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## **Use of motor fuels and lubricants: habits and practices of consumers in Europe**

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# **Use of motor fuels and lubricants: habits and practices of consumers in Europe**

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## **ABSTRACT**

A structured survey of European consumers was carried out across 250 participants to better understand their habits and practices concerning their use of vehicle fuels and lubricants. This report contains the findings of the survey. The information obtained from this survey provides insight on the current nature of consumer exposures to fuels and lubricants, and will be used to support the REACH registrations of petroleum substances and the basis for the information included in the CONCAWE Specific Consumer Exposure Determinants (SCEDS).

## **KEYWORDS**

Fuels, lubricants, exposure survey

## **INTERNET**

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## SUMMARY

A market survey was commissioned by CONCAWE in 2011 to characterise the habits and practices of European consumers in their use of petroleum products, in particular fuels and engine lubricants. The survey was carried out of Alba Science Ltd. A sample of 250 United Kingdom participants (all car drivers), who represented an authentically broad socio-demographic type, aged 18 to 65, responded to the 39 questions in the on-line survey. The survey was geographically limited but intended to be illustrative of the broader habits and practices of EU consumers. Of the survey participants, 97% regularly used gasoline and/or diesel. Some owned more than one vehicle, such that 80% refuelled with gasoline and 30% with diesel. Nearly all service stations that were visited were of the self-service type. Based on the results of the survey, the average refuelling frequency was 3.1 times/month, average refuelling amount was 30 litres and average time spent at service station was 4 minutes. Regarding dermal exposures, around 25% responded that they “sometimes” have skin contact with fuel. When disposable gloves are available, only 8% reported that they would always use them.

Information on parameters relevant for estimating exposure to engine lubricants was targeted at the topping up of the engine reservoir and at lubricant changes. Most participants reported that they occasionally check the oil reservoir level of their car and top up if necessary. 70% of the participants do not themselves change the oil in their vehicle, but 20% do it sometimes and this could result in some dermal exposure to both old and fresh lubricant.

In a comparison of the selected findings from the survey with the basic REACH assumptions and the values in the SCEDs, these survey results confirm that the values within the SCEDs better reflect current European consumer habits and practices. The resulting SCEDs exposure estimates are considered to remain suitably conservative.

## 1. INTRODUCTION

To characterize the consumer habits and practices of European consumers in their use of petroleum products, in particular fuels and engine lubricants, a market survey was commissioned by CONCAWE. A sample of 250 United Kingdom consumers (all car drivers) volunteered to participate in this on-line survey and answer 39 questions regarding their use of fuels and lubricants. The information obtained from this survey would provide insight on the current nature of consumer exposures to petroleum products and would form the basis for the information included in the CONCAWE Specific Consumer Exposure Determinants (SCEDs). SCEDs are the standardized way, accepted under REACH and by ECHA, to transparently show how consumer exposures to substances can occur.

## 2. STUDY OBJECTIVE

The objective of the study was to evaluate, in a randomly selected panel of 250 people, the habits and practices of consumers as they relate to the use of fuels and lubricants. Where the panellists are routinely exposed to one, or both, products, the frequency and circumstances of the exposure was assessed and recorded via the survey.

## 3. STUDY METHOD

### 3.1. STUDY PROTOCOL

The study was performed in accordance with Alba Science Ltd. Study Protocol 210919.

A copy of the Study Protocol is included in **Appendix A**.

### 3.2. DESIGN DESCRIPTION

The panellists were recruited remotely and were asked to complete an online screening survey and consent form.

250 panellists were selected in accordance with the screening criteria to represent a broad demographic in accordance with the inclusion criteria. Panellists were given a set period of time to complete the online questionnaire. The ensuing data was collected and is reported in this document.

### 3.3. PRIMARY ENDPOINTS

The primary endpoint for analysis was the questionnaire data.

### **3.4. SECONDARY ENDPOINTS**

There were no secondary endpoints for analysis on this study.

## **4. LOCATION**

The study was managed at the premises of Alba Science Ltd., 24 Broughton Street, Edinburgh, EH1 3RH, United Kingdom. Subjects on the study completed the online questionnaire at home.

## **5. TIMING**

The study was completed by panellists and the results were collected between 01 Mar 2011 and 31 Mar 2011.

## **6. SUBJECT PARTICIPATION**

### **6.1. PANELLIST RECRUITMENT**

250 panellists were recruited to take part in the survey. The aim was to recruit a group of panellists who represented an authentically broad socio-demographic type, in accordance with the above inclusion criteria below.

### **6.2. INCLUSION CRITERIA**

The following Inclusion Criteria were used during subject screening and recruitment:

- Male and Female
- Aged 18 to 65
- Computer literate / access to internet
- Car owners or drivers

### **6.3. EXCLUSION CRITERIA**

The following Exclusion Criteria were used during subject screening and recruitment:

- Those who fall outside the required age group.
- Non car owners or drivers.
- Those without access to the internet.

## **7. DATA COLLECTION AND PROCESSING**

### **7.1. RECORDED DATA**

The following data are recorded during the study.

- Questionnaire data

### **7.2. RECORDING METHODS**

Data collected during the study are recorded directly to a computerised Data Management System.

### **7.3. DATA STORAGE**

All data collected related to the study are stored in a computerised Data Management System.

### **7.4. DATA PROCESSING**

For data processing, a computer system produced the processed data for the study. A Data Analysis Report was generated containing both raw and processed data, together with other information gathered throughout the study.

### **7.5. DATA PROVISION**

Data are provided to the Sponsor as part of the Final report, together with appropriate presentation of the results.

## 8. STUDY RESULTS

The results of the study follow on the next page. Questions 1-3 were administrative and are therefore not reported. Textual responses can be found in the Data Analysis Report in **Appendix B**.

Question 4: Please tell us your age		
Response Options	Response (%)	Response Count
18-30	17.60	44
31-55	71.60	179
Over 55	10.80	27

Question 5: Please indicate your sex below		
Response Options	Response (%)	Response Count
Male	34.80	87
Female	65.20	163

Question 6: Please tick the box below which best describes the environment in which you live.		
Response Options	Response (%)	Response Count
Rural/ Country	25.60	64
Urban/ City	74.40	186

<b>Question 7: Please tell us which UK region you live in.</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
North East	1.20	3
North West	3.60	9
Yorkshire and Humber	3.60	9
East	2.40	6
East Midlands	1.60	4
West Midlands	2.40	6
Greater London	3.60	9
South East	5.60	14
South West	2.00	5
Scotland	72.40	181
Wales	1.20	3
Northern Ireland	0.40	1

<b>Question 8: Please indicate which of the following best describes your employment status.</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Unemployed	16.80	42
Employed	80.40	201
Retired	2.80	7

Question 9: Do you own or regularly drive a car or another type of vehicle?		
Response Options	Response (%)	Response Count
Yes	100.00	250
No	0.00	0

Question 10: Typically, how many times per week will you use your car or vehicle?		
Response Options	Response (%)	Response Count
Rarely	0.80	2
Occasional use	27.60	69
Daily / To commute to work	71.60	179

Question 11: Please indicate the type(s) of vehicle you drive or operate and the circumstances of their use. (You can tick more than one box per vehicle type if this applies).			
Response Options	Private Use	Use at Work	Response Count
Car or SUV etc.	242	61	246
Van	10	15	22
Motorbike	6	1	7
HGV	0	2	2
Tractor / vehicle used for farming purposes	2	2	4
Building / works vehicle such as a digger	1	3	4
Small scale industrial machine e.g. cement mixer	2	5	7

<b>Question 11: Please indicate the type(s) of vehicle you drive or operate and the circumstances of their use. (You can tick more than one box per vehicle type if this applies).</b>			
<b>Response Options</b>	<b>Private Use</b>	<b>Use at Work</b>	<b>Response Count</b>
Garden equipment / machinery	14	2	15
Factory or construction equipment / machinery	0	3	3
Agricultural machinery	2	1	3
Bus or coach	2	3	5
Others (please specify)			6

<b>Question 12: Please tell us how the vehicle(s) is / are powered.</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Petrol	80.00	200
Diesel	29.60	74
Liquid Petroleum Gas	1.60	4
Biofuel	0.40	1
Electric	2.80	7
If you have selected more than one fuel type (and are therefore operating more than one of the above vehicles), please state which vehicle is powered by which fuel in the box below e.g. 'Car- petrol. Lorry- diesel'		19

<b>Question 13: Typically, how many times do you visit the filling station in one month?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
More than once a week	15.20	38
Weekly	37.60	94
Fortnightly	26.00	65
Every three weeks	8.00	20
Monthly	11.20	28
Other, please specify	2.00	5

<b>Question 14: Please can you indicate how much you typically spend on fuel each time you visit the filling station.</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Up to £20	20.80	52
£21 to £40	36.00	90
£41 to £60	28.40	71
£61 to £80	11.20	28
£81 to £100	2.80	7
Over £100	0.80	2

<b>Question 15: On average, can you estimate how much time you spend actually at the pump refilling your vehicle when you are at the filling station?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Up to 2 minutes	8.80	22
More than 2 minutes, less than 4 minutes	48.80	122

<b>Question 15: On average, can you estimate how much time you spend actually at the pump refilling your vehicle when you are at the filling station?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
More than 4 minutes, less than 6 minutes	29.20	73
More than 6 minutes, less than 8 minutes	8.40	21
More than 8 minutes, less than 10 minutes	3.60	9
More than 10 minutes	1.20	3

<b>Question 16: Are you aware that disposable gloves are provided at the pumps?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Yes	84.00	210
No	16.00	40

<b>Question 17: How often would you say they are available at the pumps?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Never	14.40	36
Sometimes	55.60	139
Frequently	24.00	60
Always	6.00	15

<b>Question 18: If and when the disposable gloves are available, how often do you use them?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Never	66.00	165
Sometimes	20.00	50
Frequently	6.00	15
Always	8.00	20

<b>Question 19: When filling your vehicle, are you ever aware of any occasion(s) where your skin has come into contact with liquid fuel?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Never	30.00	75
Sometimes	60.00	150
Frequently	8.00	20
Always	2.00	5

<b>Question 20: If you have come into contact with the liquid fuel while filling up, how has this happened?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Petrol remaining in the nozzle from last refuel has spilled out	31.20	78
There has been a problem with the lever on the pump	4.80	12
Fuel remaining in the nozzle from own fill up has spilled	22.00	55

<b>Question 20: If you have come into contact with the liquid fuel while filling up, how has this happened?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Residual fuel has been left on the pump handle	28.00	70
Petrol has spilled onto the cap or car and came into contact with skin when closing after refilling	29.20	73
Not applicable, my skin does not come into contact with the fuel	28.00	70
Other (Please specify)		2

<b>Question 21: When filling up, is there ever an attendant to assist with this?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Yes	6.00	15
No	94.00	235

<b>Question 22: Are there any additional measures that you would like to see taken at refilling stations to help to prevent your skin from coming into contact with the liquid fuels?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Consistent availability of disposable gloves	38.80	97
More readily available facilities for hand washing after refilling my vehicle	37.60	94

<b>Question 22: Are there any additional measures that you would like to see taken at refilling stations to help to prevent your skin from coming into contact with the liquid fuels?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Wipes available for hands at refilling station	69.60	174
Paper towels always available at the pumps	39.20	98
Attendants at the pumps to refill vehicles	12.40	31
None, I have no preference	14.40	36

<b>Question 23: Do you ever fill up a fuel container to refill machinery at home?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Yes, with diesel	2.80	7
Yes, with petrol	20.00	50
No	77.20	193

<b>Question 24: If so, when do you tend to do this?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Winter	5.60	14
Spring	12.40	31
Summer	18.80	47
Autumn	5.20	13
Not applicable	77.60	194

**Question 25: Please indicate how often you operate a vehicle or other equipment that requires any type of lubricant or oil. (This could be motor vehicle lubricant such as Castrol or Duckhams, or 2 stroke oils and other specialist lubricants for use in scooters, powered leisure equipment and garden machinery etc.).**

Response Options	Response (%)	Response Count
Never	28.40	71
Sometimes	36.00	90
Frequently	18.40	46
Always	17.20	43

**Question 26: Please indicate which vehicle(s) you drive or operate which you also check or top up the oil levels for. Please tick in the column which indicates the circumstances of their use.**

Response Options	Private Use	Use at Work	Response Count
Car or SUV etc.	219	43	221
Van	7	11	15
Motorbike	7	1	8
HGV	0	2	2
Tractor / vehicle used for farming purposes	3	2	5
Garden equipment / machinery	37	2	38
Factory or construction equipment / machinery	1	5	6
Agricultural machinery	1	1	2
Bus or coach	0	3	3
Electrical generator	4	1	5
I do not check or top up the oil levels for any type of vehicle or machine	13	6	16
Other (please specify)			8

<b>Question 27: Please indicate approximately how frequently you top up oil in any vehicle you drive or operate.</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Annually	29.60	74
Quarterly	44.00	110
Monthly	10.00	25
More than once monthly	3.60	9
Never	12.80	32

<b>Question 28: Depending on the regularity of your oil checks, is there a certain amount you tend to top up by?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Under 0.5 litre	27.20	68
Over 0.5 litre, under 1 litre	35.60	89
Over 1 litre, under 1.5 litres	13.20	33
Over 1.5 litres	4.80	12
Not applicable, I do not top up the oil.	19.20	48

<b>Question 29: When topping up the oil in a vehicle, are you aware of any occasion where skin has come into contact with the oil.</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Never	26.00	65
Sometimes	48.80	122
Frequently	4.40	11
Always	2.00	5

<b>Question 29: When topping up the oil in a vehicle, are you aware of any occasion where skin has come into contact with the oil.</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Not applicable	18.80	47

<b>Question 30: If you have found that your skin has come into contact with the oil when topping up, please say how this happened.</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Residual oil from the last fill up was on the cap or engine	16.00	40
Oil from the dip stick when checking the levels came into contact with my skin	30.40	76
Oil came into contact with my skin when I was pouring it into the engine	19.60	49
I use a rag, cloth or gloves when doing this so my skin is not directly exposed	11.20	28
Not applicable	42.40	106
Other (please specify)		3

<b>Question 31: Do you ever change the oil in a vehicle that you drive or operate?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Never	69.20	173
Sometimes	22.80	57
Frequently	2.80	7
Always	5.20	13

<b>Question 32: If you are changing the oil in your vehicle, has your skin come into contact with it?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Yes	21.20	53
No	14.40	36
Not applicable as I do not change the oil	66.80	167

<b>Question 33: When changing the oil in the vehicle, please choose the most appropriate description for your exposure below</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
My skin came into contact when draining the old lubricant from the engine	7.60	19
My skin was exposed when working on the engine in general	7.20	18
The new oil splashed onto my skin	6.80	17
I was wearing gloves so my skin was not exposed	7.60	19
Not applicable, I do not change the oil	70.80	177

<b>Question 34: If you use an industrial lubricant in the maintenance or use of any non-vehicle engines or any other equipment, please say what these are from the list below and please indicate the circumstances of use</b>			
<b>Response Options</b>	<b>Use at Home</b>	<b>Use at Work</b>	<b>Response Count</b>
Portable electricity generator	7	4	11

<b>Question 34: If you use an industrial lubricant in the maintenance or use of any non-vehicle engines or any other equipment, please say what these are from the list below and please indicate the circumstances of use</b>			
<b>Response Options</b>	<b>Use at Home</b>	<b>Use at Work</b>	<b>Response Count</b>
Other engine type, e.g. outboard motor	4	4	7
Lawn mower	42	0	42
Other gardening equipment (e.g. hedge trimmer, chain saw, etc.)	23	2	25
Bicycle or scooter	39	0	39
General household object or appliance e.g. sewing machine	32	7	34
I never use industrial lubricant	164	100	166
Other (please specify)			3

<b>Question 35: Please say how frequently your skin is exposed to the lubricant used in the maintenance of this item</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
Never	16.00	40
Sometimes	21.60	54
Frequently	3.60	9
Always	0.80	2
Not applicable, I never use industrial lubricant	58.00	145
Comments		0

<b>Question 36: Do you try to limit your skin exposure to lubricants?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
No	19.60	49
Not applicable, I never use industrial lubricants	64.80	162
Yes (please specify)	15.60	39

<b>Question 37: Would you like to see additional precautions provided with lubricant products to limit your skin exposure to them?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
No	8.00	20
I have no preference	92.00	230
Yes (please specify)		14

<b>Question 38: Do you ever come into contact with oil / lubricants as part of your work/ occupation that is not covered in any of the above questions?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
No	95.20	238
Yes, please specify	4.80	12

<b>Question 39: Do you ever come into contact with liquid fuels as part of your work / occupation that is not covered in any of the above questions?</b>		
<b>Response Options</b>	<b>Response (%)</b>	<b>Response Count</b>
No	98.80	247
Yes, please specify	1.20	3

## 9. DISCUSSION

Consumer safety assessments have historically relied on the application of conservative default assumptions when predicting the exposures of different consumer groups. One expectation of the EU REACH Regulation is for manufacturers and suppliers of chemicals to be able to demonstrate that their products are safe to use in all likely circumstances of use. Recognizing the challenges of evaluating consumer risks to petroleum substances, CONCAWE applied the ECETOC TRA and EGRET models to its 2010 REACH registrations in order that consumer exposures to petroleum substances could be determined in a manner consistent with other chemical supply chains. However, these models are conservative in their nature both with respect to their underlying algorithms and choice of default exposure determinants. In response to this, ECETOC has proposed the development of SCEDs for key uses of consumer products. The SCEDs enable improved assessment of consumer exposure to be derived via the application of exposure determinants that are more appropriate for an identified use. For example, the default assumption within the TRA is that all the fuel and lubricant handled is also available as an exposure source, whereas in practice only a small fraction of the amount handled will be released to the air or come into contact with the hands. However, in order to deviate away from the default values contained in the models, it is necessary to be able to support the basis for such a change. This work represents a better basis for making informed judgements on some of the key characteristics surrounding key consumer uses of fuels and lubricants.

The structured online survey of 250 adults was undertaken in Q1/2011. Although the survey population showed a good representation of gender, age group, residence (urban/rural) and working status (employed or other), the findings are solely from the UK, in particular Scotland. One question that arises, therefore, is the degree to which the findings are also representative for other EU Member States. For example, all survey respondents indicated that they use cars at some point, whereas EU studies suggested that around 85% of households have access to a car (JRC, 2013). But, in the context that the study is aiming to characterize the habits and practices of those who do routinely engage in re-fuelling and lubrication activities, then the findings are most likely representative of the wider European population too (for example, the conditions under which fuel is dispensed at service stations across Europe do not differ fundamentally). Indeed, consumer exposures to fuels and lubricants can be expected to be lower in those remaining few countries where attended service stations are still routinely encountered (for example Italy).

In the UK, at least, exposures to petroleum-fuelled cars dominate (this will differ across Europe as diesel vehicles are more frequently encountered in countries such as France, Belgium and Germany). Most exposures are reported to be associated with petrol (80%) with diesel making up almost the remainder (74/250). Respondents reported that they use a car daily and almost all at least weekly. Exposures occurring during re-fuelling vehicles, however, are less frequent with only 15% reporting that they refuel at least weekly, although 79% refuel at least once every 2 weeks. The vast majority (78%) of users report refuelling activities as typically lasting between 2-6 minutes. Where PPE (gloves) are provided and available at service stations, then the majority of users (86%) report seldom if ever using them (here, it should be noted, that a previous CONCAWE activity identified that the majority of those gloves available really only should be seen as providing protection against gross contamination (CONCAWE, 2006).

A significant number of participants also reported that they use other types of equipment which can give rise to exposures to fuels and lubricants: 20% reported using some form of petrol powered machinery at home or for leisure (such as motor boats), with almost all these exposures occurring during the spring and summer.

Participants (72%) reported coming into contact with lubricants at home either via their car or other types of domestic equipment (and where the most frequently reported type was garden machinery), although only 14% reported carrying out a form of activity where contact with the lubricant was likely to occur at least monthly. A significant majority of users (76%) reported that the amount of lubricant used on such occasions to be less than 1.5 litres.

These figures bring into question some of the basic considerations behind the REACH Technical Guidance (IR&CSA ChR15, 2012). For example, the core assumptions contained within the Guidance is that exposure to consumer products occurs daily for an extended period of time and that the magnitude of the exposure is a direct function of the amount of the product handled. While such assumptions are conservative, the findings of this survey demonstrate that for key uses of fuels and lubricants, they represent an extreme representation of reality. Tables A3.1 and A3.2 compare selected findings from the survey with the basic REACH assumptions and those values taken forward for incorporation into the associated SCED. The values within the SCED have been chosen to better reflect current European habits and practices, yet by applying the various 90th percentiles for frequency, amount of fuel purchased, product concentration and time spent refuelling the vehicle to the algorithms contained within the Guidance, the resulting exposure estimate is considered to remain suitably conservative.

**Table A3.1** Exposure determinants for consumers – vehicle re-fuelling

Parameter	ChR15	Average	90 <sup>th</sup> Percentile	Proposed SCED Value
Refuelling frequency	Once / day	3.1 times / month	5 times / month	Once /week
Refuelling amount	6.7 litres	30 litres	53 litres	50 litres
Concentration of substance in product	50%	Not surveyed		100%
Time spent at service station (incl. fuelling)	240 min	4 min	7 min	3 min

**Table A3.2** Exposure determinants for consumers – vehicle lubricant maintenance

Parameter	ChR15	Average	90 <sup>th</sup> Percentile	Proposed SCED Value
Topping up frequency	Once / day	Once / 5.7 months	Once / month	Once / month
Concentration of substance in product	50%	Not surveyed		100%
Top up amount	5.7 litres	0.7 litres	1.25 litres	1.0 litres

## 10. REFERENCES

1. CONCAWE (2006) Human exposure information for EU substance risk assessment of gas oils. Report No. 1/06. Brussels: CONCAWE
2. ECETOC (2007) Addendum to ECETOC Targeted Risk Assessment (TRA). Report No. 93. Technical Report No. 107. Brussels: European Centre for Ecotoxicology and Toxicology of Chemicals
3. ECETOC (2012) ECETOC Targeted Risk Assessment (TRA). Version3: Background and rationale for the improvements. Technical Report No. 114. Brussels: European Centre for Ecotoxicology and Toxicology of Chemicals
4. ECHA (2012) Guidance on information requirements and chemical safety assessment. Chapter R.15: Consumer exposure estimation. Version: 2.1. Helsinki: European Chemicals Agency
5. JRC (2013) Analysis of national travel statistics in Europe. OPTIMISM WP2: Harmonisation of national travel statistics in Europe. Report EUR 26054 EN. Seville: European Commission, Joint Research Centre

**APPENDIX ALBA SCIENCE STUDY 210919 : FINAL REPORT**



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## Study 210919 : Final Report

CONCAWE

Issued 29 Aug 2011



## STUDY DETAILS

STUDY NO	210919
SPONSOR STUDY NO	None
STUDY TITLE	Fuels and Lubricants Exposure Questionnaire Survey - Phase 1
STUDY DATES	01 March- 01 April 2011
CRO NAME	Alba Science Ltd.
PROJECT MANAGER	Marie Reynolds BSc (Hons) SCS Dip
CRO ADDRESS	Alba Science Ltd. 24 Broughton Street Edinburgh EH1 3RH United Kingdom
SPONSOR NAME	CONCAWE
SPONSOR CO-ORDINATOR	Gary Minsavage Arlean Rohde
SPONSOR ADDRESS	CONCAWE Boulevard du Souverain 165 B-1160 Brussels Belgium

## STUDY SUMMARY

<b>STUDY NO</b>	210919
<b>SPONSOR STUDY NO</b>	None
<b>STUDY TITLE</b>	Fuels and Lubricants Exposure Questionnaire Survey-Phase 1
<b>STUDY OBJECTIVES</b>	To assess exposure to Fuels and Lubricants in a panel of 250 panellists.
<b>STUDY DESIGN</b>	Answers to questionnaire
<b>STUDY POPULATION</b>	250 panellists to complete. Panellists will be both male and female and will be between the ages of 18 and 65
<b>DURATION</b>	One month
<b>EVALUATION CRITERIA</b>	Questionnaire Survey

## SIGNATURES

STUDY NO	210919
SPONSOR STUDY NO	None
STUDY TITLE	Fuels and Lubricants Exposure Questionnaire Survey- Phase 1

PROJECT MANAGER	Marie Reynolds BSc (Hons) SCS Dip
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SIGNED	_____	DATE	_____
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## DOCUMENT INFORMATION

VERSION	1.2
ISSUED DATE	29 Aug 2011
AUTHOR	Marie Reynolds
STATUS	Final

## REVISION HISTORY

VERSION	ISSUED DATE	REASON FOR ISSUE
1.2	29 Aug 2011	Amended to include revised Quantitative Variables Summary report. Amended to document change in project manager from Camilla Seddon to Marie Reynolds.
1.1	19 May 2011	Amended due to sponsor comments and issued as Final
1.0	31 Mar 2011	Issued for Review

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## 1 STUDY OBJECTIVE

The objective of the study was to evaluate, in a randomly selected panel of 250 people, the habits and practices of consumers as they relate to the use of fuels and lubricants. Where the panellists are routinely exposed to one, or both, products, the frequency and circumstances of the exposure was assessed and recorded via the survey.

## 2 STUDY METHOD

### Study Protocol

The study was performed in accordance with Alba Science Ltd. Study Protocol 210919.

A copy of the Study Protocol is included in Appendix A.

### Design Description

The panellists were recruited remotely and were asked to complete an online screening survey and consent form.

250 panellists were selected in accordance with the screening criteria to represent a broad demographic in accordance with the inclusion criteria. Panellists were given a set period of time to complete the online questionnaire. The ensuing data was collected and is reported in this document.

### Primary Endpoints

The primary endpoint for analysis was the questionnaire data.

### Secondary Endpoints

There were no secondary endpoints for analysis on this study.

## 3 TEST MATERIALS

No test materials were required on this study.

## 4 LOCATION

The study was managed at the premises of Alba Science Ltd., 24 Broughton Street, Edinburgh, EH1 3RH, United Kingdom. Subjects on the study completed the online questionnaire at home.

## 5 TIMING

The study was completed by panellists and the results were collected between 01 Mar 2011 and 31 Mar 2011.

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## 6 STUDY SUMMARY

Subjects were recruited in accordance with the inclusion criteria. The questionnaire was emailed to them to complete at home. Results were collected and reported on.

## 7 SUBJECT PARTICIPATION

### Panellist Recruitment

250 panellists were recruited to take part in the survey. The aim was to recruit a group of panellists who represented an authentically broad socio-demographic type, in accordance with the above inclusion criteria below.

### Inclusion Criteria

The following Inclusion Criteria were used during subject screening and recruitment:

- Male and Female
- Aged 18 to 65
- Computer literate / access to internet
- Car owners or drivers

### Exclusion Criteria

The following Exclusion Criteria were used during subject screening and recruitment:

- Those who fall outside the required age group.
- Non car owners or drivers.
- Those without access to the internet.

## 8 RANDOMISATION

No randomisation was required for this study.

## 9 MEASURING EQUIPMENT

No special measuring equipment was required for this study.

## 10 ENVIRONMENTAL CONDITIONS

There were no environmental requirements.

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## 11 DATA COLLECTION AND PROCESSING

### Recorded Data

The following data was recorded during the study.

- Questionnaire data

### Recording Methods

Data collected during the study was recorded directly to a computerised Data Management System.

### Data Storage

All data collected related to the study was stored in a computerised Data Management System.

### Data Processing

For data processing, a computer system produced the processed data for the study. A Data Analysis Report was generated containing both raw and processed data, together with other information gathered throughout the study.

### Data Provision

Data was provided to the Sponsor as part of the Final report, together with appropriate presentation of the results.

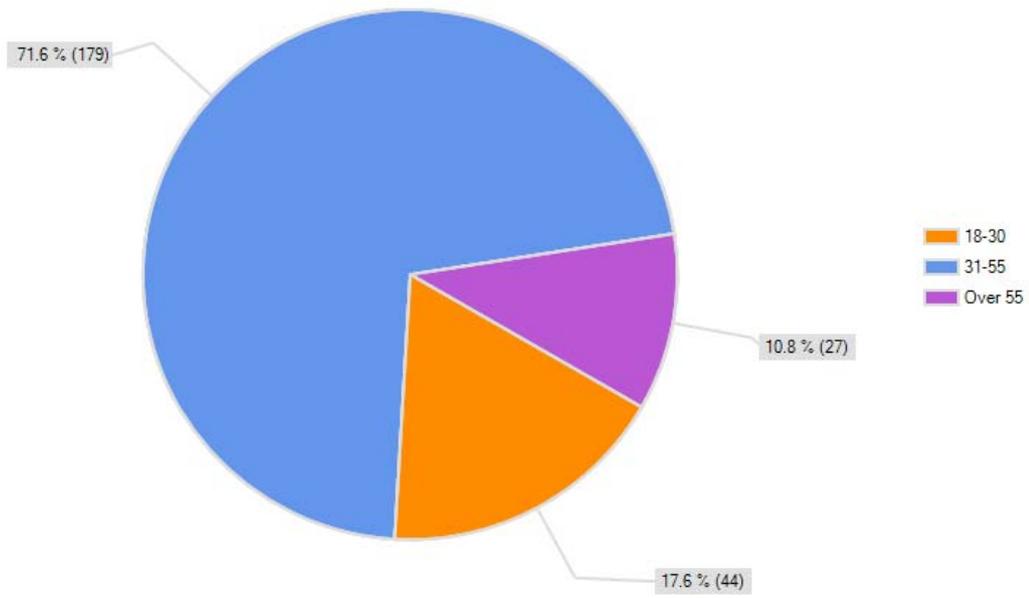
## 12 STUDY RESULTS

The results of the study follow on the next page. Questions 1-3 were administrative and are therefore not reported. Textual responses can be found in the Data Analysis Report in Appendix B.

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**Question 4**

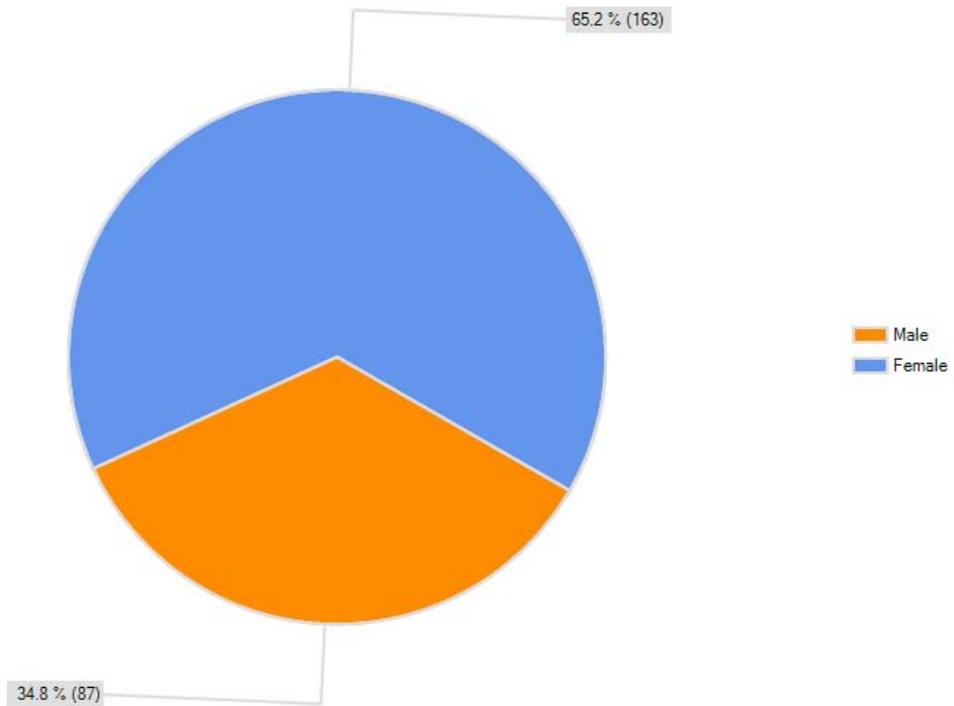
Please tell us your age.



Response Options	Response Percent	Response Count
18-30	17.6%	44
31-55	71.6%	179
Over 55	10.8%	27

Question 5

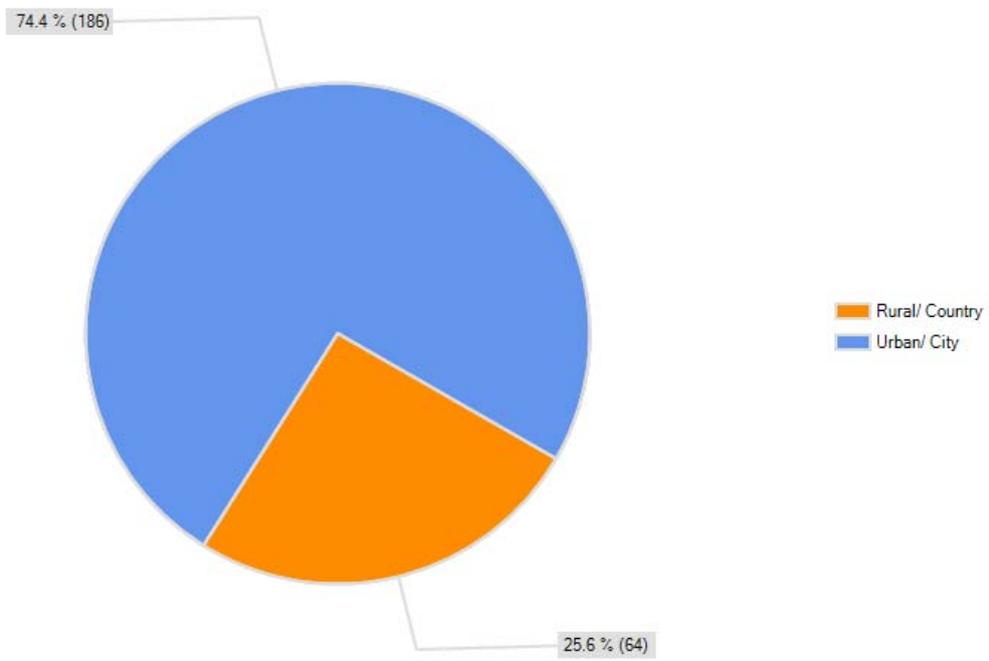
Please indicate your sex below.



Response Options	Response Percent	Response Count
Male	34.8%	87
Female	65.2%	163

**Question 6**

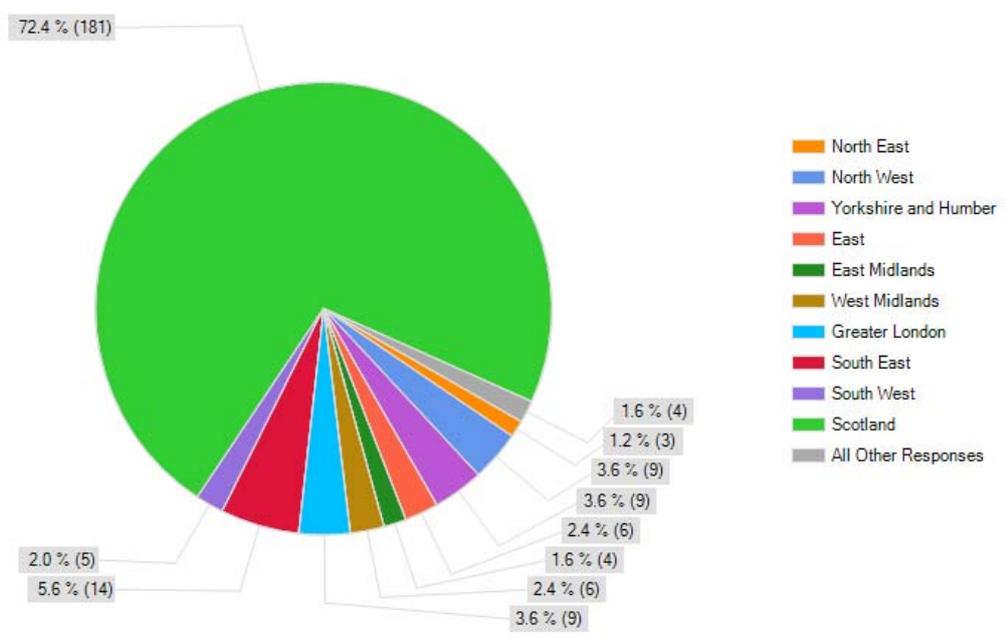
Please tick the box below which best describes the environment in which you live.



Response Options	Response Percent	Response Count
Rural/ Country	25.6%	64
Urban/ City	74.4%	186

**Question 7**

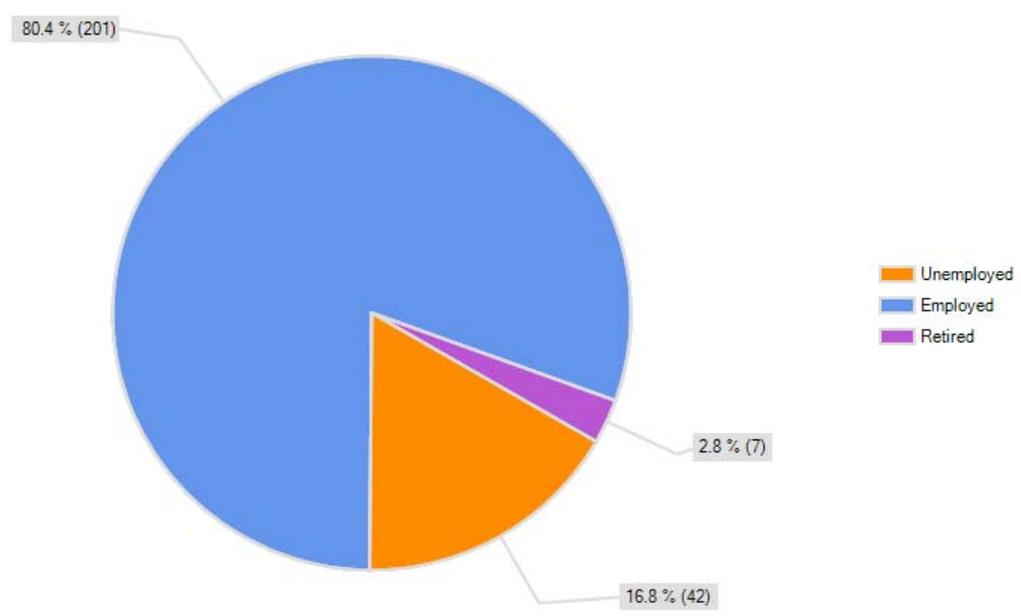
Please tell us which UK region you live in.



Response Options	Response Percent	Response Count
North East	1.2%	3
North West	3.6%	9
Yorkshire and Humber	3.6%	9
East	2.4%	6
East Midlands	1.6%	4
West Midlands	2.4%	6
Greater London	3.6%	9
South East	5.6%	14
South West	2.0%	5
Scotland	72.4%	181
Wales	1.2%	3
Northern Ireland	0.4%	1

**Question 8**

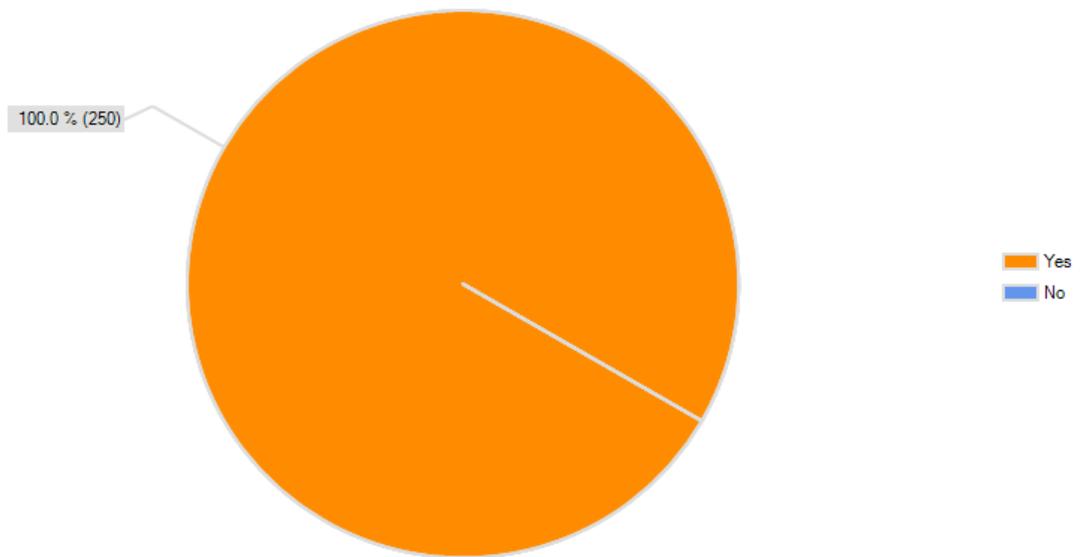
Please indicate which of the following best describes your employment status.



Response Options	Response Percent	Response Count
Unemployed	16.8%	42
Employed	80.4%	201
Retired	2.8%	7

Question 9

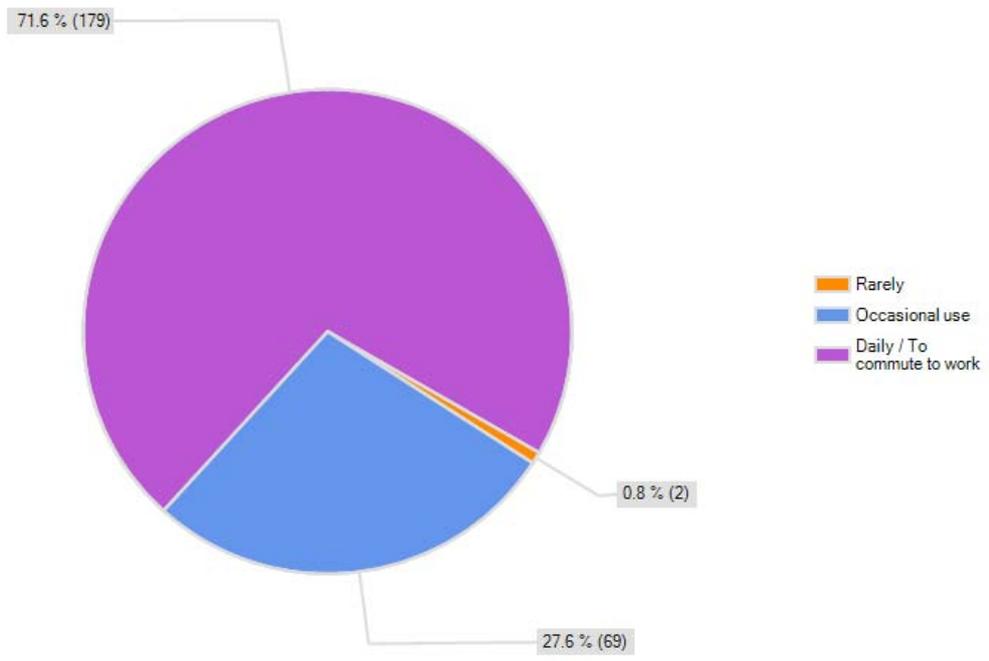
Do you own or regularly drive a car or another type of vehicle?



Response Options	Response Percent	Response Count
Yes	100.0%	250
No	0.0%	0

**Question 10**

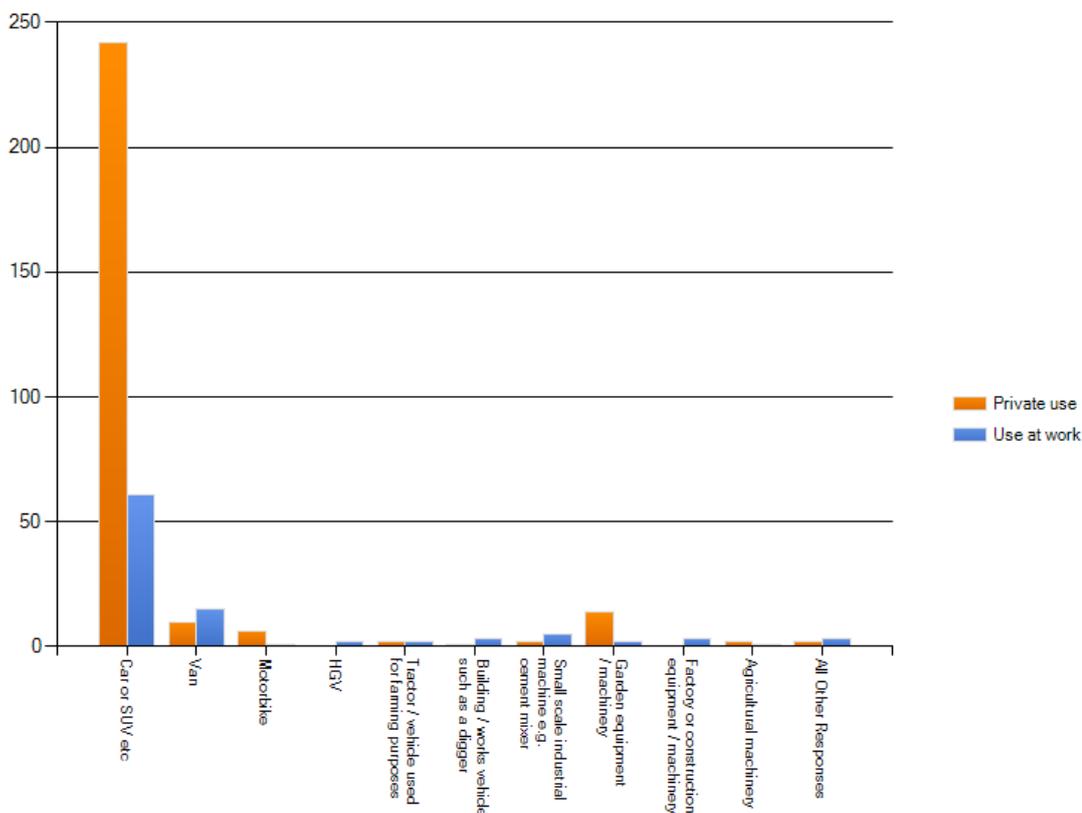
Typically, how many times per week will you use your car or vehicle?



Response Options	Response Percent	Response Count
Rarely	0.8%	2
Occasional use	27.6%	69
Daily / To commute to work	71.6%	179

**Question 11**

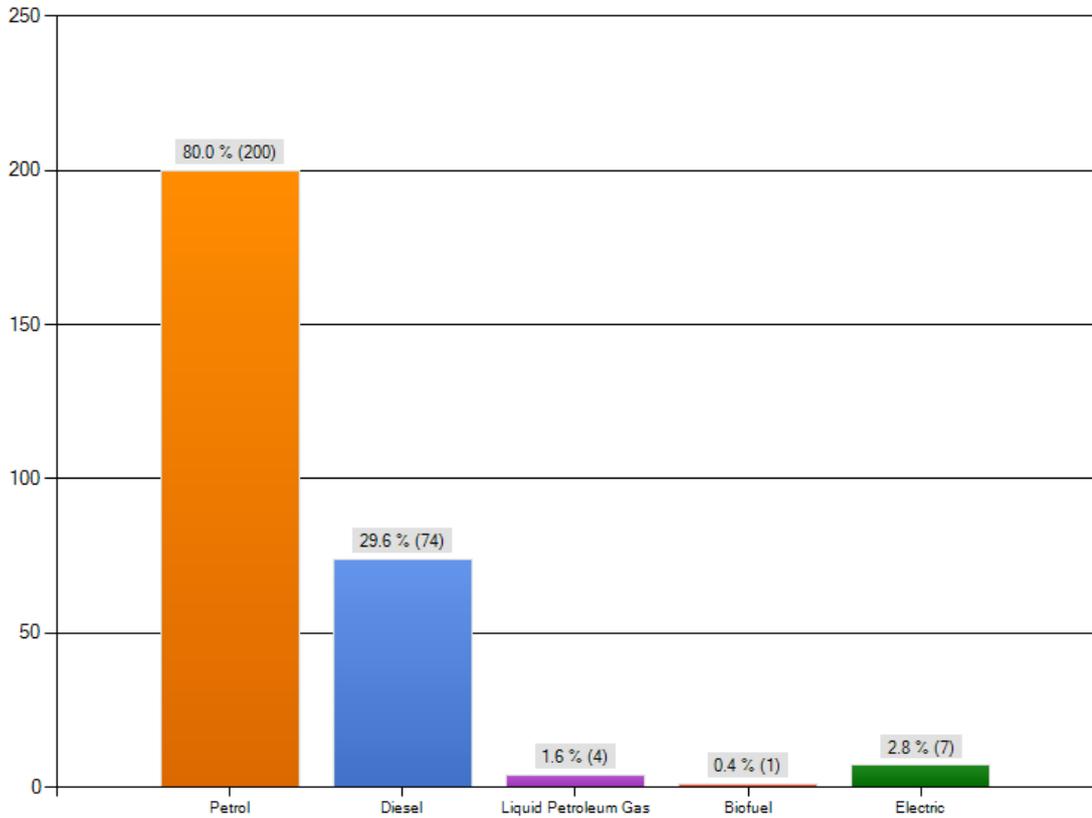
Please indicate the type(s) of vehicle you drive or operate and the circumstances of their use. (You can tick more than one box per vehicle type if this applies).



Response Options	Private Use	Use at Work	Response Count
Car or SUV etc	242	61	246
Van	10	15	22
Motorbike	6	1	7
HGV	0	2	2
Tractor / vehicle used for farming purposes	2	2	4
Building / works vehicle such as a digger	1	3	4
Small scale industrial machine e.g. cement mixer	2	5	7
Garden equipment / machinery	14	2	15
Factory or construction equipment / machinery	0	3	3
Agricultural machinery	2	1	3
Bus or coach	2	3	5
Others (please specify)			6

Question 12

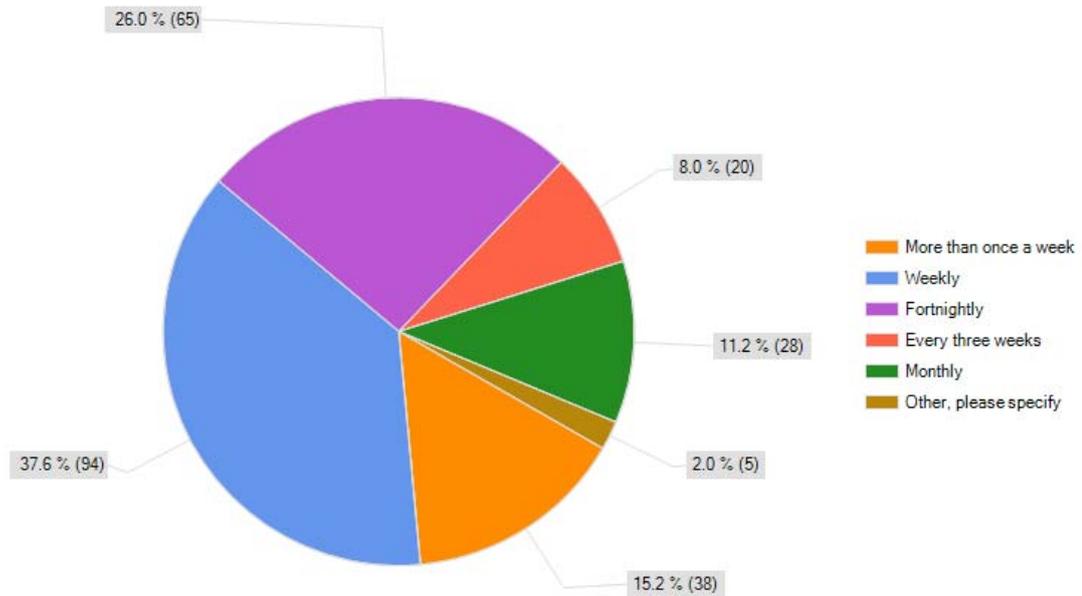
Please tell us how the vehicle(s) is / are powered.



Response Options	Response Percent	Response Count
Petrol	80.0%	200
Diesel	29.6%	74
Liquid Petroleum Gas	1.6%	4
Biofuel	0.4%	1
Electric	2.8%	7
If you have selected more than one fuel type (and are therefore operating more than one of the above vehicles), please state which vehicle is powered by which fuel in the box below e.g. 'Car- petrol. Lorry- diesel'		19

**Question 13**

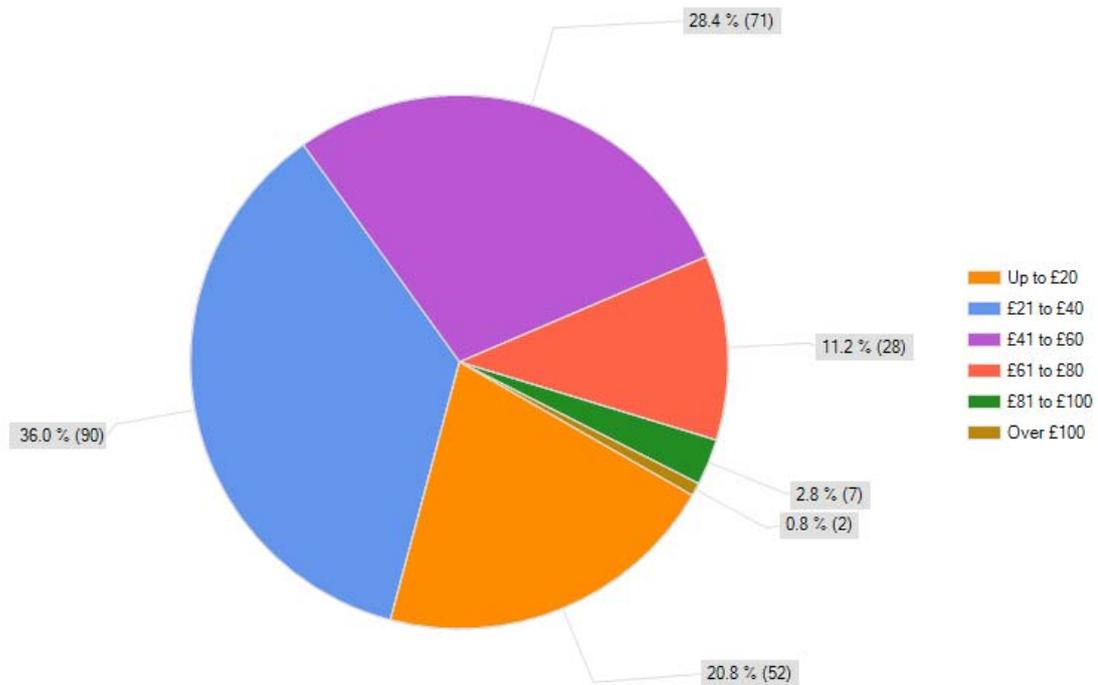
Typically, how many times do you visit the filling station in one month?



Response Options	Response Percent	Response Count
More than once a week	15.2%	38
Weekly	37.6%	94
Fortnightly	26.0%	65
Every three weeks	8.0%	20
Monthly	11.2%	28
Other, please specify	2.0%	5

**Question 14**

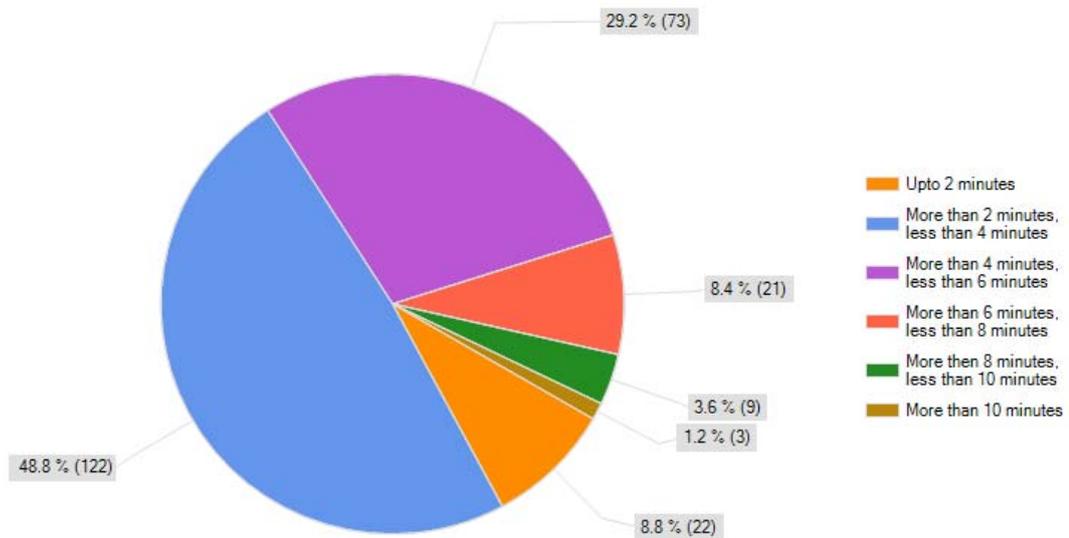
Please can you indicate how much you typically spend on fuel each time you visit the filling station.



Response Options	Response Percent	Response Count
Up to £20	20.8%	52
£21 to £40	36.0%	90
£41 to £60	28.4%	71
£61 to £80	11.2%	28
£81 to £100	2.8%	7
Over £100	0.8%	2

**Question 15**

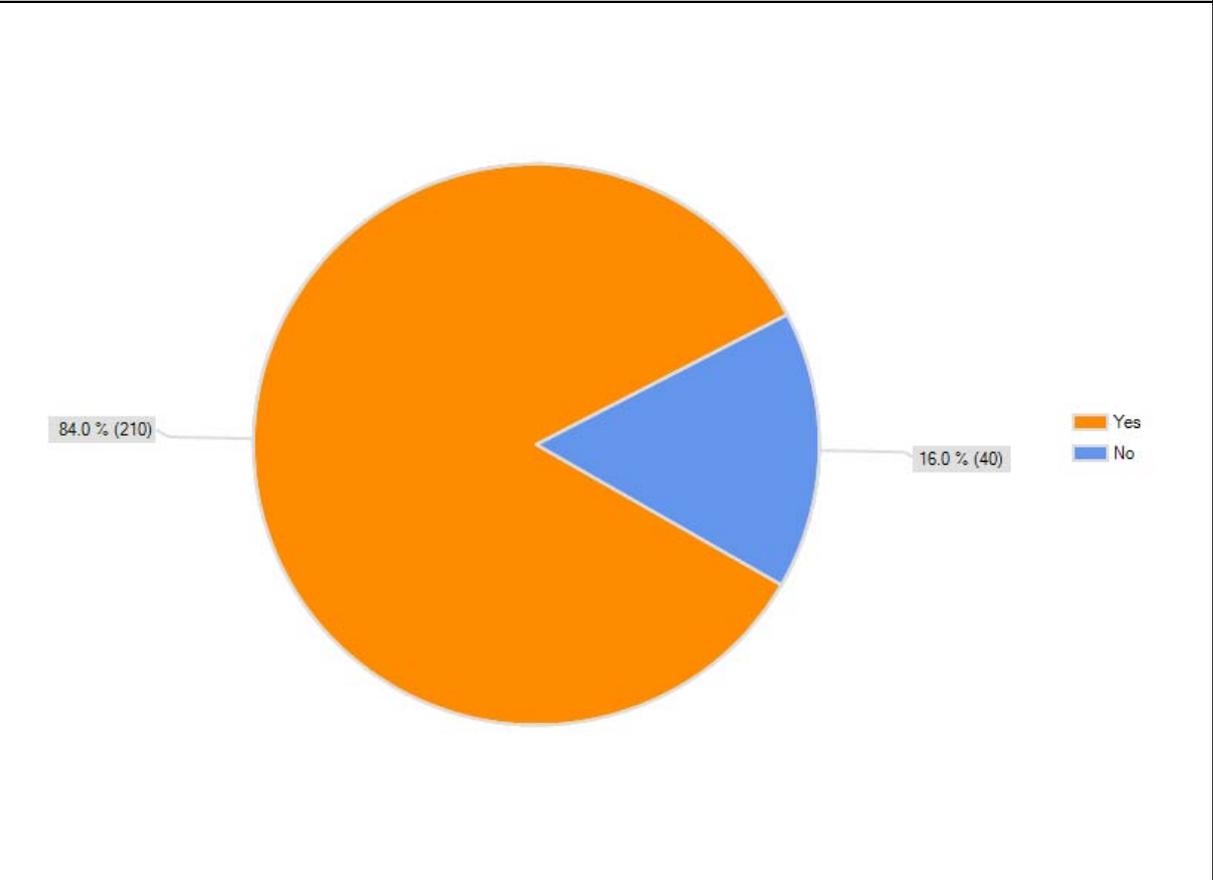
On average, can you estimate how much time you spend actually at the pump refilling your vehicle when you are at the filling station?



Response Options	Response Percent	Response Count
Upto 2 minutes	8.8%	22
More than 2 minutes, less than 4 minutes	48.8%	122
More than 4 minutes, less than 6 minutes	29.2%	73
More than 6 minutes, less than 8 minutes	8.4%	21
More than 8 minutes, less than 10 minutes	3.6%	9
More than 10 minutes	1.2%	3

**Question 16**

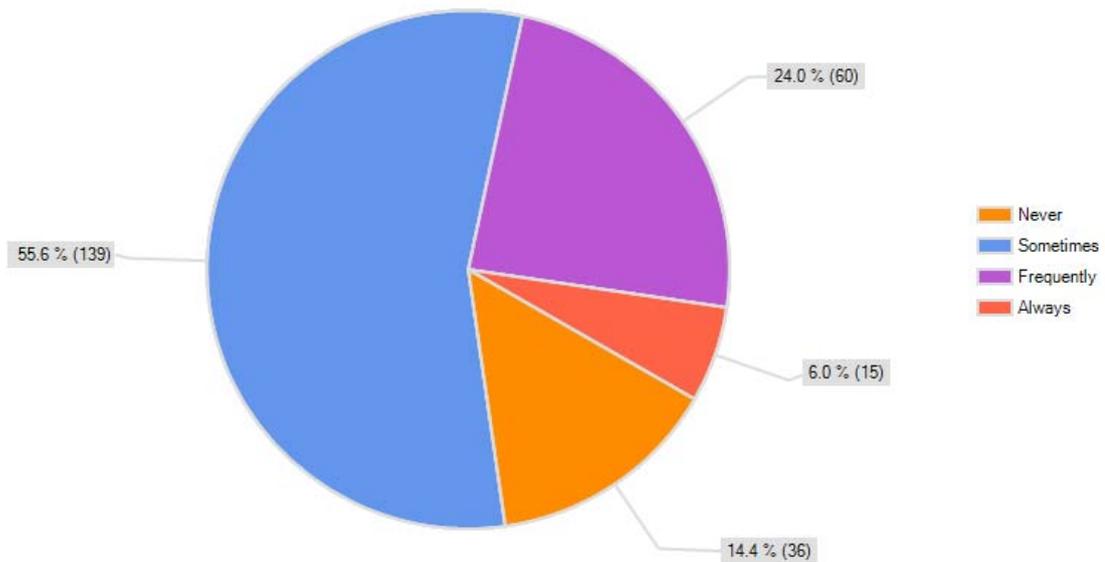
Are you aware that disposable gloves are provided at the pumps?



Response Options	Response Percent	Response Count
Yes	84.0%	210
No	16.0%	40

Question 17

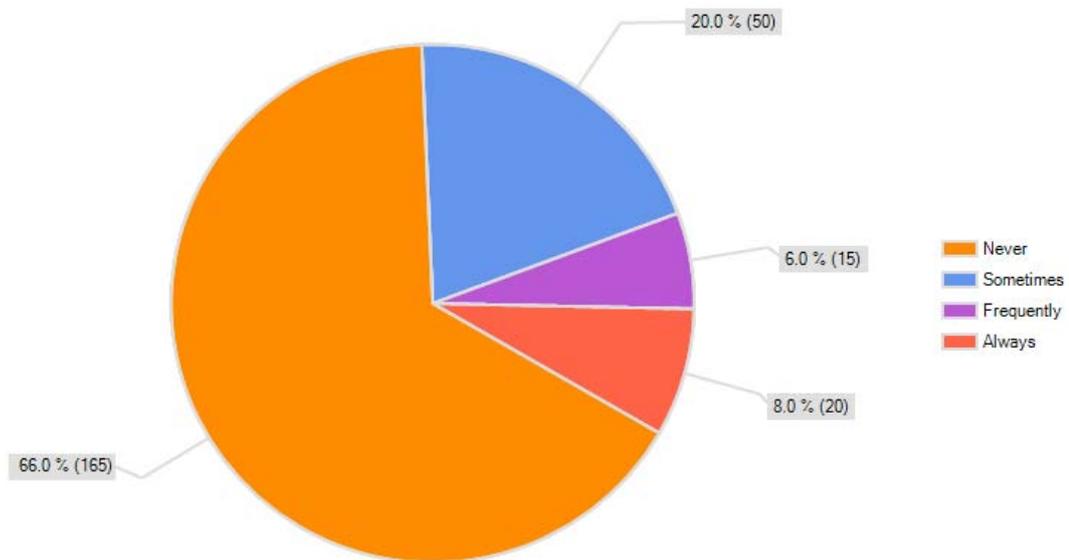
How often would you say they are available at the pumps?



Response Options	Response Percent	Response Count
Never	14.4%	36
Sometimes	55.6%	139
Frequently	24.0%	60
Always	6.0%	15

**Question 18**

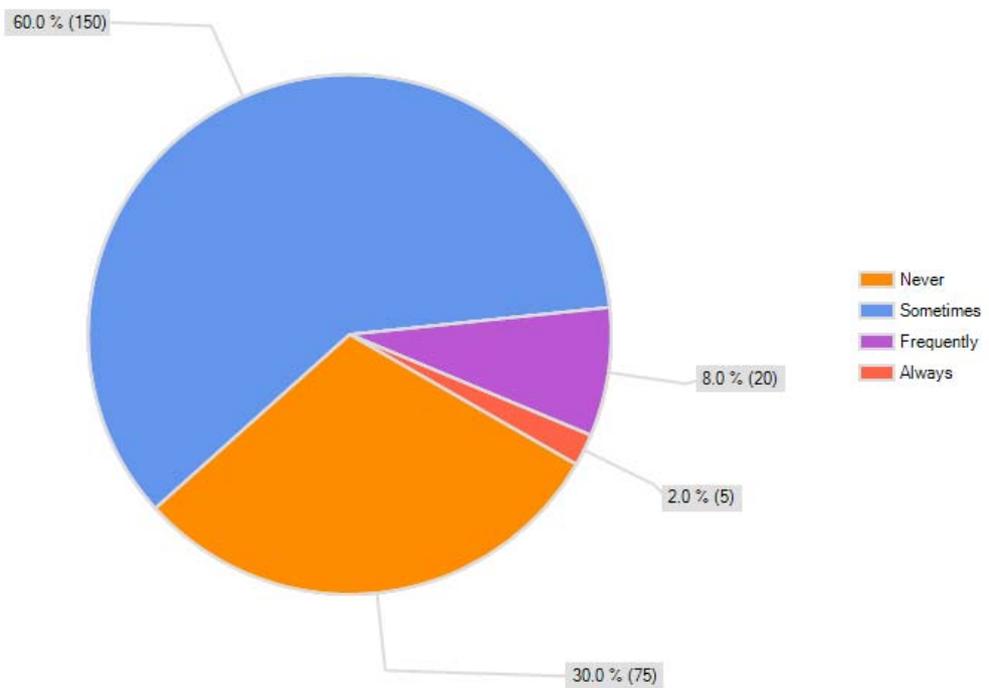
If and when the disposable gloves are available, how often do you use them?



Response Options	Response Percent	Response Count
Never	66.0%	165
Sometimes	20.0%	50
Frequently	6.0%	15
Always	8.0%	20

**Question 19**

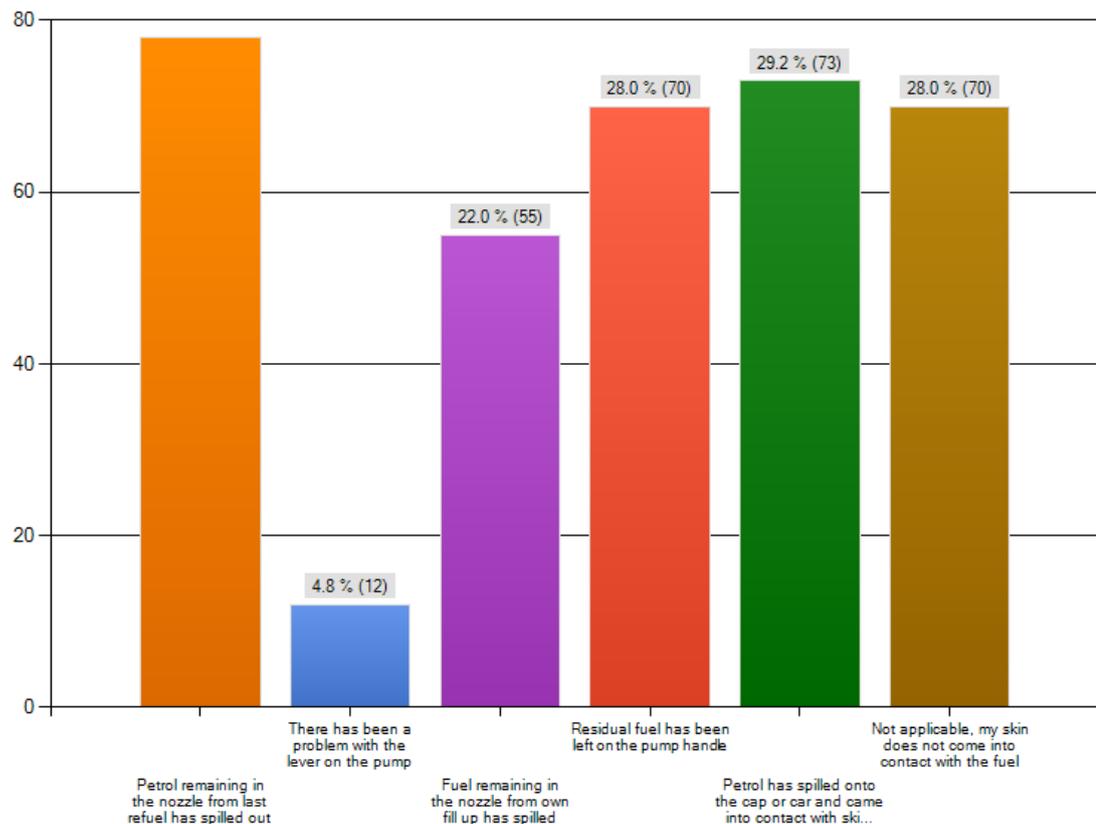
When filling your vehicle, are you ever aware of any occasion(s) where your skin has come into contact with liquid fuel?



Response Options	Response Percent	Response Count
Never	30.0%	75
Sometimes	60.0%	150
Frequently	8.0%	20
Always	2.0%	5

**Question 20**

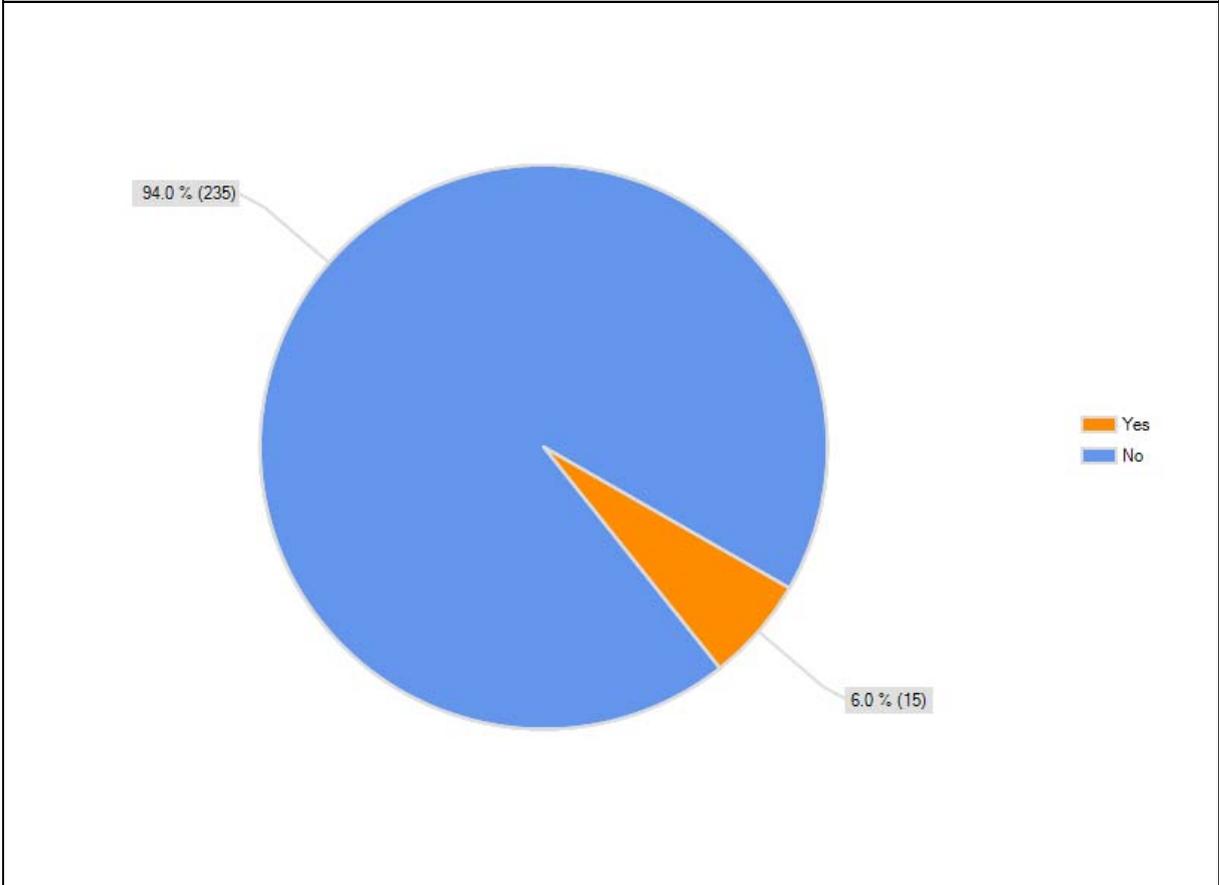
If you have come into contact with the liquid fuel while filling up, how has this happened?



Response Options	Response Percent	Response Count
Petrol remaining in the nozzle from last refuel has spilled out	31.2%	78
There has been a problem with the lever on the pump	4.8%	12
Fuel remaining in the nozzle from own fill up has spilled	22.0%	55
Residual fuel has been left on the pump handle	28.0%	70
Petrol has spilled onto the cap or car and came into contact with skin when closing after refilling	29.2%	73
Not applicable, my skin does not come into contact with the fuel	28.0%	70
Other (Please specify)		2

**Question 21**

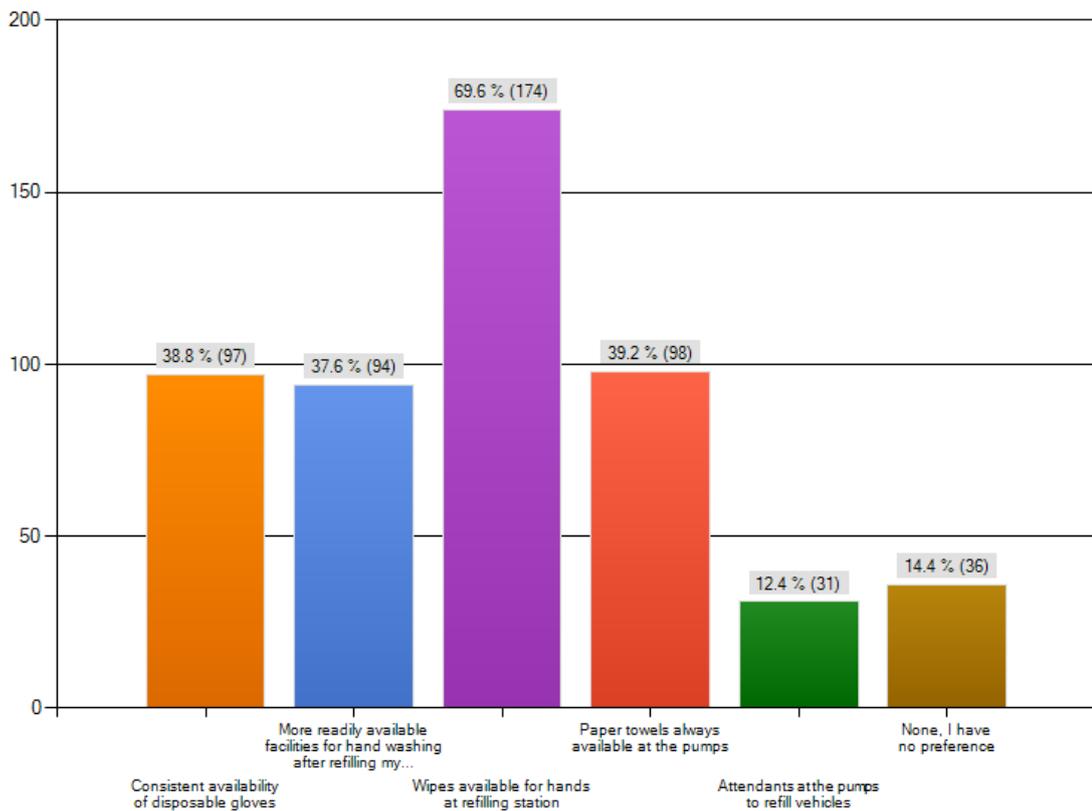
When filling up, is there ever an attendant to assist with this?



Response Options	Response Percent	Response Count
Yes	6.0%	15
No	94.0%	235

**Question 22**

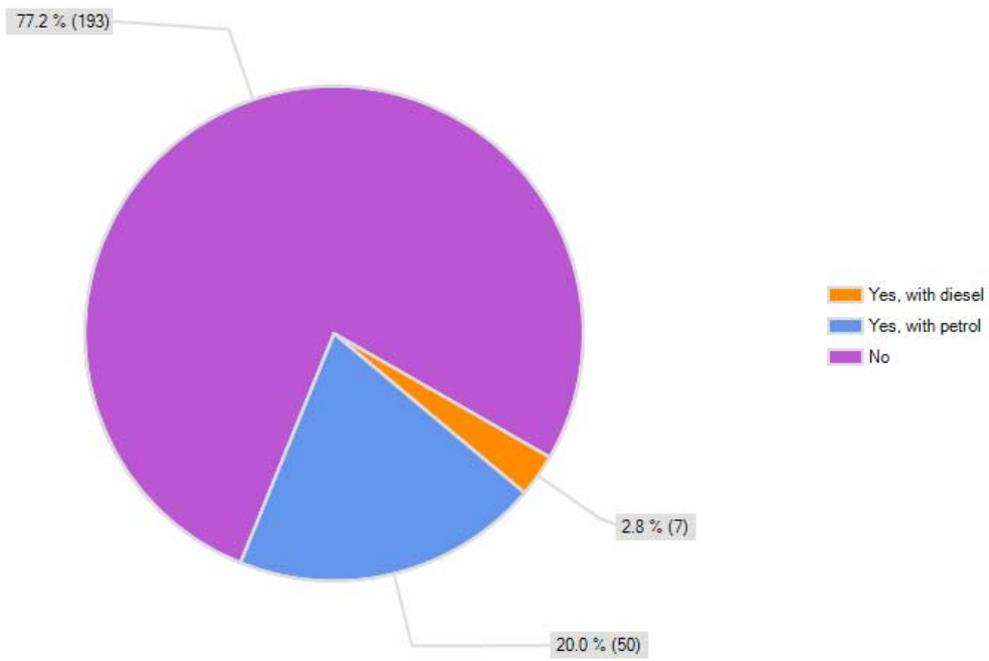
Are there any additional measures that you would like to see taken at refilling stations to help to prevent your skin from coming into contact with the liquid fuels?



Response Options	Response Percent	Response Count
Consistent availability of disposable gloves	38.8%	97
More readily available facilities for hand washing after refilling my vehicle	37.6%	94
Wipes available for hands at refilling station	69.6%	174
Paper towels always available at the pumps	39.2%	98
Attendants at the pumps to refill vehicles	12.4%	31
None, I have no preference	14.4%	36

**Question 23**

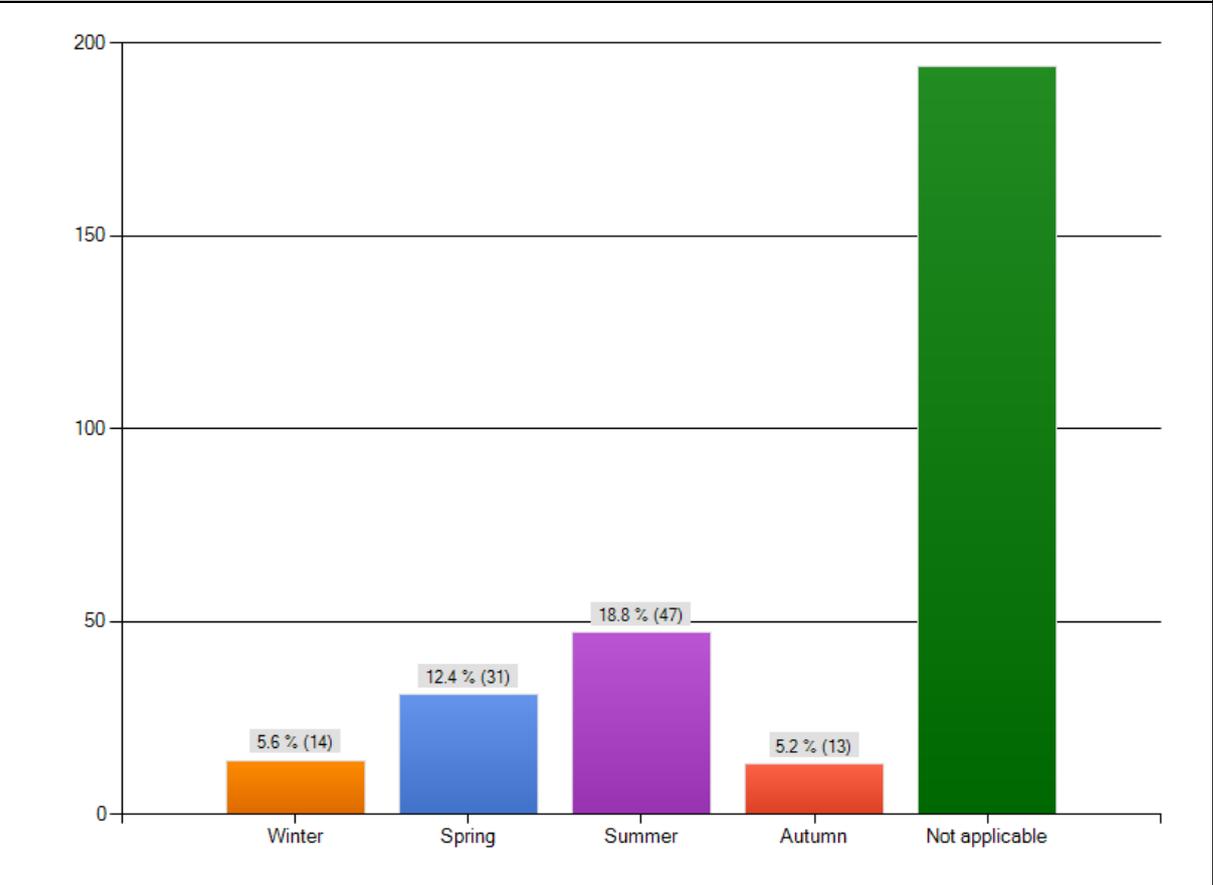
Do you ever fill up a fuel container to refill machinery at home?



Response Options	Response Percent	Response Count
Yes, with diesel	2.8%	7
Yes, with petrol	20.0%	50
No	77.2%	193

**Question 24**

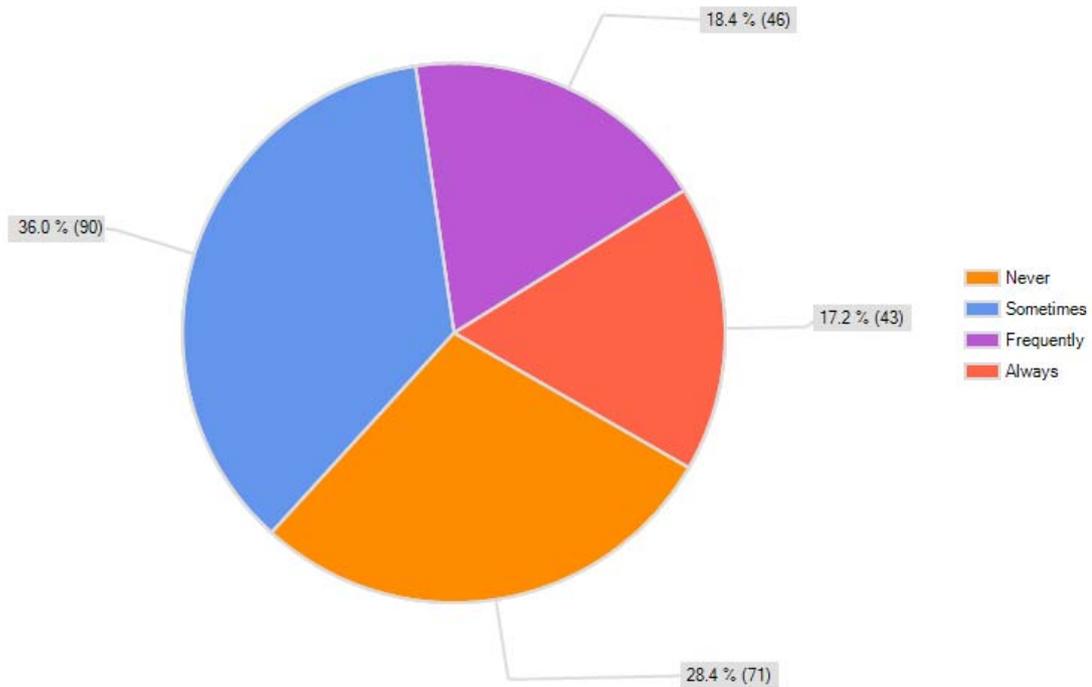
If so, when do you tend to do this?



Response Options	Response Percent	Response Count
Winter	5.6%	14
Spring	12.4%	31
Summer	18.8%	47
Autumn	5.2%	13
Not applicable	77.6%	194

**Question 25**

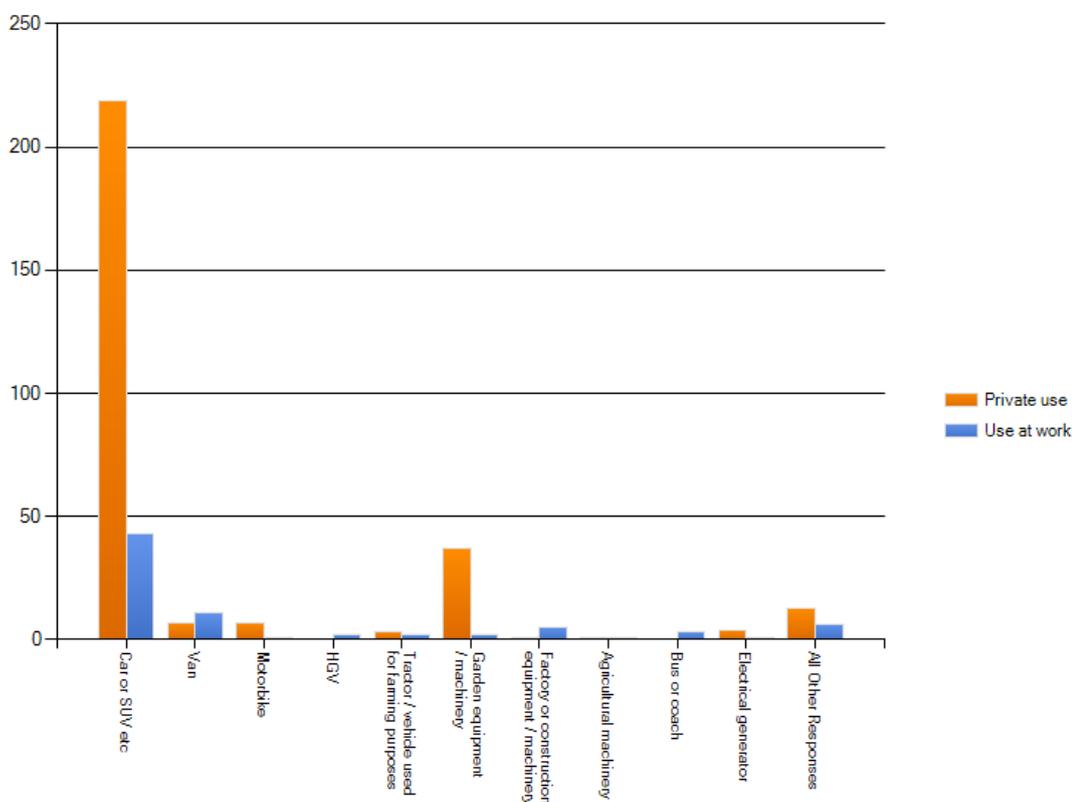
Please indicate how often you operate a vehicle or other equipment that requires any type of lubricant or oil. (This could be motor vehicle lubricant such as Castrol or Duckhams, or 2 stroke oils and other specialist lubricants for use in scooters, powered leisure equipment and garden machinery etc.).



Response Options	Response Percent	Response Count
Never	28.4%	71
Sometimes	36.0%	90
Frequently	18.4%	46
Always	17.2%	43

**Question 26**

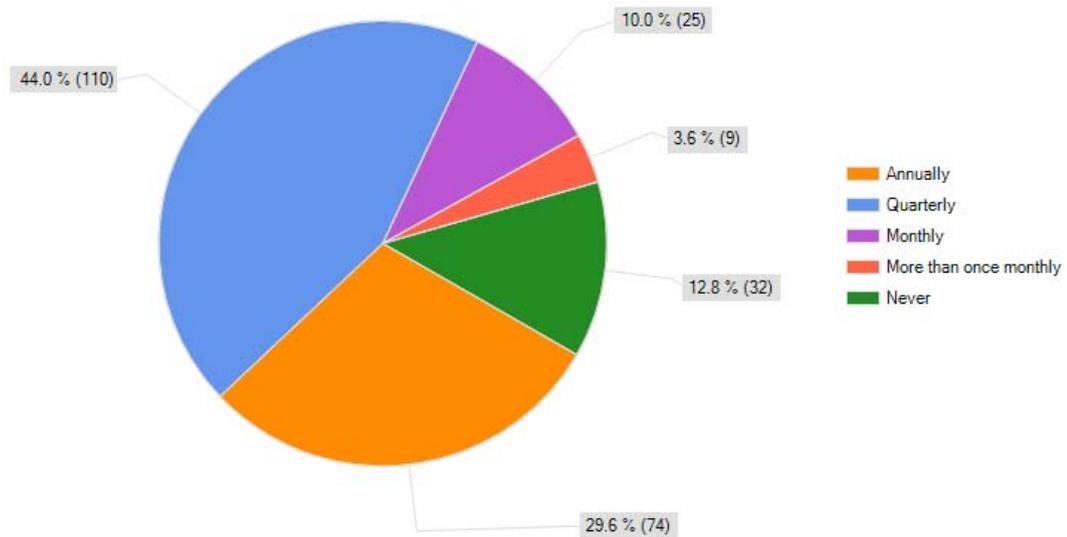
Please indicate which vehicle(s) you drive or operate which you also check or top up the oil levels for. Please tick in the column which indicates the circumstances of their use.



Response Options	Private Use	Use at Work	Response Count
Car or SUV etc	219	43	221
Van	7	11	15
Motorbike	7	1	8
HGV	0	2	2
Tractor / vehicle used for farming purposes	3	2	5
Garden equipment / machinery	37	2	38
Factory or construction equipment / machinery	1	5	6
Agricultural machinery	1	1	2
Bus or coach	0	3	3
Electrical generator	4	1	5
I do not check or top up the oil levels for any type of vehicle or machine	13	6	16
Other (please specify)			8

**Question 27**

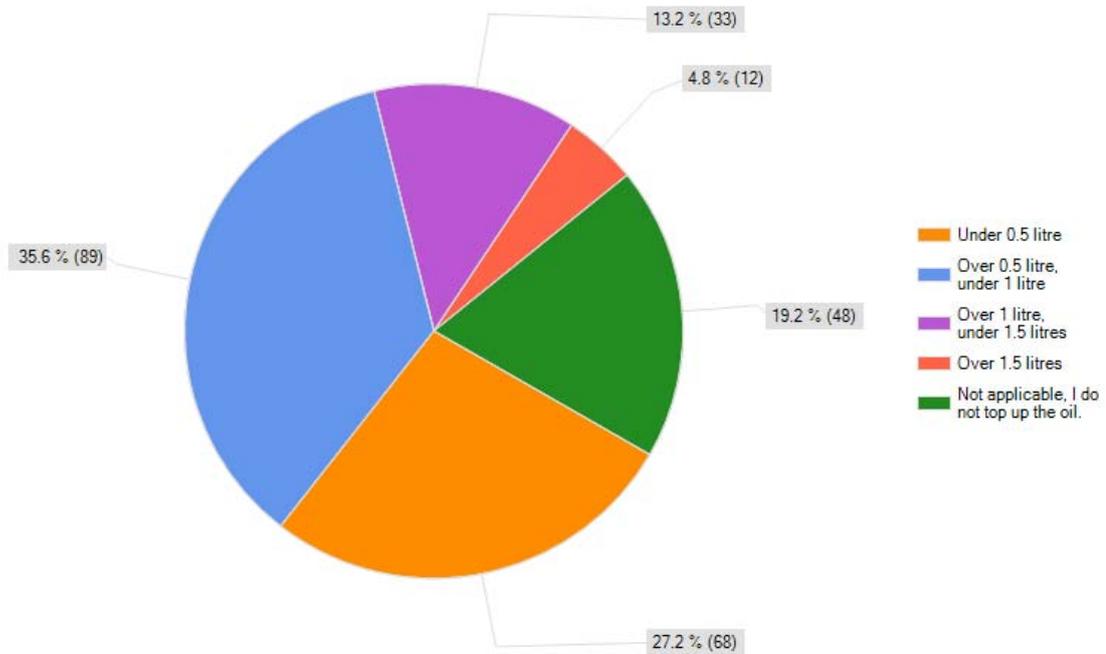
Please indicate approximately how frequently you top up oil in any vehicle you drive or operate.



Response Options	Response Percent	Response Count
Annually	29.6%	74
Quarterly	44.0%	110
Monthly	10.0%	25
More than once monthly	3.6%	9
Never	12.8%	32

Question 28

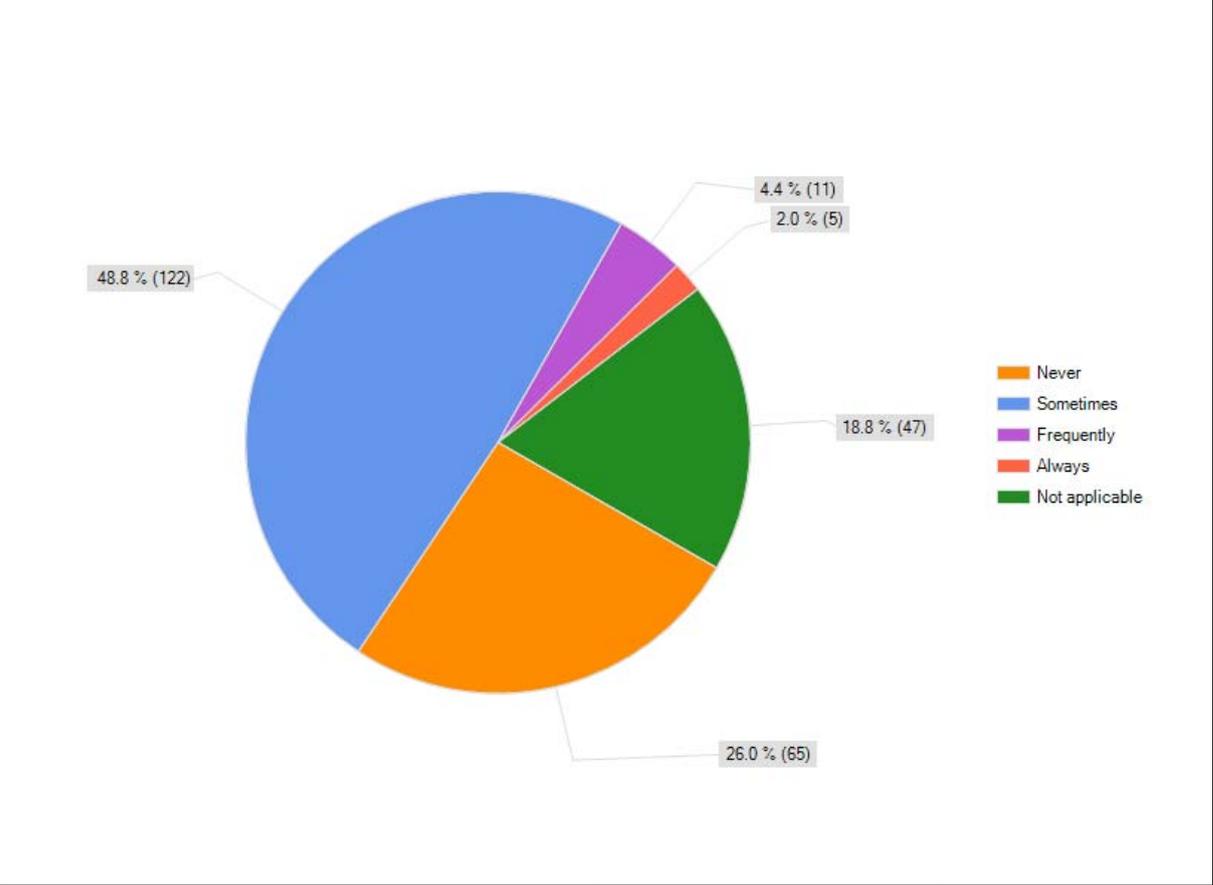
Depending on the regularity of your oil checks, is there a certain amount you tend to top up by?



Response Options	Response Percent	Response Count
Under 0.5 litre	27.2%	68
Over 0.5 litre, under 1 litre	35.6%	89
Over 1 litre, under 1.5 litres	13.2%	33
Over 1.5 litres	4.8%	12
Not applicable, I do not top up the oil.	19.2%	48

**Question 29**

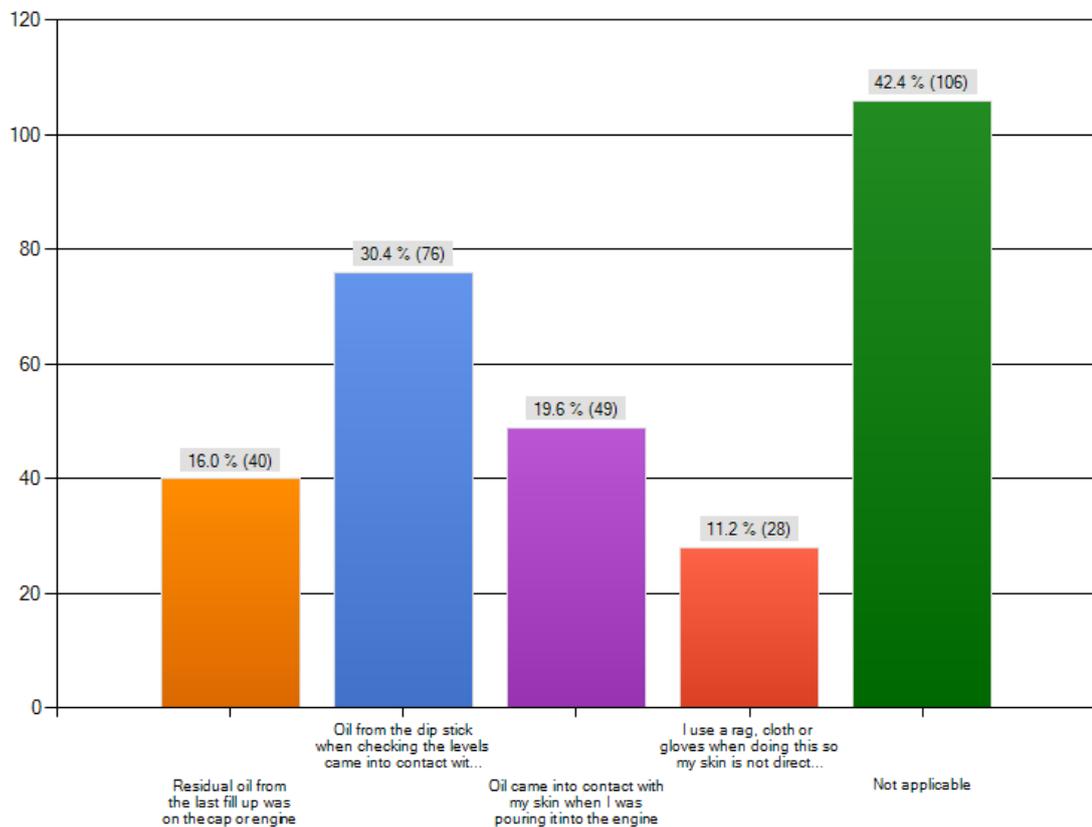
When topping up the oil in a vehicle, are you aware of any occasion where skin has come into contact with the oil.



Response Options	Response Percent	Response Count
Never	26.0%	65
Sometimes	48.8%	122
Frequently	4.4%	11
Always	2.0%	5
Not applicable	18.8%	47

**Question 30**

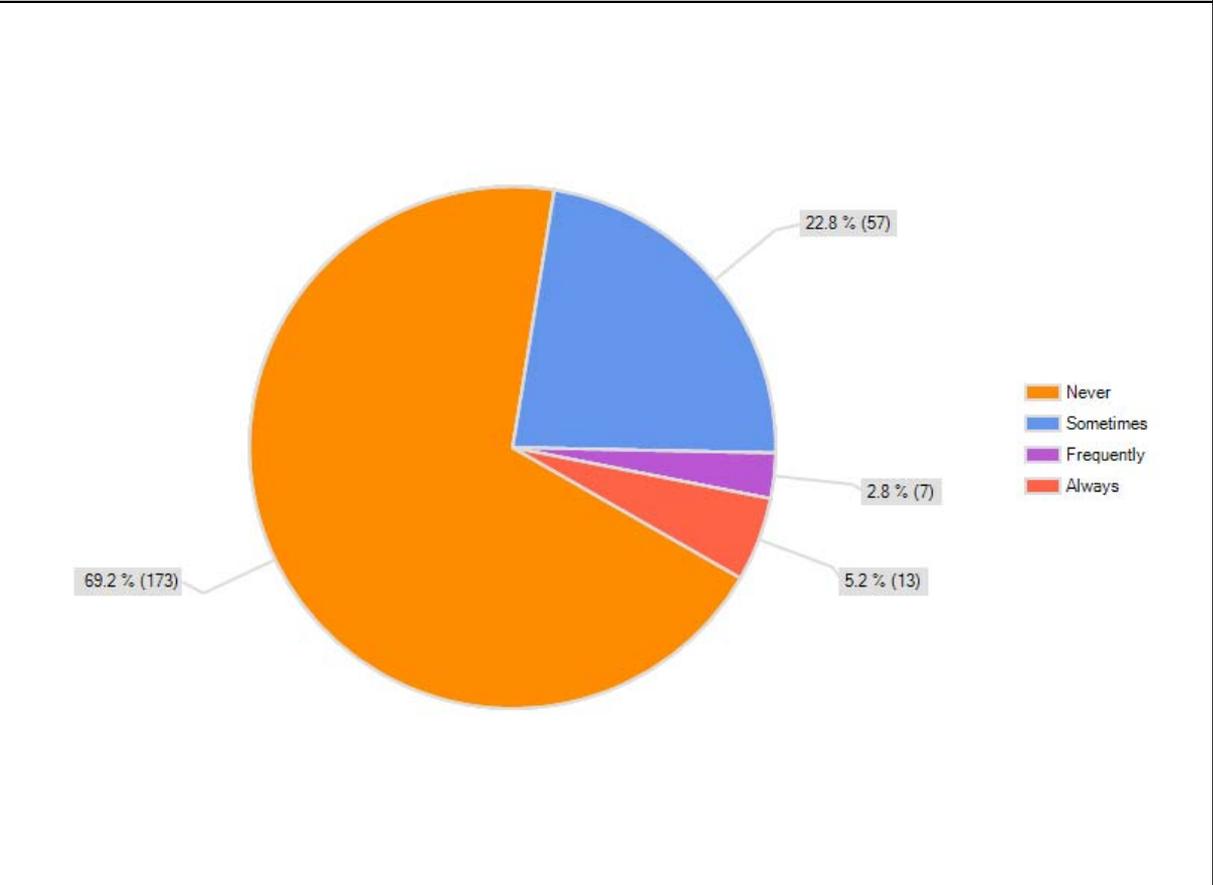
If you have found that your skin has come into contact with the oil when topping up, please say how this happened.



Response Options	Response Percent	Response Count
Residual oil from the last fill up was on the cap or engine	16.0%	40
Oil from the dip stick when checking the levels came into contact with my skin	30.4%	76
Oil came into contact with my skin when I was pouring it into the engine	19.6%	49
I use a rag, cloth or gloves when doing this so my skin is not directly exposed	11.2%	28
Not applicable	42.4%	106
Other (please specify)		3

**Question 31**

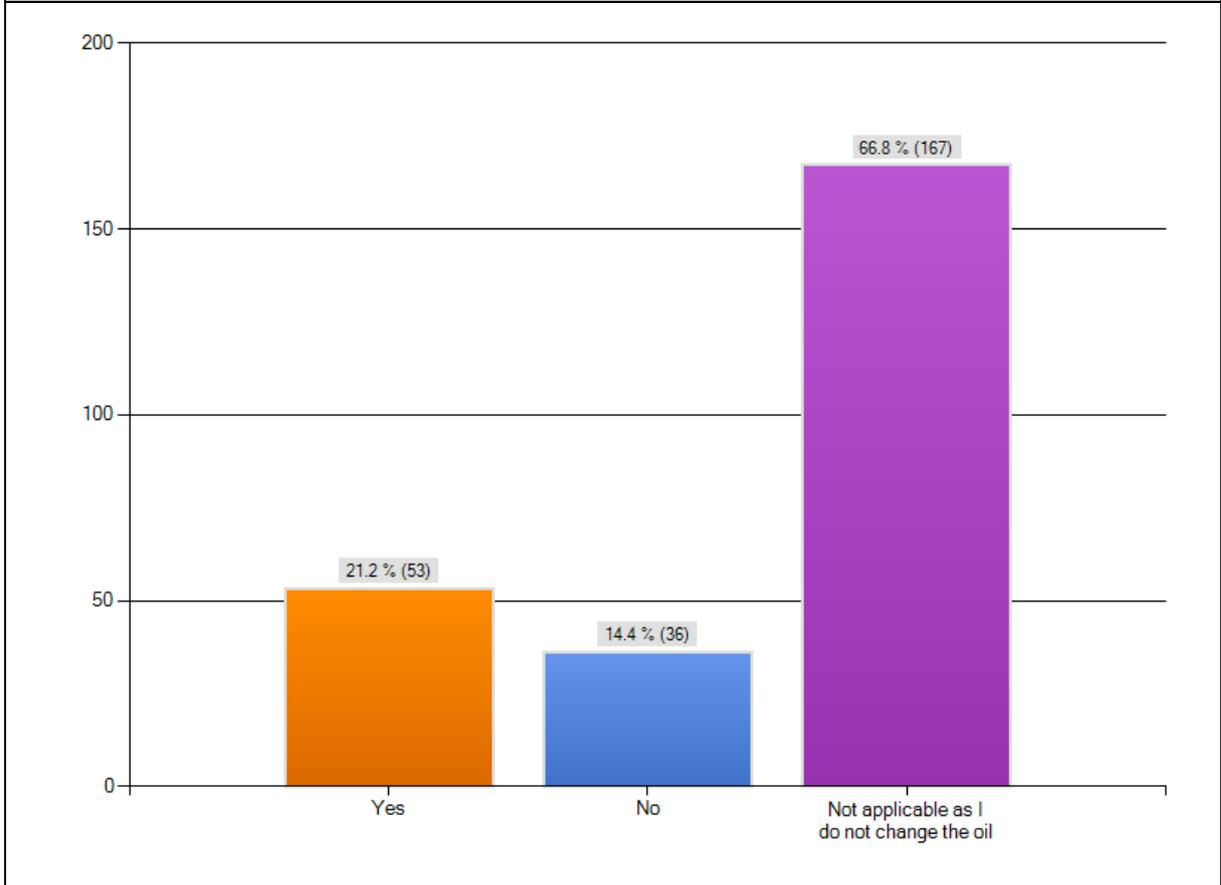
Do you ever change the oil in a vehicle that you drive or operate?



Response Options	Response Percent	Response Count
Never	69.2%	173
Sometimes	22.8%	57
Frequently	2.8%	7
Always	5.2%	13

**Question 32**

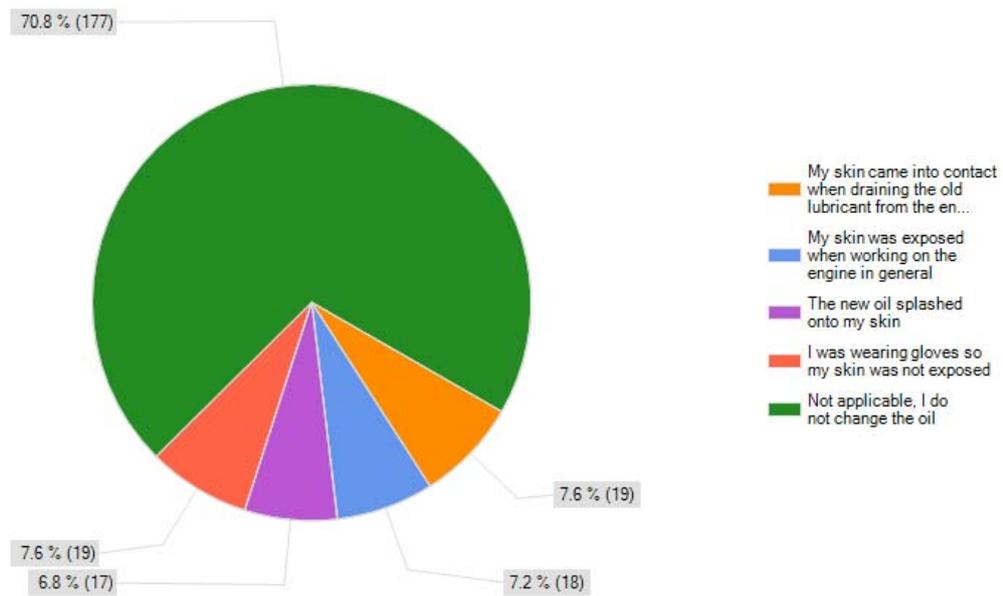
If you are changing the oil in your vehicle, has your skin come into contact with it?



Response Options	Response Percent	Response Count
Yes	21.2%	53
No	14.4%	36
Not applicable as I do not change the oil	66.8%	167

**Question 33**

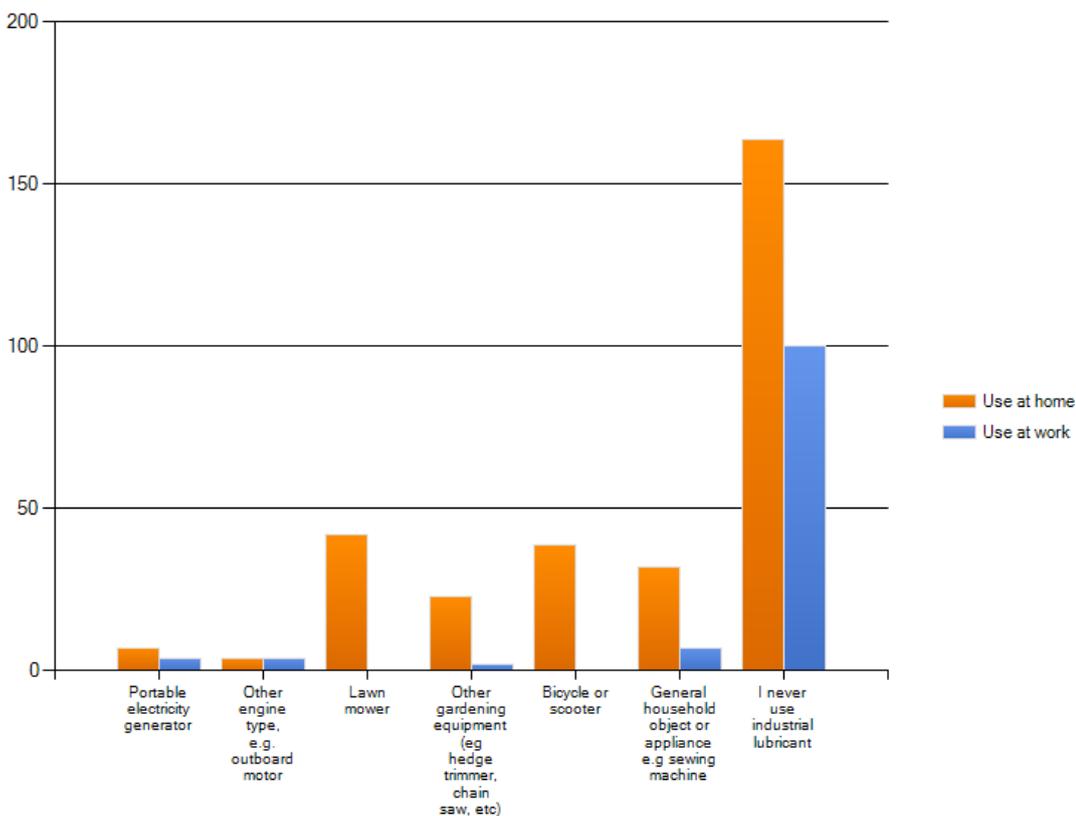
When changing the oil in the vehicle, please choose the most appropriate description for your exposure below



Response Options	Response Percent	Response Count
My skin came into contact when draining the old lubricant from the engine	7.6%	19
My skin was exposed when working on the engine in general	7.2%	18
The new oil splashed onto my skin	6.8%	17
I was wearing gloves so my skin was not exposed	7.6%	19
Not applicable, I do not change the oil	70.8%	177

**Question 34**

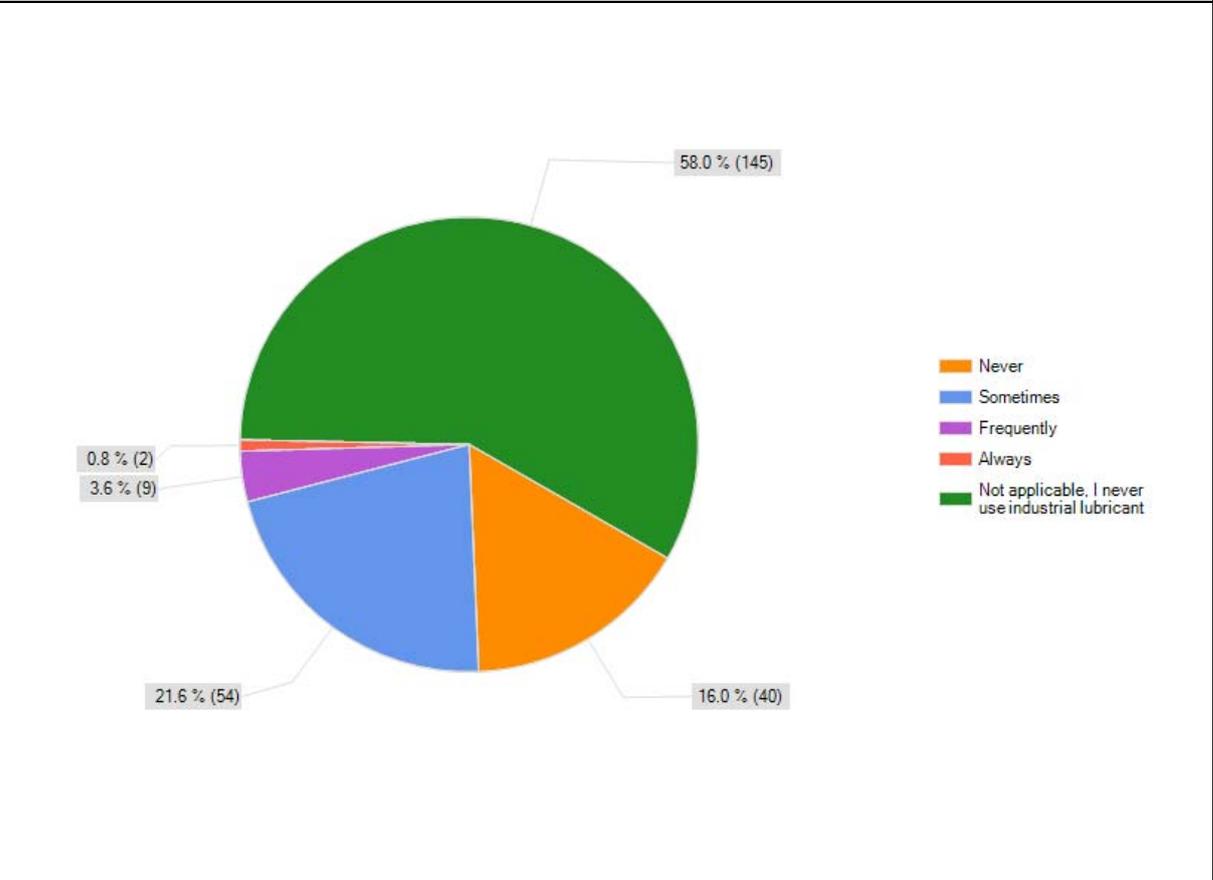
If you use an industrial lubricant in the maintenance or use of any non-vehicle engines or any other equipment, please say what these are from the list below and please indicate the circumstances of use



Response Options	Use at Home	Use at Work	Response Count
Portable electricity generator	7	4	11
Other engine type, e.g. outboard motor	4	4	7
Lawn mower	42	0	42
Other gardening equipment (eg hedge trimmer, chain saw, etc)	23	2	25
Bicycle or scooter	39	0	39
General household object or appliance e.g sewing machine	32	7	34
I never use industrial lubricant	164	100	166
Other (please specify)			3

**Question 35**

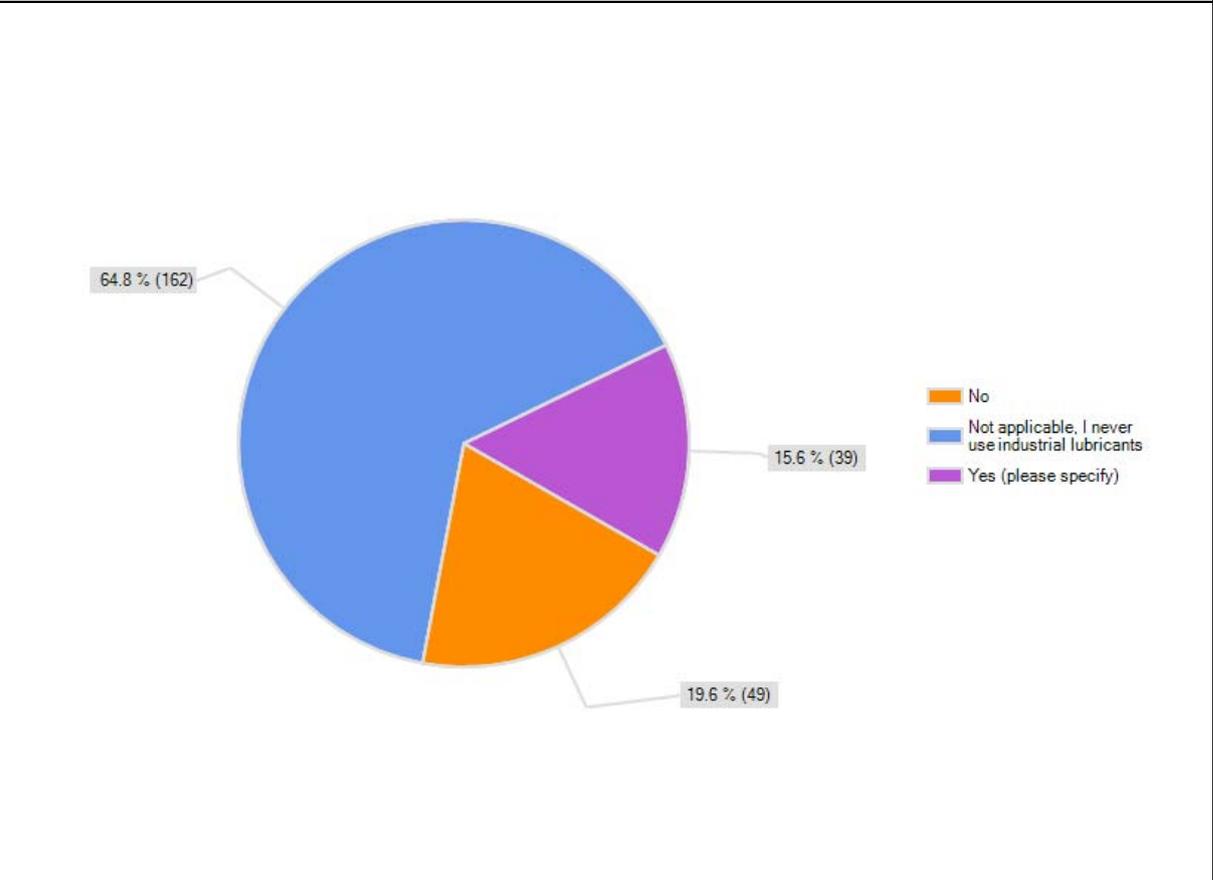
Please say how frequently your skin is exposed to the lubricant used in the maintenance of this item



Response Options	Response Percent	Response Count
Never	16.0%	40
Sometimes	21.6%	54
Frequently	3.6%	9
Always	0.8%	2
Not applicable, I never use industrial lubricant	58.0%	145
Comments		0

**Question 36**

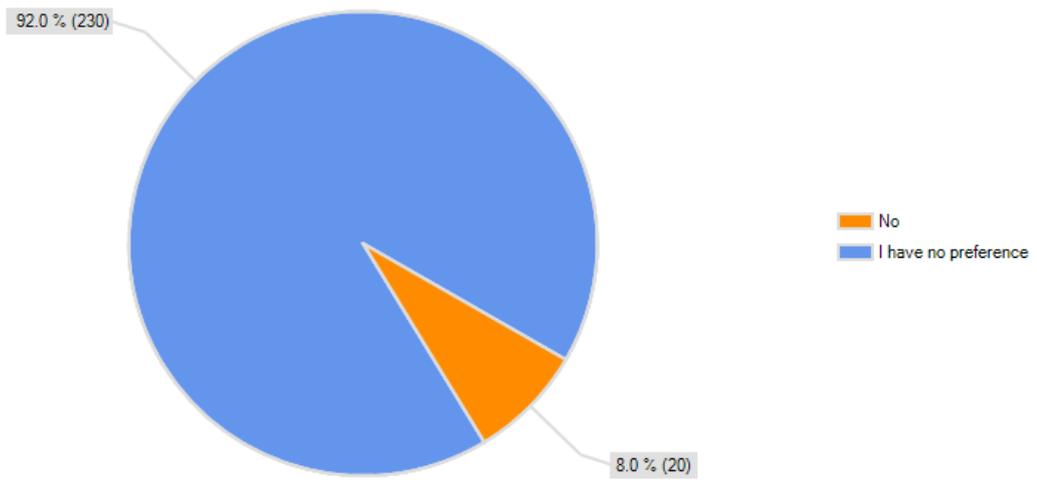
Do you try to limit your skin exposure to lubricants?



Response Options	Response Percent	Response Count
No	19.6%	49
Not applicable, I never use industrial lubricants	64.8%	162
Yes (please specify)	15.6%	39

**Question 37**

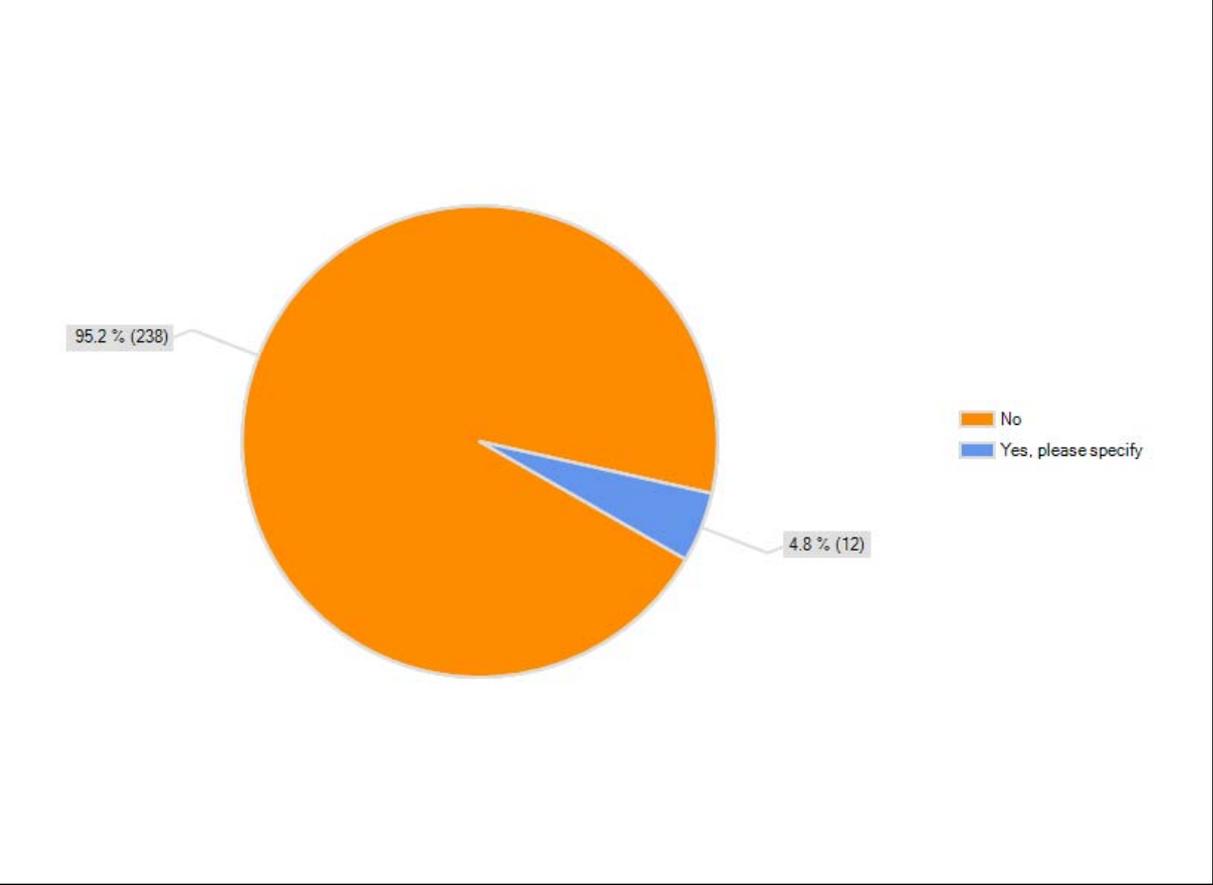
Would you like to see additional precautions provided with lubricant products to limit your skin exposure to them?



Response Options	Response Percent	Response Count
No	8.0%	20
I have no preference	92.0%	230
Yes (please specify)		14

**Question 38**

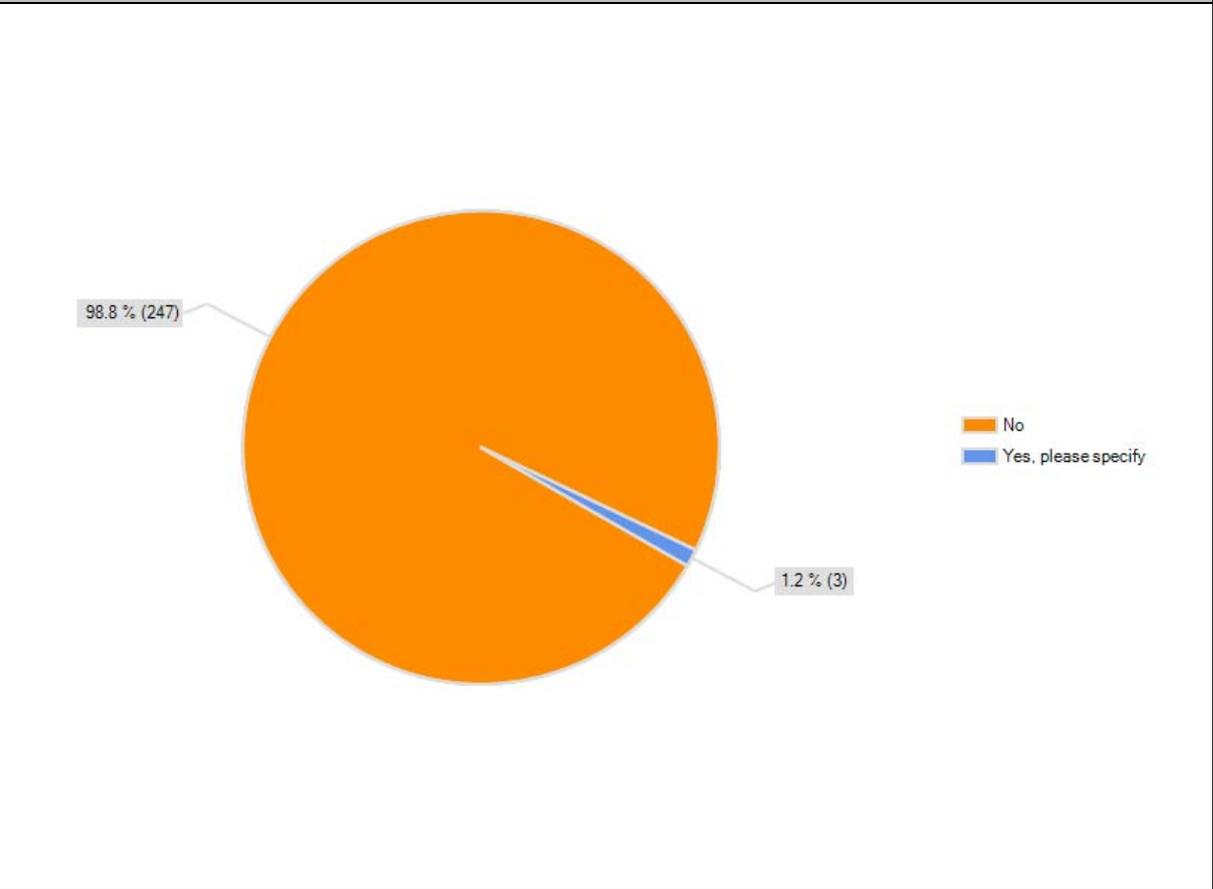
Do you ever come into contact with oil / lubricants as part of your work/ occupation that is not covered in any of the above questions?



Response Options	Response Percent	Response Count
No	95.2%	238
Yes, please specify	4.8%	12

**Question 39**

Do you ever come into contact with liquid fuels as part of your work / occupation that is not covered in any of the above questions?



Response Options	Response Percent	Response Count
No	98.8%	247
Yes, please specify	1.2%	3

### 13 STATISTICAL ANALYSIS

The statistical analysis present summary statistics for several quantitative variables found within the study survey. The responses to quantitative questions within the survey were allocated to bins. Sample means and percentiles have been calculated from these frequency distributions- where each bin is treated as having a mean equal to its mid-point and the percentiles come naturally from ordered data.

Open-ended response bins required special treatment and these are outlined in the attached statistical report, included in Appendix C.

### 14 ADVERSE REACTIONS / ADVERSE EVENTS

There were no adverse events or adverse reactions throughout the study.

### 15 DISCUSSION AND CONCLUSION

The results of the study are detailed in the Data Analysis Reports, included in Appendix B. Data was reviewed by the sponsor prior to the statistical analysis being performed. As this was a study to assess consumer habits and practices, the results are included in the Statistical Analysis report, included in Appendix C.

### 16 QUALITY ASSURANCE

This Final report was reviewed by our Quality Assurance personnel and audited prior to the final report being issued.

### 17 GOOD CLINICAL PRACTICE

No formal claim of GCP compliance has been made for this study, however the practices and procedures adopted during the conduct of this study have been consistent with the Principles of Good Clinical Practice (CPMP/ICH/135/95).

### 18 ETHICS COMMITTEE AND REGULATORY APPROVAL

As this was a home-use study, Ethics Committee and Regulatory approval for the study was not required. As the study involved human subjects, it was conducted in consideration of the requirements of the 1996 Declaration of Helsinki.

### 19 ARCHIVING

The Record Retention Period for this study is 5 years.

Alba Science Ltd. will retain in its archive, for the defined record retention period (or for such shorter period as, in the opinion of Alba Science Ltd., the quality of the material affords evaluation) following the date of the Final Report, the undernoted materials relating to the project:

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- Study Protocol
- Study Protocol Amendments
- Correspondence.
- Test material receipts.
- All original data generated.
- Copy of the Final and final reports.

Once the Record Retention Period has lapsed, Alba Science Ltd. will contact the Sponsor for instructions on the transfer, retention or disposal of materials. Fees for the transfer or continued retention of the materials will be invoiced to the Sponsor. Disposal will be undertaken free of charge.

## 20 REFERENCES

None.

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1.2	29 Aug 2011	Marie Reynolds	47 of 49

## A STUDY PROTOCOL

A copy of Study Protocol for this study is included for reference below:



210919 Study  
Protocol v1.1.pdf

## B DATA ANALYSIS REPORT

A copy of the Data Analysis Report for this study is included for reference below



210919 Data  
Analysis Report (Sum

## C STATISTICAL REPORT

A copy of the Statistical Analysis Report for this study is included for reference below



210919 Quantitative  
Variables Summary v2

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210919

What is your email address ?	
Answer Options	Response Count
<i>answered question</i>	
<i>skipped question</i>	

210919

Please tell us your first name	
Answer Options	Response Count
<i>answered question</i>	
<i>skipped question</i>	

210919

Please tell us your surname	
Answer Options	Response Count
<i>answered question</i>	
<i>skipped question</i>	

210919

Please tell us your age.

Answer Options	Response Percent	Response Count
18-30	17.6%	44
31-55	71.6%	179
Over 55	10.8%	27
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

Please indicate your sex below.

Answer Options	Response Percent	Response Count
Male	34.8%	87
Female	65.2%	163
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

Please tick the box below which best describes the environment in which you live.

Answer Options	Response Percent	Response Count
Rural/ Country	25.6%	64
Urban/ City	74.4%	186
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

Please tell us which UK region you live in.

Answer Options	Response Percent	Response Count
North East	1.2%	3
North West	3.6%	9
Yorkshire and Humber	3.6%	9
East	2.4%	6
East Midlands	1.6%	4
West Midlands	2.4%	6
Greater London	3.6%	9
South East	5.6%	14
South West	2.0%	5
Scotland	72.4%	181
Wales	1.2%	3
Northern Ireland	0.4%	1
	<i>answered question</i>	250
	<i>skipped question</i>	0

210919

Please indicate which of the following best describes your employment status.

Answer Options	Response Percent	Response Count
Unemployed	16.8%	42
Employed	80.4%	201
Retired	2.8%	7
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

Do you own or regularly drive a car or another type of vehicle?		
Answer Options	Response Percent	Response Count
Yes	100.0%	250
No	0.0%	0
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

210919

Typically, how many times per week will you use your car or vehicle?

Answer Options	Response Percent	Response Count
Rarely	0.8%	2
Occasional use	27.6%	69
Daily / To commute to work	71.6%	179
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

210919

Please indicate the type(s) of vehicle you drive or operate and the circumstances of their use. (You can tick more than one box per vehicle type if this applies).

Answer Options	Private use	Use at work	Response Count
Car or SUV etc	242	61	246
Van	10	15	22
Motorbike	6	1	7
HGV	0	2	2
Tractor / vehicle used for farming purposes	2	2	4
Building / works vehicle such as a digger	1	3	4
Small scale industrial machine e.g. cement mixer	2	5	7
Garden equipment / machinery	14	2	15
Factory or construction equipment / machinery	0	3	3
Agricultural machinery	2	1	3
Bus or coach	2	3	5
Others (please specify)			6
<i>answered question</i>			<b>250</b>
<i>skipped question</i>			<b>0</b>

Number	Response Date	Others (please specify)	Categories
1	Mar 24, 2011 12:02 PM	Hire a car twice monthly to see family and friends.	
2	Mar 24, 2011 9:03 PM	Drive a taxi for my employment.	
3	Mar 28, 2011 11:24 AM	Land Rover	
4	Mar 28, 2011 11:58 AM	Land Rover	
5	Mar 28, 2011 4:02 PM	SSV	
6	Mar 28, 2011 4:28 PM	Street Lighting van with cherrypicker	

210919

Please tell us how the vehicle(s) is / are powered.		
Answer Options	Response Percent	Response Count
Petrol	80.0%	200
Diesel	29.6%	74
Liquid Petroleum Gas	1.6%	4
Biofuel	0.4%	1
Electric	2.8%	7
If you have selected more than one fuel type (and are therefore operating		19
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

Number	Response Date	Categories
		<b>If you have selected more than one fuel type (and are therefore operating more than one of the above vehicles), please state which vehicle is powered by which fuel in the box below e.g. 'Car-petrol. Lorry-diesel'</b>
1	Mar 24, 2011 11:04 AM	CAR - PETROLCAR - DIESEL
2	Mar 24, 2011 11:07 AM	car dieselcar petrol/lpg
3	Mar 24, 2011 11:09 AM	car-petrolvan deisel
4	Mar 24, 2011 11:11 AM	Car petrol Van diesel
5	Mar 24, 2011 11:12 AM	Car - petrolMortorbike - petrolCement mixer - dieselGarden equipmeny - electric
6	Mar 24, 2011 11:44 AM	Car - petrolCleaning Scrubbing machine - electric
7	Mar 24, 2011 11:56 AM	car-diesel
8	Mar 24, 2011 1:08 PM	Car-petrol, Lorry-diesel, Bus-diesel
9	Mar 24, 2011 1:59 PM	Car - Petrol Car- Diesel
10	Mar 24, 2011 3:56 PM	Car
11	Mar 24, 2011 6:21 PM	van-gas
12	Mar 24, 2011 7:16 PM	SUV - DieselCar - Petrol
13	Mar 24, 2011 7:56 PM	Car- dieselLawn Mower - petrol
14	Mar 25, 2011 9:09 AM	3 cars - petrol. 1 car - diesel. Industrial equipment - electric. Lawnmower - petr
15	Mar 25, 2011 6:54 PM	own two cars - one petrol, one diesel
16	Mar 28, 2011 11:18 AM	Car - petrolLawn mower - petrolHedge trimmer - electirc
17	Mar 28, 2011 4:02 PM	Car PetrolSSV DEisel
18	Mar 28, 2011 4:28 PM	Car-petrolvan-diesel
19	Mar 28, 2011 5:57 PM	car petrolexcavator and van diesel

210919

Typically, how many times do you visit the filling station in one month?		
Answer Options	Response Percent	Response Count
More than once a week	15.2%	38
Weekly	37.6%	94
Fortnightly	26.0%	65
Every three weeks	8.0%	20
Monthly	11.2%	28
Other, please specify	2.0%	5
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

Number	Response Date	Other, please specify	Categories
1	Mar 24, 2011 12:02 PM	every three months	
2	Mar 24, 2011 2:30 PM	bi-monthly	
3	Mar 24, 2011 6:59 PM	approximately 3 times per month	
4	Mar 24, 2011 9:03 PM	Daily	
5	Mar 28, 2011 11:35 AM	The electric vehicles are charged daily but I don't pay	

210919

Please can you indicate how much you typically spend on fuel each time you visit the filling station.

Answer Options	Response Percent	Response Count
Up to £20	20.8%	52
£21 to £40	36.0%	90
£41 to £60	28.4%	71
£61 to £80	11.2%	28
£81 to £100	2.8%	7
Over £100	0.8%	2
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

On average, can you estimate how much time you spend actually at the pump refilling your vehicle when you are at the filling station?

Answer Options	Response Percent	Response Count
Upto 2 minutes	8.8%	22
More than 2 minutes, less than 4 minutes	48.8%	122
More than 4 minutes, less than 6 minutes	29.2%	73
More than 6 minutes, less than 8 minutes	8.4%	21
More then 8 minutes, less than 10 minutes	3.6%	9
More than 10 minutes	1.2%	3
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

Are you aware that disposable gloves are provided at the pumps?

Answer Options	Response Percent	Response Count
Yes	84.0%	210
No	16.0%	40
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

How often would you say they are available at the pumps?

Answer Options	Response Percent	Response Count
Never	14.4%	36
Sometimes	55.6%	139
Frequently	24.0%	60
Always	6.0%	15
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

If and when the disposable gloves are available, how often do you use them?

Answer Options	Response Percent	Response Count
Never	66.0%	165
Sometimes	20.0%	50
Frequently	6.0%	15
Always	8.0%	20
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

210919

When filling your vehicle, are you ever aware of any occasion(s) where your skin has come into contact with liquid fuel?

Answer Options	Response Percent	Response Count
Never	30.0%	75
Sometimes	60.0%	150
Frequently	8.0%	20
Always	2.0%	5
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

If you have come into contact with the liquid fuel while filling up, how has this happened?		
Answer Options	Response Percent	Response Count
Petrol remaining in the nozzle from last refuel has spilled out	31.2%	78
There has been a problem with the lever on the pump	4.8%	12
Fuel remaining in the nozzle from own fill up has	22.0%	55
Residual fuel has been left on the pump handle	28.0%	70
Petrol has spilled onto the cap or car and came into contact with skin when closing after refilling	29.2%	73
Not applicable, my skin does not come into contact with the fuel	28.0%	70
Other (please specify)		2
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

Number	Response Date	Other (please specify)	Categories
1	Mar 24, 2011 12:19 PM	Pump malfunctioned and spilled onto clothing and hands.	
2	Mar 28, 2011 9:11 PM	Splash-back	

210919

When filling up, is there ever an attendant to assist with this?		
Answer Options	Response Percent	Response Count
Yes	6.0%	15
No	94.0%	235
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

210919

Are there any additional measures that you would like to see taken at refilling stations to help to prevent your skin from coming into contact with the liquid fuels?

Answer Options	Response Percent	Response Count
Consistent availability of disposable gloves	38.8%	97
More readily available facilities for hand washing after	37.6%	94
Wipes available for hands at refilling station	69.6%	174
Paper towels always available at the pumps	39.2%	98
Attendants at the pumps to refill vehicles	12.4%	31
None, I have no preference	14.4%	36
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

Do you ever fill up a fuel container to refill machinery at home?

Answer Options	Response Percent	Response Count
Yes, with diesel	2.8%	7
Yes, with petrol	20.0%	50
No	77.2%	193
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

If so, when do you tend to do this?		
Answer Options	Response Percent	Response Count
Winter	5.6%	14
Spring	12.4%	31
Summer	18.8%	47
Autumn	5.2%	13
Not applicable	77.6%	194
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

210919

Please indicate how often you operate a vehicle or other equipment that requires any type of lubricant or oil. (This could be motor vehicle lubricant such as Castrol or

Answer Options	Response Percent	Response Count
Never	28.4%	71
Sometimes	36.0%	90
Frequently	18.4%	46
Always	17.2%	43
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

210919

Please indicate which vehicle(s) you drive or operate which you also check or top up the oil levels for.  
Please tick in the column which indicates the circumstances of their use.

Answer Options	Private use	Use at work	Response Count
Car or SUV etc	219	43	221
Van	7	11	15
Motorbike	7	1	8
HGV	0	2	2
Tractor / vehicle used for farming purposes	3	2	5
Garden equipment / machinery	37	2	38
Factory or construction equipment / machinery	1	5	6
Agricultural machinery	1	1	2
Bus or coach	0	3	3
Electrical generator	4	1	5
I do not check or top up the oil levels for any type of	13	6	16
Other (please specify)			8
<i>answered question</i>			<b>250</b>
<i>skipped question</i>			<b>0</b>

Number	Response Date	Other (please specify)	Categories
1	Mar 24, 2011 12:18 PM	petrol lawnmower	
2	Mar 24, 2011 12:27 PM	lawnmower	
3	Mar 24, 2011 9:04 PM	Plus taxi	
4	Mar 28, 2011 11:11 AM	Bycycles	
5	Mar 28, 2011 11:28 AM	Land Rover	
6	Mar 28, 2011 11:59 AM	Land Rover	
7	Mar 28, 2011 4:04 PM	vacuum/suction pumps at work	
8	Mar 28, 2011 5:40 PM	use air tools and oil them weekly/fortnightly	

210919

Please indicate approximately how frequently you top up oil in any vehicle you drive or operate.

Answer Options	Response Percent	Response Count
Annually	29.6%	74
Quarterly	44.0%	110
Monthly	10.0%	25
More than once monthly	3.6%	9
Never	12.8%	32
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

Depending on the regularity of your oil checks, is there a certain amount you tend to top up by?

Answer Options	Response Percent	Response Count
Under 0.5 litre	27.2%	68
Over 0.5 litre, under 1 litre	35.6%	89
Over 1 litre, under 1.5 litres	13.2%	33
Over 1.5 litres	4.8%	12
Not applicable, I do not top up the oil.	19.2%	48
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

When topping up the oil in a vehicle, are you aware of any occasion where skin has come into contact with the oil.

Answer Options	Response Percent	Response Count
Never	26.0%	65
Sometimes	48.8%	122
Frequently	4.4%	11
Always	2.0%	5
Not applicable	18.8%	47
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

If you have found that your skin has come into contact with the oil when topping up, please say how this happened.

Answer Options	Response Percent	Response Count
Residual oil from the last fill up was on the cap or engine	16.0%	40
Oil from the dip stick when checking the levels came into contact with my skin	30.4%	76
Oil came into contact with my skin when I was pouring it into the engine	19.6%	49
I use a rag, cloth or gloves when doing this so my skin is not directly exposed	11.2%	28
Not applicable	42.4%	106
Other (please specify)		3
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

Number	Response Date	Other (please specify)	Categories
1	Mar 24, 2011 11:10 AM	i all ways wipe oil from the dipstick on my fingers so i can feel how gritty the oil is between my fingers.	
2	Mar 24, 2011 11:50 AM	The oil would be changed when the car is serviced.	
3	Mar 24, 2011 2:30 PM	Only get oil top up when car being services so I personally don't have contact with oil.	

210919

Do you ever change the oil in a vehicle that you drive or operate?

Answer Options	Response Percent	Response Count
Never	69.2%	173
Sometimes	22.8%	57
Frequently	2.8%	7
Always	5.2%	13
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

210919

If you are changing the oil in your vehicle, has your skin come into contact with it?

Answer Options	Response Percent	Response Count
Yes	21.2%	53
No	14.4%	36
Not applicable as I do not change the oil	66.8%	167
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

210919

When changing the oil in the vehicle, please choose the most appropriate description for your exposure below

Answer Options	Response Percent	Response Count
My skin came into contact when draining the old lubricant	7.6%	19
My skin was exposed when working on the engine in	7.2%	18
The new oil splashed onto my skin	6.8%	17
I was wearing gloves so my skin was not exposed	7.6%	19
Not applicable, I do not change the oil	70.8%	177
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

If you use an industrial lubricant in the maintenance or use of any non-vehicle engines or any other equipment, please say what these are from the list below and please indicate the circumstances of use

Answer Options	Use at home	Use at work	Response Count
Portable electricity generator	7	4	11
Other engine type, e.g. outboard motor	4	4	7
Lawn mower	42	0	42
Other gardening equipment (eg hedge trimmer, chain	23	2	25
Bicycle or scooter	39	0	39
General household object or appliance e.g sewing	32	7	34
I never use industrial lubricant	164	100	166
Other item (please specify)			3
<i>answered question</i>			250
<i>skipped question</i>			0

Number	Response Date	Other item (please specify)	Categories
1	Mar 24, 2011 11:06 AM	hedge trimmer and strimmer	
2	Mar 24, 2011 11:27 AM	production machinery, line belts rollers ect.	
3	Mar 28, 2011 11:34 AM	chainsaw	

210919

Please say how frequently your skin is exposed to the lubricant used in the maintenance of this item

Answer Options	Response Percent	Response Count
Never	16.0%	40
Sometimes	21.6%	54
Frequently	3.6%	9
Always	0.8%	2
Not applicable, I never use industrial lubricant	58.0%	145
Comments		0
	<i>answered question</i>	<b>250</b>
	<i>skipped question</i>	<b>0</b>

210919

Do you try to limit your skin exposure to lubricants?		
Answer Options	Response Percent	Response Count
No	19.6%	49
Not applicable, I never use industrial lubricants	64.8%	162
Yes (please specify)	15.6%	39
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

Number	Response Date	Yes (please specify)	Categories
1	Mar 24, 2011 11:06 AM	gloves	
2	Mar 24, 2011 11:06 AM	If I top up any of the garden machinery, I always wear gloves.	
3	Mar 24, 2011 11:06 AM	What am I supposed to say here??	
4	Mar 24, 2011 11:14 AM	By wearing gloves	
5	Mar 24, 2011 11:15 AM	I try to wear gloves	
6	Mar 24, 2011 11:18 AM	Use gloves	
7	Mar 24, 2011 11:27 AM	At home i wear thin latex gloves when i can find them in the shed.when in a hurry i try to hold can with just two fingers or with a cloth.In w	
8	Mar 24, 2011 11:33 AM	try not to let it touch my skin. but its hard especially if you are putting oil on a bicycle chain etc.	
9	Mar 24, 2011 11:38 AM	Only need to use them occasionally, not regularly so not too bothered about creating a barrier each time. If I used more I would use glove	
10	Mar 24, 2011 11:42 AM	have paper tissues around, if its toxic would wear gloves and glasses for eyes.	
11	Mar 24, 2011 11:43 AM	use gloves when I have them	
12	Mar 24, 2011 11:51 AM	Just try to be careful	
13	Mar 24, 2011 12:04 PM	I try to limit my exposure as it can be troublesome to remove from my hands.	
14	Mar 24, 2011 12:20 PM	by being careful and steady, wearing gloves.	
15	Mar 24, 2011 12:42 PM	wash hands with soap after touching it	
16	Mar 24, 2011 1:16 PM	wear gloves when suitable	
17	Mar 24, 2011 2:56 PM	try not to get any on my hands because i dont like the smell on my hands	
18	Mar 24, 2011 3:03 PM	Hands are sensitive. Use gloves where possible.	
19	Mar 24, 2011 4:16 PM	im always careful so not a problem	
20	Mar 24, 2011 4:37 PM	I try to remember to wear gloves	
21	Mar 24, 2011 5:12 PM	gloves	
22	Mar 24, 2011 7:20 PM	I try to be careful when maintaining the lawnmower but don't wear gloves so I end up with some oil on my hands	
23	Mar 24, 2011 9:11 PM	protecting hands with gloves where available.	
24	Mar 24, 2011 9:39 PM	it is bad for the skin, so i wear rubber gloves whilst applying lubricants.	
25	Mar 27, 2011 12:04 PM	waring gloves and rugs to whipe the excess	
26	Mar 28, 2011 11:14 AM	wash hands after exposure	
27	Mar 28, 2011 11:34 AM	wear neoprine gloves as much as possible	
28	Mar 28, 2011 11:39 AM	I use gloves as much as possible and always use paper towels to minimise excess fluid.	
29	Mar 28, 2011 11:59 AM	Remember to wear gloves	
30	Mar 28, 2011 11:59 AM	wear gloves if they are handy	
31	Mar 28, 2011 12:02 PM	try and wear neoprine gloves	

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Would you like to see additional precautions provided with lubricant products to limit your skin exposure to them?		
Answer Options	Response Percent	Response Count
No	8.0%	20
I have no preference	92.0%	230
Yes (please specify)		14
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

Number	Response Date	Yes (please specify)	Categories
1	Mar 24, 2011 11:14 AM	Yes disposable gloves should be provided or recommended	
2	Mar 24, 2011 11:18 AM	Free gloves. No spill lids	
3	Mar 24, 2011 11:33 AM	some sort of glove or item to limit the exposure	
4	Mar 24, 2011 11:38 AM	A warning on the product recommending use of a barrier, especially for frequent users. Perhaps sold as an add on or given away free with a lubricant product.	
5	Mar 24, 2011 11:48 AM	spout to pour with and handle to hold container	
6	Mar 24, 2011 1:17 PM	yes	
7	Mar 24, 2011 3:08 PM	better nozzles on cans	
8	Mar 24, 2011 7:20 PM	Gloves provided	
9	Mar 28, 2011 11:16 AM	provide gloves with product	
10	Mar 28, 2011 11:34 AM	Maybe gloves with cans of oil?!	
11	Mar 28, 2011 11:59 AM	maybe a nozzle that is simple to use on the bottle	
12	Mar 28, 2011 12:22 PM	barrier creams that work	
13	Mar 28, 2011 12:38 PM	Gloves	
14	Mar 28, 2011 9:21 PM	Pouring spout, as for petrol containers a pouring tube	

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Do you ever come into contact with oil / lubricants as part of your work/ occupation that is not covered in any of the above questions?

Answer Options	Response Percent	Response Count
No	95.2%	238
Yes, please specify	4.8%	12
<i>answered question</i>		<b>250</b>
<i>skipped question</i>		<b>0</b>

Number	Response Date	Yes, please specify	Categories
1	Mar 24, 2011 11:20 AM	I WORK AT A DRY CLEANING SHOP	
2	Mar 24, 2011 11:38 AM	Natural fixed and essential plant oils when dispensing in a herbal dispensary.	
3	Mar 24, 2011 12:04 PM	I am a Homecarer and use hoists/lifts as part of my job. Occasionally these may develop a fault/leak so I have once or twice got lubricant or	
4	Mar 24, 2011 12:05 PM	When using by bicycle.	
5	Mar 24, 2011 2:32 PM	Sometimes get lubricant on me from fixing the photocopier	
6	Mar 25, 2011 9:14 AM	I use a silicon lubricant for work which I spray about liberally and it inevitably goes on my skin/ in my eyes!	
7	Mar 28, 2011 11:34 AM	I have changed oils in generators, tractors, other peoples cars, concrete mixers etc.	
8	Mar 28, 2011 12:02 PM	Filling mowers, chainsaw, concrete mixer, agricultural machinery	
9	Mar 28, 2011 4:08 PM	Oils-used in science school practicals-have to dispense them into smaller containers.	
10	Mar 28, 2011 5:44 PM	i oil my airtools at work	
11	Mar 28, 2011 6:03 PM	grease cartridges	
12	Mar 30, 2011 1:10 PM	i work as a cycle mechanic so i come into contact with oils and lubricants associated with bicycles	

210919

Do you ever come into contact with liquid fuels as part of your work / occupation that is not covered in any of the above questions?

Answer Options	Response Percent	Response Count
No	98.8%	247
Yes, please specify	1.2%	3
<i>answered question</i>		250
<i>skipped question</i>		0

Number	Response Date	Yes, please specify	Categories
1	Mar 28, 2011 11:34 AM	filling lawn mowers, chainsaw etc.	
2	Mar 28, 2011 12:02 PM	Filling mowers, chainsaw, concrete mixer, agricultural machinery	
3	Mar 28, 2011 4:08 PM	Lighter fuel other fuels as part of school science practicals.	



**Study 210919**  
**Summary of quantitative questionnaire variables**

**Prepared for Alba Science Ltd.**

DMP Statistical Solutions UK Ltd.

21 July 2011



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## INTRODUCTION

This document presents summary statistics for several quantitative variables found within the Alba study 210919 survey questionnaire<sup>1</sup>. Study details can be found within the associated protocol *Study 210919 : Study Protocol CONCAWE*. These results are expected to be supplementary to other analysis provided by Alba Science Ltd.

We present here the requested summary statistics (means, 10<sup>th</sup> and 90<sup>th</sup> percentiles) for several questionnaire responses and assumptions required to generate these<sup>2</sup>.

The following five questions were deemed amenable to quantitative summaries:

- A. Section 3, Fuels Survey
  - i. Question 5: "Typically, how many times do you visit the filling station in one month?"
  - ii. Question 6: "Please can you indicate how much you typically spend on fuel each time you visit the filling station."
  - iii. Question 7: "On average, can you estimate how much time you spend actually at the pump refilling your vehicle when you are at the filling station?"
- B. Section 4, Lubricants/Oil Survey
  - i. Question 3: "Please indicate approximately how frequently you top up oil in any vehicle you drive or operate."
  - ii. Question 4: "Depending on the regularity of your oil checks, is there a certain amount you tend to top up by?"

These are addressed in turn in the following section.

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<sup>1</sup> 210919 Survey Draft v. 1.3.pdf is referred to here

<sup>2</sup> Note, only data summaries are provided – no inferential statistics have been requested.

## VARIABLE SUMMARIES

The responses to quantitative questions within the survey were allocated to bins. Sample means and percentiles are straightforward to calculate from these frequency distributions – where each bin is treated as having a mean equal to its mid-point and the percentiles come naturally from the ordered data.

Open-ended response bins however require special treatment - these are outlined within each question below.

### FUELS SURVEY §3, QUESTION 5

The question asks:

*"Typically, how many times do you visit the filling station in one month?"*

The average number of visits per month was approximately 3.2, 10% of customers visited 1 time or less per month and 90% of customers visited 5 times or less per month. Specifically the sample mean for the number of visits per month = 3.15, the 10<sup>th</sup> percentile = 1 visit per month and the 90<sup>th</sup> percentile = 5 visits per month.

Note: the questionnaire contains an open-ended group "More than once a week". To calculate the mean above, it was assumed that people who answered "More than once a week" visited an average of 5 times per month as a group.

### FUELS SURVEY §3, QUESTION 6

The question asks:

*"Please can you indicate how much you typically spend on fuel each time you visit the filling station."*

The average amount spent per visit was approximately £38.3, 10% of customers spent £10 or less and 90% of customers spent £70 or less. Specifically the sample mean spend-per-visit = £38.32, the 10<sup>th</sup> percentile = £10 and the 90<sup>th</sup> percentile = £70.

Note: the questionnaire contains an open-ended group "Over £100". To calculate the mean above, it was assumed that people who answered "Over £100" had an average of £110 as a group.

### FUELS SURVEY §3, QUESTION 7

The question asks:

*"On average, can you estimate how much time you spend actually at the pump refilling your vehicle when you are at the filling station?"*

The average amount of time spent filling per visit was approximately 4 minutes, 10% of customers spent 3 minutes or less and 90% of customers spent 7 minutes or less. Specifically the sample mean number of minutes spent filling = 4.056, the 10<sup>th</sup> percentile = 3 minutes and the 90<sup>th</sup> percentile = 7 minutes.

Note: the questionnaire contains an open-ended group "More than 10 minutes". To calculate the mean above,



it was assumed that people who answered "More than 10 minutes" had an average of 11 minutes as a group.

### LUBRICANTS/OILS SURVEY §4 QUESTION 3

The question asks:

*"Please indicate approximately how frequently you top up oil in any vehicle you drive or operate."*

Given the customer ever top up, the average frequency of topping-up was approximately once every 5.7 months, 10% of customers topped up at least every month and 90% of customers topped up at least once every 12 months. Specifically the sample mean number of months to top up = 5.72, the 10<sup>th</sup> percentile = 1 month and the 90<sup>th</sup> percentile = 12 months.

Note: to calculate the above, people who answered "More than monthly" were assumed to have an average of 0.5 months as a group. Additionally there was a category for customers who never topped-up. These customers were excluded and therefore the results are conditional on whether the customer ever tops up.

### LUBRICANTS/OILS SURVEY §4 QUESTION 4

The question asks:

*"Depending on the regularity of your oil checks, is there a certain amount you tend to top up by?"*

The average volume of oil that customers reported using in top ups was approximately 0.72 litres, 10% used 0.25 litres and 90% of customers used 1.25 litres or less when topping up. Specifically the sample mean was a top-up = 0.723 litres, the 10<sup>th</sup> percentile = 0.25 litres and the 90<sup>th</sup> percentile = 1.25 litres.

Note: to calculate the above mean, it was assumed that people who answered "Over 1.5 litres" had an average of 1.75 litres as a group.

### EFFECT OF ASSUMPTIONS

In calculating the means, two principal assumptions are used to account for the information lost from binning the responses:

- a) the binned values have a mean equal to their mid-points and
- b) the open-ended groups have the assumed means stated.

The results are likely to be robust to a) and it is likely that the values within the bins are roughly uniformly distributed. Means are not robust to extreme values however, so if the values in the open-ended groups are much larger than that assumed in each case, the reported mean may be markedly small. However considering the questions, it is unlikely that the actual values encapsulated by the open-ended bins are very different to the other observations.

The 90<sup>th</sup> percentiles reported here are rank statistics and will be entirely invariant to the assumptions noted, unless the point falls within the open-ended group. Therefore only 90<sup>th</sup> percentile reported in the fuel question 5 in §4 can potentially be incorrect – depending on whether “more than once a week” can be satisfactorily re-labelled as “5 times per month”.

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