<sup>6</sup> This table can be easily extended. For example, to obtain counts of the number of male and female participants in each age-group, drag the Q1 column heading into the Column Labels box.

excluding the missing data). Similarly, you could uncheck the row labelled “(blank)”, which may appear<sup>7</sup>.

### Column chart

Once you have the appropriate values in a PivotTable then you can consider using charts to show your findings graphically. To show the age distribution of the survey participants in a column chart you can highlight the whole PivotTable, click on the Insert tab, and select a Clustered Column Chart (2-D). You should then have a Chart that looks something like this:



This chart shows that 22% of survey participants were aged 45-54: just over 5% of participants were aged 85 years and over.

The grey boxes in this Chart can be removed by clicking on one of the grey boxes, using right-click, and then choosing the “Hide All Field Buttons on Chart” option. Of course, many formatting improvements can be made to this Chart (such as getting rid of the decimal points on the vertical axis), but these are beyond the scope of this User Guide.

<sup>7</sup> The (blank) label may appear if earlier you selected all the cells in the “Raw-Data” worksheet by clicking the Select All button in the top left corner of the worksheet.

## EXAMPLE 2: INDICATORS OF COMMUNITY SEVERANCE BY AGE-GROUP

In this more complicated example we show how you can calculate and graphically show the responses to a question for survey participants in different categories.

In this example, we are finding out the percentage of survey participants in each age-group who reported that their ability to walk to places in their local area was “Often” or “Always” affected by factors such as the speed or the amount of traffic. These indicators of the “barrier effect” of transport infrastructure or of motorised traffic were asked in Q8 of the Health and Neighbourhood Mobility Survey as follows:

### Survey question on barriers to walkability

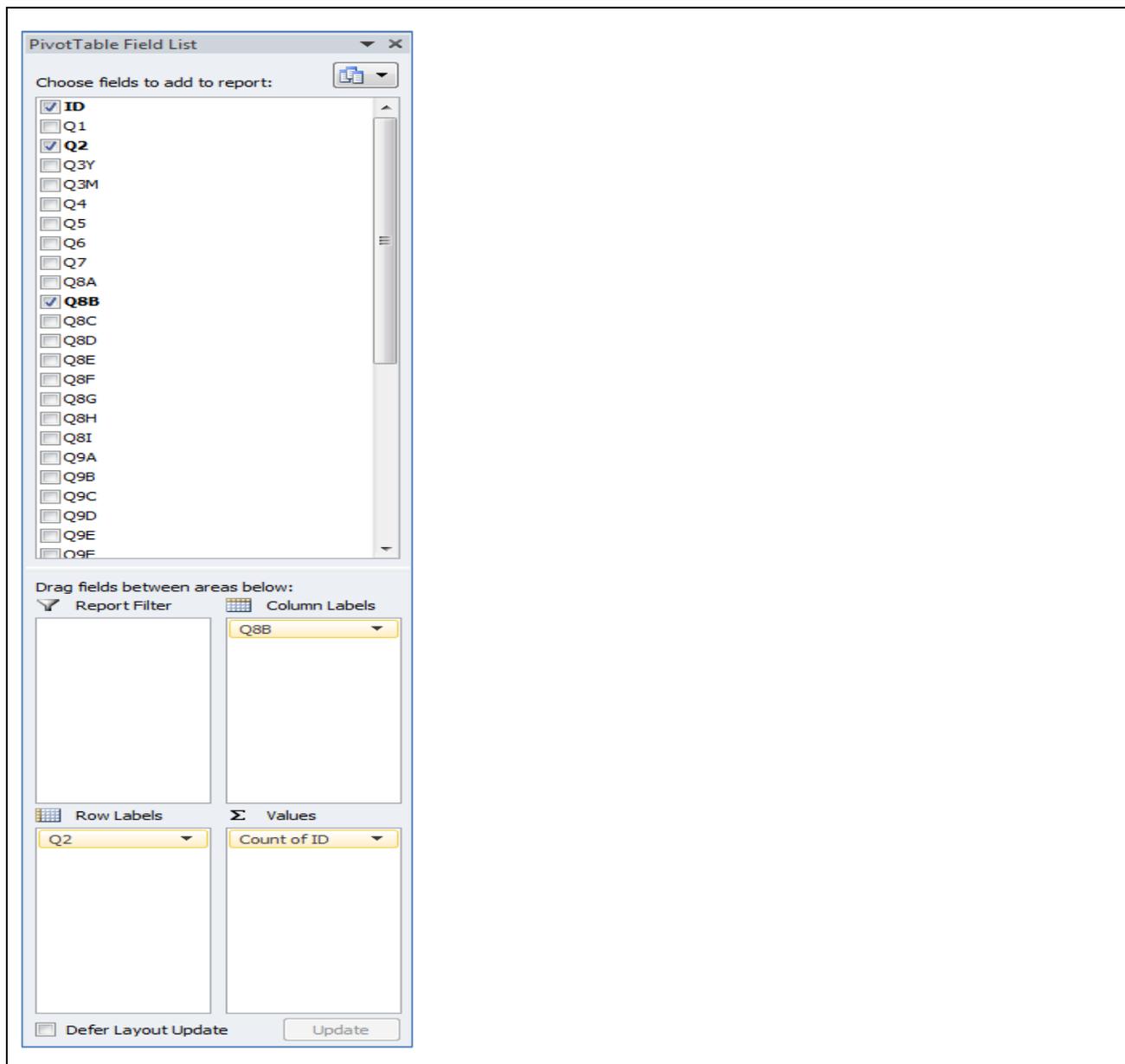
8) Thinking about everywhere within a 20 minute walk or about a mile of your home... How often, if ever, do the following factors affect your ability to walk to places in your local area? <i>Tick one box on each line</i>				
	Never	Occasionally	Often	Always
a. Speed of traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Amount of traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Lack of crossing points (for example, for nearby roads, railways, or waterways)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Crossings do not allow adequate time to cross	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Poor lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Poor pavements or paths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Noise pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Air pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Fear of crime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In this example, we focus on four of the community severance indicators:

- amount of traffic (column Q8B in the Excel database);
- crossings that do not allow adequate time to cross (column Q8D);
- poor pavements or paths (column Q8F); and
- air pollution (column Q8H).

To show these results, we build on the earlier example. In the worksheet containing the raw data, click on the *Insert* tab, and select *PivotTable*. In the Create PivotTable box, use the ‘Select a table or range’ option, and using the mouse on your computer highlight the whole survey data.

We recommend as a simple first step creating four PivotTables within the same new Excel Worksheet: i.e. a separate PivotTable for each of the four indicators of community severance. For example, to create the PivotTable for the amount of traffic (Q8B), drag the column heading for age-group (Q2) into the Row Labels box, drag the column heading Q8B into the Column Labels box, and drag ID number into the  $\Sigma$  Values box. As before, we do not want the 'Sum of ID number' (the default). Choose the down arrow in the  $\Sigma$  Values box: select Value Field Settings: change Sum of ID to Count of ID in the option list (as shown below).



Adding appropriate Row and Column Labels, excluding missing values<sup>8</sup>, and entering a title for the PivotTable, you could have a PivotTable that looks something like this:

<sup>8</sup> Click on the Row Labels down arrow in the PivotTable, and uncheck the box containing the -2 Row Label; click on the Column Labels down arrow in the PivotTable, and uncheck the box which contains the -2 Column Label.

Q8B: Affected by the volume of traffic when walking to places in your local area?					
Count of   Column					
Row Labels	Never	Occasionally	Often	Always	Grand Total
18-24	3	1	1	4	9
25-34	1	1	1	3	6
35-44	1	5	7	3	16
45-54	2	6	6	6	20
55-64	5	3	1	4	13
65-74	4	5	6	1	16
75-84	1		2	2	5
85+	3		2	1	6
<b>Grand Total</b>	<b>20</b>	<b>21</b>	<b>26</b>	<b>24</b>	<b>91</b>

Then click on a cell within the same Excel Worksheet where it would be convenient to create a similar PivotTable for the barrier representing crossings that do not allow adequate time to cross (column Q8D). This cell would be the **upper-left cell** of the new PivotTable. Repeating this procedure, we would then have four separate PivotTables within the same Excel Worksheet that looks something like this:

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Q8B: Affected by the volume of traffic when walking to places in your local area?						Q8D: Affected by crossings with not enough time to cross...?							
Count of   Column						Count of   Column							
Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total		
18-24	3	1	1	4	9	18-24	3	2	3	1	9		
25-34	1	1	1	3	6	25-34	1	4		1	6		
35-44	1	5	7	3	16	35-44		5	6	5	16		
45-54	2	6	6	6	20	45-54	9	3	6	2	20		
55-64	5	3	1	4	13	55-64	5	2	5	1	13		
65-74	4	5	6	1	16	65-74	7	2	2	5	16		
75-84	1		2	2	5	75-84	1	2		2	5		
85+	3		2	1	6	85+	5	1			6		
<b>Grand Total</b>	<b>20</b>	<b>21</b>	<b>26</b>	<b>24</b>	<b>91</b>	<b>Grand Total</b>	<b>31</b>	<b>21</b>	<b>22</b>	<b>17</b>	<b>91</b>		
Q8F: Affected by poor pavements or paths..?						Q8H: Affected by air pollution?							
Count of   Column						Count of   Column							
Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total		
18-24	2	3	3	1	9	18-24	2	2	3	2	9		
25-34	3	1	1	1	6	25-34		3	1	2	6		
35-44	4	2	3	7	16	35-44	4	3	5	4	16		
45-54	4	6	5	5	20	45-54	6	2	8	4	20		
55-64	5	4	3	1	13	55-64	4	4	1	4	13		
65-74	5	2	4	5	16	65-74	4	3	5	4	16		
75-84	3	1	1		5	75-84	1	1	1	2	5		
85+	3		3		6	85+	2	2	2		6		
<b>Grand Total</b>	<b>29</b>	<b>19</b>	<b>23</b>	<b>20</b>	<b>91</b>	<b>Grand Total</b>	<b>23</b>	<b>20</b>	<b>26</b>	<b>22</b>	<b>91</b>		

As mentioned earlier, we want to show the percentage of survey participants in each age-group who reported that their ability to walk to places in their local area was “Often” or “Always” affected by factors such as the speed or the amount of traffic. To achieve this, we must add the percentage of participants in the “Often” and “Always” columns.

We can achieve this in the following three steps.

First, we convert the cell counts in the four PivotTables to row percentages: by clicking in the cells of the PivotTable, use right-click, and select “Show Values As -> % of Row Total” (as shown below):

## Showing percentages rather than frequency

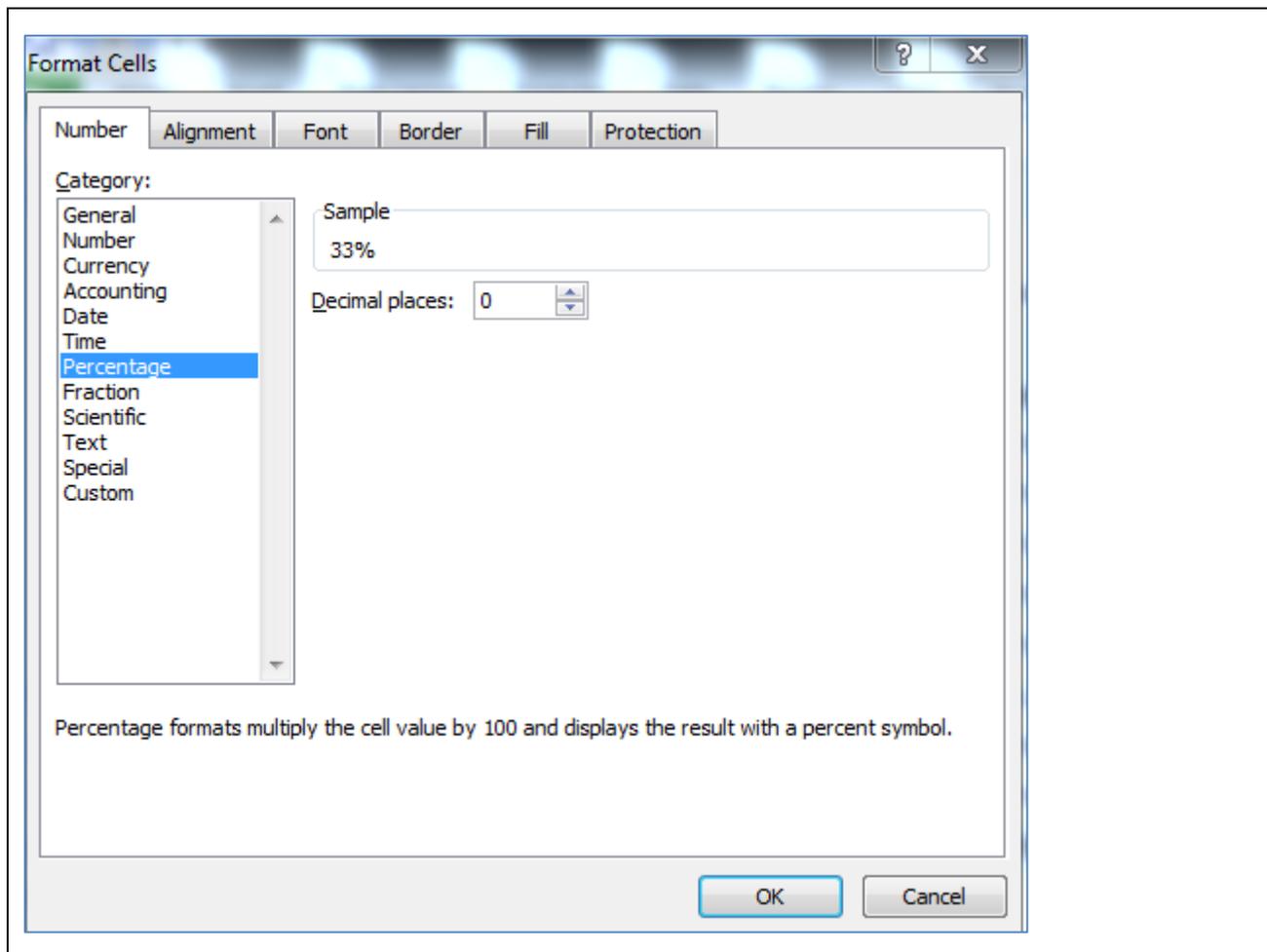
The screenshot shows an Excel spreadsheet with two PivotTables. The first PivotTable is for 'Q8B: Affected by the volume of traffic when walking to places in your local area?' and the second is for 'Q8H: Affected by air pollution?'. A context menu is open over the first PivotTable, with 'Show Values As' selected, and '% of Row Total' highlighted.

Row Labels	Never	Occasionally	Often	Always	Grand Total
18-24	1	4	9		
25-34	1	3	6		
35-44	7	3	16		
45-54	6	6	20		
55-64	1	4	13		
65-74	6	1	16		
75-84			5		
85+			6		
<b>Grand Tot</b>	<b>29</b>	<b>19</b>	<b>23</b>	<b>20</b>	<b>91</b>

The first PivotTable would then look something like this:

Q8B: Affected by the volume of traffic when walking to places in your local area?					
Count of ID	Column Labels				
Row Labels	Never	Occasionally	Often	Always	Grand Total
18-24	33.33%	11.11%	11.11%	44.44%	100.00%
25-34	16.67%	16.67%	16.67%	50.00%	100.00%
35-44	6.25%	31.25%	43.75%	18.75%	100.00%
45-54	10.00%	30.00%	30.00%	30.00%	100.00%
55-64	38.46%	23.08%	7.69%	30.77%	100.00%
65-74	25.00%	31.25%	37.50%	6.25%	100.00%
75-84	20.00%	0.00%	40.00%	40.00%	100.00%
85+	50.00%	0.00%	33.33%	16.67%	100.00%
<b>Grand Total</b>	<b>21.98%</b>	<b>23.08%</b>	<b>28.57%</b>	<b>26.37%</b>	<b>100.00%</b>

We can change the formatting to show the percentages to no decimal points by highlighting all the numbers in a PivotTable, right-click, select "Format Cells" and use the down arrow to show 0 decimal places (as shown below) and click OK.



Doing this separately for the four PivotTables, the Excel worksheet would then look something like this:

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2	Q8B: Affected by the volume of traffic when walking to places in your local area?						Q8D: Affected by crossings with not enough time to cross...?								
3	Count of ID	Column Labels				Grand Total	Count of ID	Column Labels							
4	Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total			
5	18-24	33%	11%	11%	44%	100%	18-24	33%	22%	33%	11%	100%			
6	25-34	17%	17%	17%	50%	100%	25-34	17%	67%	0%	17%	100%			
7	35-44	6%	31%	44%	19%	100%	35-44	0%	31%	38%	31%	100%			
8	45-54	10%	30%	30%	30%	100%	45-54	45%	15%	30%	10%	100%			
9	55-64	38%	23%	8%	31%	100%	55-64	38%	15%	38%	8%	100%			
10	65-74	25%	31%	38%	6%	100%	65-74	44%	13%	13%	31%	100%			
11	75-84	20%	0%	40%	40%	100%	75-84	20%	40%	0%	40%	100%			
12	85+	50%	0%	33%	17%	100%	85+	83%	17%	0%	0%	100%			
13	Grand Total	22%	23%	29%	26%	100%	Grand Total	34%	23%	24%	19%	100%			
14															
15	Q8F: Affected by poor pavements or paths...?						Q8H: Affected by air pollution?								
16	Count of ID	Column Labels				Grand Total	Count of ID	Column Labels							
17	Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total			
18	18-24	22%	33%	33%	11%	100%	18-24	22%	22%	33%	22%	100%			
19	25-34	50%	17%	17%	17%	100%	25-34	0%	50%	17%	33%	100%			
20	35-44	25%	13%	19%	44%	100%	35-44	25%	19%	31%	25%	100%			
21	45-54	20%	30%	25%	25%	100%	45-54	30%	10%	40%	20%	100%			
22	55-64	38%	31%	23%	8%	100%	55-64	31%	31%	8%	31%	100%			
23	65-74	31%	13%	25%	31%	100%	65-74	25%	19%	31%	25%	100%			
24	75-84	60%	20%	20%	0%	100%	75-84	20%	20%	20%	40%	100%			
25	85+	50%	0%	50%	0%	100%	85+	33%	33%	33%	0%	100%			
26	Grand Total	32%	21%	25%	22%	100%	Grand Total	25%	22%	29%	24%	100%			

Secondly, we need to add the percentages in the separate “Often” **and** “Always” columns. Unfortunately, this can be quite problematic due to the embedded formulae within the PivotTable.

Therefore, we recommend using **Copy - Paste values** to create a copy of each PivotTable before we do our adding up. Using this method, we want to copy the contents of a cell, but just want to paste the value and not the underlying formula that is displayed in the formula bar.<sup>9</sup> To do this:

1. Highlight the whole PivotTable;
2. Use copy (Ctrl-C<sup>10</sup>);
3. Select on the upper-left cell of the paste area (where you want the new Table to go); and
4. Right-click and then check the “paste values” box.

Repeat this for the other three PivotTables.

Then format each table to show as percentages with no decimal points (by highlighting all the numbers in the table, right-click, select **“Format Cells”**, choose the **Percentage** option, and use the down arrow to show 0 decimal places).

The Excel worksheet would then look something like this (where the four created PivotTables are on the left-side of the worksheet, and the four copies are on the right-side):

Finally, for summary purposes, we can then create our own table in Excel which shows the percentage of survey participants that were “Often” or “Always” affected by a particular barrier. To do this, using the tables we have just copied (i.e. the tables pasted with values, not formulas), we can calculate the relevant percentages for being “Often” or “Always” affected by a barrier.

<sup>9</sup> A useful guide to this procedure can be found here: <https://support.office.com/en-us/article/Paste-values-not-formulas-12687B4D-C79F-4137-B0CC-947C229C55B9>.

<sup>10</sup> Press the C key when holding down the Ctrl key on your keyboard.

For example, within the same worksheet, we can create an empty table such as this:

Percentage "often" or "always" affected..				
	Q8B	Q8D	Q8F	Q8H
18-24				
25-34				
35-44				
45-54				
55-64				
65-74				
75-84				
85+				

Within the cells of this table, we can use Excel's built-in functions to add the appropriate percentages.

For example, in the first row of the column headed Q8B, we can type in the cell

= SUM(S5,T5)

and press return.

In this example, S5 is the cell that contains the % of participants aged 18-24 who reported being "Often" affected by the volume of traffic; T5 is the cell that contains the % of participants aged 18-24 who reported being "Always" affected by the volume of traffic. We used the SUM function to add these two %s. Repeating this for each PivotTable would give us the following:

### Using Excel's built in functions to combine columns

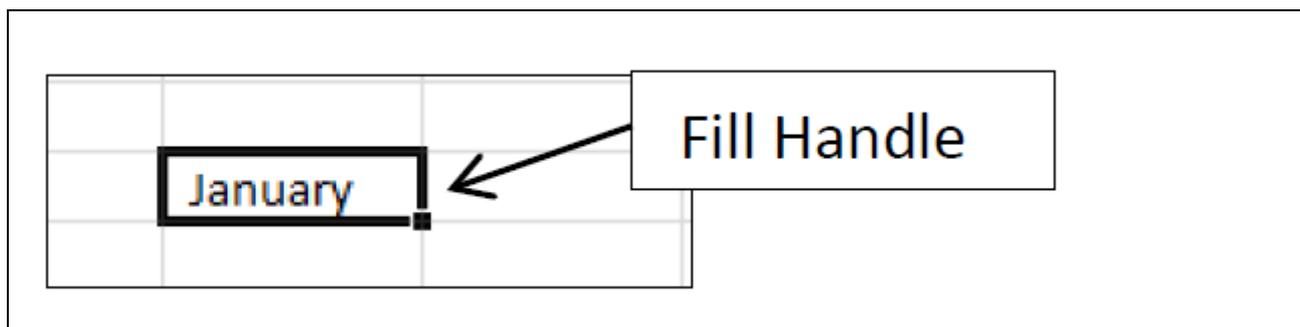
	Q8B	Q8D	Q8F	Q8H
18-24	=SUM(S5,T5)	=SUM(S18,T18)	=SUM(S31,T31)	=SUM(S44,T44)
25-34				
35-44				
45-54				
55-64				
65-74				
75-84				
85+				

For the first row of our Table the results would be as follows:

	Q8B	Q8D	Q8F	Q8H
<b>18-24</b>	56%	44%	44%	56%
<b>25-34</b>				
<b>35-44</b>				
<b>45-54</b>				
<b>55-64</b>				
<b>65-74</b>				
<b>75-84</b>				
<b>85+</b>				

Once we have the correct formula in place for each column we can then use Excel’s AUTOFILL function to fill cell content: this can save time, and minimise computing error, when you have content to enter that follows a repeatable pattern or sequence.

More specifically, we can then take advantage of the **Fill Handle** in Excel: this is the little black square in the lower right-hand corner of the selected cell (as illustrated below)<sup>11</sup>:



Having used the SUM formula for the first row in a column, move the cursor over the fill handle. The cursor becomes a black crosshair (+). Click and drag the fill handle down the column. The percentage of participants in each age-group who were “Often” or “Always” affected would then be calculated automatically. Then repeat this procedure for the other three columns. The results would be as follows:

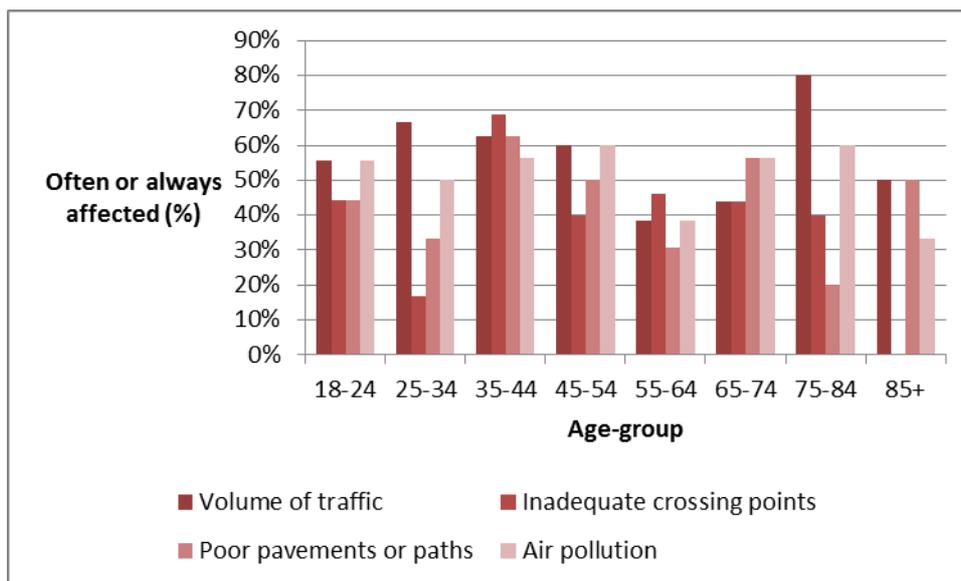
**% of participants “Often” or “Always” affected by a particular barrier by age-group**

<sup>11</sup> More details on using autofill in Excel to fill cell content can be found here: [www.siumed.edu/lib/classes/excel/Excel2013-Basics.pdf](http://www.siumed.edu/lib/classes/excel/Excel2013-Basics.pdf)

	Q8B	Q8D	Q8F	Q8H
18-24	56%	44%	44%	56%
25-34	67%	17%	33%	50%
35-44	63%	69%	63%	56%
45-54	60%	40%	50%	60%
55-64	38%	46%	31%	38%
65-74	44%	44%	56%	56%
75-84	80%	40%	20%	60%
85+	50%	0%	50%	33%

### Column chart

Once you have the appropriate values in your own Excel Table then you can consider using a chart to graphically show your findings. To show the percentage of the survey participants who were “Often” or “Always” affected by the four chosen barriers separately by age-group you can highlight the whole Table, click on the Insert tab, and select a Clustered Column Chart (2-D). After some formatting improvements, you could then have a Chart that looks something like this:



## EXAMPLE 3: INDICATORS OF COMMUNITY SEVERANCE BY MOBILITY LIMITATION

In this final example we show how you can calculate and graphically show the percentage of survey participants with and without a mobility limitation (Q7 in the Survey) who reported that barriers such as the speed or the amount of traffic were “Often” or “Always” a problem on the busiest road in the local area. These potential “barrier effects” are asked in Q9 of the Health and Neighbourhood Mobility Survey as follows:

### Survey question on problems on the busiest road

9) We are now asking you about <i>[insert name of road of concern]</i> . How often, if ever, are any of the following a problem on this road? Tick one box on each line				
	Never	Occasionally	Often	Always
a. Speed of traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Amount of traffic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Lack of crossing points (for example, for nearby roads, railways, or waterways)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Crossings do not allow adequate time to cross	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Poor lighting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Poor pavements or paths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Noise pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Air pollution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Fear of crime	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In this example, we focus on each potential “barrier effect”. The results will be compared for the two groups of participants: those with and without a mobility limitation.

To show these results, we build on the earlier examples.

The first step is to create a separate PivotTable for each “barrier effect”. As before, drag the relevant column heading for the barrier effect into the Column Labels box, drag the column for mobility limitations (column Q7 in the Excel database) into the Row Labels box, and drag the column heading ID into the  $\Sigma$  Values box. We do not want the ‘Sum of ID number’ (which is the default setting). Choose the down arrow in the  $\Sigma$  Values box: select Value Field Settings: change Sum of ID to **Count** of ID in the option list.

After adding appropriate Row and Column Labels, excluding missing values, and entering a title for each PivotTable, the same Excel Worksheet containing the nine separate PivotTables would look something like this:

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	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2	Q9A: Speed of traffic						Q9F: Poor pavements or paths						
3	Count of ID						Count of ID						
4	Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total	
5	Has mobility limitation	7	9	14	8	38	Has mobility limitation	9	8	15	6	38	
6	Does not have mobility limitation	16	16	12	15	59	Does not have mobility limitation	15	12	15	17	59	
7	Grand Total	23	25	26	23	97	Grand Total	24	20	30	23	97	
8													
9	Q9B: Amount of traffic						Q9G: Noise pollution						
10	Count of ID						Count of ID						
11	Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total	
12	Has mobility limitation	5	15	8	10	38	Has mobility limitation	11	5	14	8	38	
13	Does not have mobility limitation	16	15	9	19	59	Does not have mobility limitation	17	10	21	11	59	
14	Grand Total	21	30	17	29	97	Grand Total	28	15	35	19	97	
15													
16	Q9C: Lack of crossing points						Q9H: Air pollution						
17	Count of ID						Count of ID						
18	Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total	
19	Has mobility limitation	9	13	11	5	38	Has mobility limitation	10	6	7	15	38	
20	Does not have mobility limitation	11	14	15	19	59	Does not have mobility limitation	19	9	15	16	59	
21	Grand Total	20	27	26	24	97	Grand Total	29	15	22	31	97	
22													
23	Q9D: Crossings do not allow adequate time to cross						Q9I: Fear of crime						
24	Count of ID						Count of ID						
25	Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total	
26	Has mobility limitation	8	11	11	8	38	Has mobility limitation	7	6	11	14	38	
27	Does not have mobility limitation	14	15	15	15	59	Does not have mobility limitation	11	19	12	17	59	
28	Grand Total	22	26	26	23	97	Grand Total	18	25	23	31	97	
29													
30	Q9E: Poor lighting												
31	Count of ID												
32	Row Labels	Never	Occasionally	Often	Always	Grand Total							
33	Has mobility limitation	7	12	10	9	38							
34	Does not have mobility limitation	16	9	18	16	59							
35	Grand Total	23	21	28	25	97							

The second step is to convert the cell counts in the nine PivotTables to row percentages. As in the earlier example, click in the cells of the PivotTable, use right-click, and select “Show Values As -> % of Row Total”. Change the formatting to show percentages to no decimal points by highlighting all the numbers in a PivotTable, right-click, select “Format Cells” and use the down arrow to show 0 decimal places.

Doing this separately for the nine PivotTables, the Excel worksheet would then look something like this:

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2	Q9A: Speed of traffic						Q9F: Poor pavements or paths						
3	Count of ID						Count of ID						
4	Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total	
5	Has mobility limitation	18%	24%	37%	21%	100%	Has mobility limitation	24%	21%	39%	16%	100%	
6	Does not have mobility limitation	27%	27%	20%	25%	100%	Does not have mobility limitation	25%	20%	25%	29%	100%	
7	Grand Total	24%	26%	27%	24%	100%	Grand Total	25%	21%	31%	24%	100%	
8													
9	Q9B: Amount of traffic						Q9G: Noise pollution						
10	Count of ID						Count of ID						
11	Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total	
12	Has mobility limitation	13%	39%	21%	26%	100%	Has mobility limitation	29%	13%	37%	21%	100%	
13	Does not have mobility limitation	27%	25%	15%	32%	100%	Does not have mobility limitation	29%	17%	36%	19%	100%	
14	Grand Total	22%	31%	18%	30%	100%	Grand Total	29%	15%	36%	20%	100%	
15													
16	Q9C: Lack of crossing points						Q9H: Air pollution						
17	Count of ID						Count of ID						
18	Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total	
19	Has mobility limitation	24%	34%	29%	13%	100%	Has mobility limitation	26%	16%	18%	39%	100%	
20	Does not have mobility limitation	19%	24%	25%	32%	100%	Does not have mobility limitation	32%	15%	25%	27%	100%	
21	Grand Total	21%	28%	27%	25%	100%	Grand Total	30%	15%	23%	32%	100%	
22													
23	Q9D: Crossings do not allow adequate time to cross						Q9I: Fear of crime						
24	Count of ID						Count of ID						
25	Row Labels	Never	Occasionally	Often	Always	Grand Total	Row Labels	Never	Occasionally	Often	Always	Grand Total	
26	Has mobility limitation	21%	29%	29%	21%	100%	Has mobility limitation	18%	16%	29%	37%	100%	
27	Does not have mobility limitation	24%	25%	25%	25%	100%	Does not have mobility limitation	19%	32%	20%	29%	100%	
28	Grand Total	23%	27%	27%	24%	100%	Grand Total	19%	26%	24%	32%	100%	
29													
30	Q9E: Poor lighting												
31	Count of ID												
32	Row Labels	Never	Occasionally	Often	Always	Grand Total							
33	Has mobility limitation	18%	32%	26%	24%	100%							
34	Does not have mobility limitation	27%	15%	31%	27%	100%							
35	Grand Total	24%	22%	29%	26%	100%							

We are then able to add the percentages in the separate “Often” and “Always” columns. As in the earlier example, this is easier to do by using **Copy – Paste values** to create a copy of each PivotTable before we do our adding up. For each PivotTable:

1. Highlight the whole PivotTable;
2. Use copy (Ctrl-C<sup>12</sup>);
3. Select on the **upper-left cell** of the paste area (where you want the new Table to go); and
4. Right-click and then check the “paste values” box.

Then format each table to show as percentages with no decimal points (by highlighting all the numbers in the table, right-click, select **“Format Cells”**, choose the **Percentage** option, and use the down arrow to show 0 decimal places).

The Excel worksheet would then look something like this (where the original created PivotTables are on the left-side of the worksheet, and the copies are on the right-side):

The screenshot shows a grid of PivotTables in Excel. Each table has a 'Count of ID' row and a 'Row Labels' section with categories: 'Has mobility limitation', 'Does not have mobility limitation', and 'Grand Total'. The columns represent response categories: 'Never', 'Occasional', 'Often', and 'Always', plus a 'Total' column. Percentages are shown in the cells, such as 18%, 24%, 37%, 21%, and 100% for the first table.

Finally, for summary purposes, we can then create our own table in Excel which shows the percentage of survey participants with and without a mobility limitation who were “Often” or “Always” affected by a particular problem on the busiest road in their area. To do this, using the tables we have just copied, we can calculate the relevant percentages for being “Often” or “Always” affected by a barrier.

<sup>12</sup> Press the C key when holding down the Ctrl key on your keyboard.

For example, within the same Excel worksheet, we can create an empty table such as this:

Percentage "often" or "always" affected	Q9A	Q9B	Q9C	Q9D	Q9E	Q9F	Q9G	Q9H	Q9I
Has mobility limitation									
Does not have mobility limitation									

Within the cells of this table, we can use Excel’s built-in functions to add the appropriate percentages. In the first row of the column Q9A, type in the cell:

= SUM(R5,S5)

and press return.

In this example, R5 is the cell that contains the % of participants with a mobility limitation who reported being “Often” affected by the speed of traffic on the busiest road in their area; S5 is the cell that contains the % of participants with a mobility limitation who reported being “Always” affected by the speed of traffic on the busiest road in their area.

As before, we then use Excel’s AUTOFILL function (the **Fill Handle**) to calculate the result for the participants who did not report a mobility limitation. Having used a formula for the first row in a column (the group with a mobility limitation), move the cursor over the fill handle. The cursor becomes a black crosshair (+). Click and drag the fill handle down the column. The percentage of participants who did not report a mobility limitation that were “Often” or “Always” affected by the speed of traffic on the busiest road would then be calculated automatically.

Then repeat this procedure for the other “barrier effects”. The results would be as follows:

**% of participants “Often” or “Always” affected by a particular barrier on the busiest road by mobility limitation**

Percentage "often" or "always" affected	Q9A	Q9B	Q9C	Q9D	Q9E	Q9F	Q9G	Q9H	Q9I
Has mobility limitation	58%	47%	42%	50%	50%	55%	58%	58%	66%
Does not have mobility limitation	46%	47%	58%	51%	58%	54%	54%	53%	49%

**Bar chart**

To show the percentage of the survey participants who were “Often” or “Always” affected by the potential barriers on the busiest road separately for participants with and without a mobility limitation you can highlight the whole Table, click on the Insert tab, and select a Bar Chart. After some formatting improvements, you could then have a chart that looks something like this:

